International Journal for Research in Engineering Application & Management (IJREAM)
ISSN : 2454-9150 Vol-04, Issue-09, Dec 2018

Linkage between NAVs of Mutual Fund and Benchmark Index and Outperformance of Mutual Funds: An Empirical Study of Index Schemes of Mutual Funds in India

CA Dr Das Shyamsundar Premanand, Professor, Kala Institute of Management Studies, Kandivali West, Mumbai, India, sspdas@icai.org

Abstract: Investors has option to invest directly in individual securities or they may invest indirectly through mutual funds. It may be argued that an individual may not have necessary expertise in investing in right stock and outperform the markets. On the other-hand it is believed that Mutual Fund houses hire investment managers who have necessary expertise in managing fund in a way that it outperforms the market. This study evaluates the performance of index based mutual funds vis a vis market performance. The study adopts risk adjusted performance measurement tools to evaluate performance of select Index Schemes of Mutual Funds against market benchmark S&P Nifty. The study concludes that the mutual funds outperform and hence are better to invest through them rather than directly investing in individual securities.

Keywords: Net Asset Value (NAV), Beta, Sharpe Index, Treynor Index, Jensen Alpha, Eugene Fama.

I. INTRODUCTION

Small investor has to encounter several hurdles while making investments in different investment avenues. The dynamic and complex nature of capital markets further magnifies the problem. Limited resources, Lack of professional advice and lack of information, etc are the major hurdles of investment decisions of small and retail investors. Mutual fund is an ideal answer to address the hurdles faced by the small investors.

Investor has option either to invest directly in individual securities, or they may invest indirectly through a financial intermediary (some may exercise both the options). A mutual fund is a type of financial intermediary that pools the funds of investor. Mutual fund attempts to accomplish the same general investment objective as individual investors seek.

This study evaluates the performance of selected index mutual fund schemes in India and compare them with performance of broad based market index S&P Nifty.

II. LITERATURE REVIEW

A number of studies have been conducted ever-since the emergence of mutual fund industry. The pioneering study was done by Irwin, Brown and others at Wharton School of Finance and Commerce in 1962 on US mutual funds for the period 1953-1958, later published in 1965. The study examined policy aspects, portfolio revision rate, performance and impact of MF activity on the stock market.

The Markowitz portfolio theory and the capital asset pricing model (CAPM)[7] developed by William Sharpe (1984) and John Dintner (1969) revolutionized the evaluation of portfolio performance. Other remarkable contributions are those made by Treynor (1965), Sharpe (1966) and Jenson (1968) all on similar lines. Kon and Jen (1979)[13], Viet and Cheney (1982) Henrickson (1984) and Chang and Lewellen (1984) evaluated Mutual Fund's performance in relation to market timing selectivity. The convergent conclusion pointed out that fund managers did not possess these abilities and if any little existed.

Walker, Robert Ferguson, Jack (1976)[11] made a study titled "investors guide to index fund controversy". Their findings revealed that, costs of contracting index funds, are lower than actively managed funds, transaction cost and overall administrative expenses are lower. Study also indicated that the construction of an ideal portfolio is actually impossible, thus an index fund (for e.g. S&P 500 Index Fund) will be a good surrogate for this ideal fund.

III. OBJECTIVE

The broad objectives of the study are,

1) To evaluate the linkage between the NAVs of selected index schemes of mutual funds and S&P Nifty
2) To evaluate and compare the performance of Nifty Index fund of mutual fund houses in India
3) To compare the performance of the Nifty index fund schemes with S&P Nifty and rank them.

IV. RESEARCH METHODOLOGY

A. Method of Study:

The research is empirical in nature. Empirical information and data of mutual fund houses in India is being collected and evaluated to test the hypothesis

B. Hypothesis of Study:

 DOI : 10.18231/2454-9150.2018.1219

Null and alternate hypotheses formulated for the study are as under

H_{01}: *"There is no significant link between the NAVs of Index Schemes of Select Mutual Funds and Index S&P Nifty".*

H_{11}: *"There is significant link between the NAVs of Index Schemes of Select Mutual Funds and Index S&P Nifty".*

H_{02}: *"Index schemes of Mutual Funds has not significantly performed better than NSE Index - S&PNIFTY".*

H_{12}: *"Index schemes of Mutual Funds has significantly performed better than NSE Index - S&P NIFTY".*

C. Period of Study:

To test the hypothesis study covered the performance data of the sample universe for the period 1st April 2017 to 31st March 2018.

D. Sampling Universe:

The sampling universe consisted of schemes of 40 Mutual Fund Houses in India registered with SEBI.

E. Sampling Technique:

Judgement sampling technique is being adopted for the conduct of the study.

F. Sample Size:

The index schemes investing in NSE Nifty stocks of four Mutual Fund houses in India out of the 40 Mutual Funds registered with SEBI, which is around 10% of the sample universe is the sample size. They are as under.

(a) ICICI Prudential Nifty Index Fund – Growth
(b) Sundaram Smart Nifty Index Fund – Growth
(c) Tata Nifty Index Fund – Growth
(d) UTI Nifty Index Fund - Growth

G. Data:

Secondary data has been used for the study. NAV as published by the fund manager of the respective mutual fund houses and the Nifty index data as published by National Stock Exchange has been used for the study.

H. Method of Analysis:

Correlation and Regression[1] analysis has been adopted to study the linkage between the NAVs of selected index schemes of mutual funds and Index S&P Nifty.

The following four risk adjusted measures of performance analysis is being used to evaluate the performance of the index schemes of mutual funds and S&P Nifty.

(a) William Sharpe's Ratio
(b) Jack Treynor's Index
(c) Michael Jenson's Model
(d) Eugen Fama's Model

The Sharpe measure uses the standard deviation of returns as the measure of risk. It measures return relative to total risk. In a well developed portfolio, total risk is predominantly from systematic risk factor. This ratio measures *Reward to Variability.*

$$\mathbf{S = (R_P - R_f) \div \sigma_P}$$

The Treynor measure adjusts excess return for systematic risk. Treynor's measure can be an appropriate risk measure for single securities as well as portfolio. It is computed by dividing a portfolio's excess return, by its beta as shown in the equation below.

$$\mathbf{T = (R_P - R_f) \div \beta_P}$$

Jensen's measure of portfolio performance is based on capital assets pricing model (CAPM). The CAPM expresses the relationship between the risk of a security or fund measured by its beta and expected rate of return. The basic formula is as under,

Jensen Measure i.e. $\mathbf{\alpha = R_f + \beta_P (R_m - R_f)}$

Where, R_f = risk-free rate of return, R_m = expected return on a market index and β_p = beta of a portfolio.

Eugene Fama Index is similar to Jensen Alpha, except that standard deviation is used instead of beta. Since standard deviation is a measure of total risk, the ratio can be used even for non-diversified portfolios. A positive Eugene Fama number means the fund manager's performance is better than what is expected based on the scheme's total risk, as measured by standard deviation.

$$\mathbf{F_p = R_f + (\sigma_P/\sigma_M)(R_m - R_f)}$$

Natural Logarithmic returns has been used to calculate Mean and standard deviation of NAV of the sample mutual fund scheme and NSE Index S&P NIFTY by taking data of 12 months on 15 days basis covering period April 2017 to March 2018. The beta co-efficient of the sample index schemes of the Mutual Fund Houses and NSE Index (S&P NIFTY) is being calculated on 15 days basis. For the purpose of calculating beta, the risk-free rate and number of days in a year is assumed to be 6% and 360 days respectively

V. DATA ANALYSIS & INTERPRETATION

The NAVs of the four schemes and the S&P CNX Nifty for the period April 2017 to March 2018 is presented in Table 1 to Table 5 below.

Table 1
NAV of ICICI Prudential Nifty Index Fund

Date	NAV	Date	NAV
03-Apr-17	₹ 88.66	18-Oct-17	₹ 98.16
18-Apr-17	₹ 87.36	02-Nov-17	₹ 100.26
02-May-17	₹ 89.32	16-Nov-17	₹ 98.24
17-May-17	₹ 91.31	01-Dec-17	₹ 97.30
02-Jun-17	₹ 92.58	15-Dec-17	₹ 99.29
16-Jun-17	₹ 92.06	02-Jan-18	₹ 100.28

 DOI : 10.18231/2454-9150.2018.1219

03-Jul-17	₹ 92.40	16-Jan-18	₹ 102.71
18-Jul-17	₹ 94.58	31-Jan-18	₹ 105.82
02-Aug-17	₹ 97.06	15-Feb-18	₹ 101.26
17-Aug-17	₹ 95.37	01-Mar-18	₹ 100.44
01-Sep-17	₹ 96.04	15-Mar-18	₹ 99.46
15-Sep-17	₹ 97.10	28-Mar-18	₹ 97.22
03-Oct-17	₹ 94.84	*Source: Fund Fact Sheet*	

Table 2
NAV of Sundaram Smart Nifty Index Fund

Date	NAV	Date	NAV
03-Apr-17	₹ 10.91	18-Oct-17	₹ 12.06
18-Apr-17	₹ 10.91	02-Nov-17	₹ 12.52
02-May-17	₹ 11.18	16-Nov-17	₹ 12.16
17-May-17	₹ 11.41	01-Dec-17	₹ 12.09
02-Jun-17	₹ 11.22	15-Dec-17	₹ 12.26
16-Jun-17	₹ 11.23	02-Jan-18	₹ 12.61
03-Jul-17	₹ 11.23	16-Jan-18	₹ 12.77
18-Jul-17	₹ 11.59	31-Jan-18	₹ 12.70
02-Aug-17	₹ 11.73	15-Feb-18	₹ 12.33
17-Aug-17	₹ 11.60	01-Mar-18	₹ 12.16
01-Sep-17	₹ 11.80	15-Mar-18	₹ 11.98
15-Sep-17	₹ 11.96	28-Mar-18	₹ 11.71
03-Oct-17	₹ 11.65	*Source: Fund Fact Sheet*	

Table 3
NAV of Tata Nifty Index Fund

Date	NAV	Date	NAV
03-Apr-17	₹ 54.96	18-Oct-17	₹ 60.89
18-Apr-17	₹ 54.15	02-Nov-17	₹ 62.22
02-May-17	₹ 55.36	16-Nov-17	₹ 60.97
17-May-17	₹ 56.61	01-Dec-17	₹ 60.40
02-Jun-17	₹ 57.41	15-Dec-17	₹ 61.64
16-Jun-17	₹ 57.09	02-Jan-18	₹ 62.27
03-Jul-17	₹ 57.32	16-Jan-18	₹ 63.79
18-Jul-17	₹ 58.66	31-Jan-18	₹ 65.67
02-Aug-17	₹ 60.20	15-Feb-18	₹ 62.87
17-Aug-17	₹ 59.14	01-Mar-18	₹ 62.37
01-Sep-17	₹ 59.55	15-Mar-18	₹ 61.78
15-Sep-17	₹ 60.21	28-Mar-18	₹ 60.43
03-Oct-17	₹ 58.81	*Source: Fund Fact Sheet*	

Table 4
NAV of UTI Nifty Index Fund

Date	NAV	Date	NAV
03-Apr-17	₹ 58.87	18-Oct-17	₹ 65.56
18-Apr-17	₹ 58.02	02-Nov-17	₹ 66.97
02-May-17	₹ 59.33	16-Nov-17	₹ 65.64
17-May-17	₹ 60.69	01-Dec-17	₹ 65.04
02-Jun-17	₹ 61.56	15-Dec-17	₹ 66.39
16-Jun-17	₹ 61.25	02-Jan-18	₹ 67.09
03-Jul-17	₹ 61.25	16-Jan-18	₹ 68.74
18-Jul-17	₹ 63.87	31-Jan-18	₹ 70.84
02-Aug-17	₹ 64.62	15-Feb-18	₹ 67.81
17-Aug-17	₹ 63.52	01-Mar-18	₹ 67.27
01-Sep-17	₹ 63.89	15-Mar-18	₹ 66.67
15-Sep-17	₹ 64.77	28-Mar-18	₹ 65.21
03-Oct-17	₹ 63.33	*Source: Fund Fact Sheet*	

Table 5
S&P CNX Nifty

Date	Nifty	Date	Nifty
03-Apr-17	9237.85	18-Oct-17	10210.85
18-Apr-17	9105.15	02-Nov-17	10423.80
02-May-17	9313.80	16-Nov-17	10214.75
17-May-17	9525.75	01-Dec-17	10121.80
02-Jun-17	9653.50	15-Dec-17	10333.25
16-Jun-17	9588.05	02-Jan-18	10442.20
03-Jul-17	9615.00	16-Jan-18	10700.45
18-Jul-17	9827.15	31-Jan-18	11027.70
02-Aug-17	10081.50	15-Feb-18	10545.50
17-Aug-17	9904.15	01-Mar-18	10458.35
01-Sep-17	9974.40	15-Mar-18	10360.15
15-Sep-17	10085.40	28-Mar-18	10113.70
03-Oct-17	9859.50	*Source: NSE Website*	

The correlation and regression statistics of the selected index schemes of Mutual Fund and S&P CNX Nifty for the year 2017-2018 are presented in Table 6 to Table 10

Table 6
ICICI Prudential Nifty Index Fund
Regression Statistics

Multiple R	0.9996089
R Square	0.9992179
Adjusted R Square	0.9991839
Standard Error	0.1302742
Observations	25

Table 7
ICICI Prudential Nifty Index Fund
Analysis of Variance

	df	*SS*	*MS*	*F*	*Sig. F*
Regression	1	498.71	498.71	29385.30	0.0000
Residual	23	0.39	0.02		
Total	24	499.10			

Table 8
ICICI Prudential Nifty Index Fund
Coefficients and p Value

	Co-eff.	*Std. Error*	*t Stat*	*P-value*
Intercept	-0.40486	0.56511	-0.7164	48.09%
S&P Nifty	0.00965	0.00005	171.4214	0.00%

The R square of 0.9992179 indicates that the 99% of the fluctuation in NAV of ICICI Prudential Nifty Index Fund can be explained by changes in S&P Nifty. Further the p-Value at confidence level of 95% is less than 5% which indicates that there is significant linkage between NAV of ICICI Prudential Nifty Index Fund and S&P Nifty. Thus, the study rejects the Null Hypothesis and accepts the Alternate Hypothesis.

Table 9
Sundaram Smart Nifty Index Fund
Regression Statistics

Multiple R	0.9573168

 DOI : 10.18231/2454-9150.2018.1219

R Square	0.9164555
Adjusted R Square	0.9128232
Standard Error	0.1605642
Observations	25

Table 10
Sundaram Smart Nifty Index Fund
Analysis of Variance

	df	*SS*	*MS*	*F*	*Sig. F*
Regression	1	6.5046	6.5046	252.30	0.0000
Residual	23	0.5930	0.0258		
Total	24	7.0975			

Table 11
Sundaram Smart Nifty Index Fund
Coefficients and p Value

	Co-eff.	*Std. Error*	*t Stat*	*P-value*
Intercept	0.77832	0.69650	1.1175	27.53%
S&P Nifty	0.00110	0.00007	15.8840	0.00%

The R square of 0.9164555 indicates that the 91% of the fluctuation in NAV of Sundaram Smart Nifty Index Fund can be explained by changes in S&P Nifty. Further the p-Value at confidence level of 95% is less 5% which indicates that there is significant linkage between NAV of Sundaram Smart Nifty Index Fund and S&P Nifty. Thus, the study rejects the Null Hypothesis and accepts the Alternate Hypothesis.

Table 12
Tata Nifty Index Fund
Regression Statistics

Multiple R	0.9996214
R Square	0.999243
Adjusted R Square	0.99921
Standard Error	0.0804521
Observations	25

Table 13
Tata Nifty Index Fund
Analysis of Variance

	df	*SS*	*MS*	*F*	*Sig. F*
Regression	1	196.50	196.50	30358.63	0.0000
Residual	23	0.15	0.01		
Total	24	196.65			

Table 14
Tata Nifty Index Fund
Coefficients and p Value

	Co-eff.	*Std. Error*	*t Stat*	*P-value*
Intercept	-0.95293	0.34899	-2.7305	1.19%
S&P Nifty	0.00606	0.00003	174.2373	0.00%

The R square of 0.999243 indicates that the 99% of the fluctuation in NAV of Tata Nifty Index Fund can be explained by changes in S&P Nifty. Further the p-Value at confidence level of 95% is less than 5% which indicates that there is significant linkage between NAV of Tata Nifty Index Fund and S&P Nifty. Thus, the study rejects the Null Hypothesis and accepts the Alternate Hypothesis.

Table 15
UTI Nifty Index Fund
Regression Statistics

Multiple R	0.9974203
R Square	0.9948473
Adjusted R Square	0.9946233
Standard Error	0.2357667
Observations	25

Table 16
UTI Nifty Index Fund
Analysis of Variance

	df	*SS*	*MS*	*F*	*Sig. F*
Regression	1	246.8417	246.8417	4440.72	0.0000
Residual	23	1.2785	0.0556		
Total	24	248.1201			

Table 17
UTI Nifty Index Fund
Coefficients and p Value

	Co-eff.	*Std. Error*	*t Stat*	*P-value*
Intercept	-3.75263	1.02272	-3.6693	0.13%
S&P Nifty	0.00679	0.00010	66.6387	0.00%

The R square of 0. 0.9948473 indicates that the 99% of the fluctuation in NAV of UTI Nifty Index Fund can be explained by changes in S&P Nifty. Further the p-Value at confidence level of 95% is less than 5% which indicates that there is significant linkage between NAV of UTI Nifty Index Fund and S&P Nifty. Thus, the study rejects the Null Hypothesis and accepts the Alternate Hypothesis.

The risk and return measures of Mutual Fund Index Schemes and S&P Nifty computed from NAV data and S&P Nifty index data is presented in Table 18 below.

Table 18
Return Measures

Schemes	**Return (R)**	**Risk-Free Return (R_f)**
ICICI Pru. Nifty Index Fund	9.22%	6.00%
Sundaram Smart Nifty Index	7.08%	6.00%
Tata Nifty Index Fund	9.49%	6.00%
UTI Nifty Index Fund	10.23%	6.00%
S&P Nifty	9.06%	6.00%

The risk adjusted performance measures of sample Index schemes of Mutual Funds is presented in Table 19 and Table 20 as under.

 DOI : 10.18231/2454-9150.2018.1219

Table 19
Risk Adjusted Measures and Ranks

Schemes	Sharpe's Index		Treynor's Index	
	(Rp-Rf)/SD		(Rp-Rf)/(βp)	
	Ratio	Rank	Ratio	Rank
ICICI Pru. Nifty Index Fund	0.3209	3	0.0320	3
Sundaram Smart Nifty Index	0.1081	5	0.0133	5
Tata Nifty Index Fund	0.3492	2	0.0346	2
UTI Nifty Index Fund	0.4104	1	0.0445	1
S&P Nifty	0.3034	4	0.0306	4

Table 20
Risk Adjusted Measures and Ranks

Schemes	Jensen's Alpha		Fama Index	
	Rf + βp*(Rm-Rf)		Rf + (SDp/SDm)(Rm-Rf)	
	Ratio	Rank	Ratio	Rank
ICICI Pru. Nifty Index Fund	0.0907	2	0.0904	3
Sundaram Smart Nifty Index	0.0848	5	0.0903	4
Tata Nifty Index Fund	0.0909	1	0.0903	4
UTI Nifty Index Fund	0.0891	4	0.0913	1
S&P Nifty	0.0906	3	0.0906	2

It can be seen that all the selected Index Schemes of Mutual Funds, except Sundaram Smart Nifty Index Fund has outperformed the market i.e. S&P Nifty during the period April 2017 to March 2018. Amongst the four Nifty Index Fund, UTI Nifty Index Fund is the top performer followed by Tata Index fund and ICICI Prudential Nifty Index Fund.

VI. CONCLUSIONS

The regression studies on the four selected index schemes of mutual fund revealed that the NAVs of all the selected schemes has significant linkage with the S&P Nifty. Thus, the Null Hypothesis H_{01}, is rejected and alternative hypothesis H_{11} is accepted. Further most of the risk adjusted performance measurement techniques indicates that the selected Index Schemes of Mutual Funds has outperformed the markets in 2017-2018. Thus, Null Hypothesis H_{02} is rejected and the Alternative Hypothesis H_{12} is accepted.

Based on findings of this study it may be concluded there NAVs of Index Schemes of Mutual Fund houses has linkage with S&P Nifty. It may further be concluded that Nifty Index Schemes have performed better than S&P Nifty.

It may be noted that this study covered period 2017-2018 and thus conclusions are specific and may not be generalized and are just indicative.

REFERENCES

[1] Gupta S P, Statistical Methods, Sultanchand & Sons, New Delhi, Edition 1997
[2] ICFAI, Mutual Funds, ICFAI University Press, Edition October 2004
[3] IIBF, Mutual Funds: Products and Services, Edition 2007.
[4] Jatana Renu & K J Bosire, Mutual Fund: Their Schemes and Price Management, Mahamaya Publishing House, New Delhi, Edition 2007.
[5] Krishnaswami & Ranganatham, Methodology of Research in Social Sciences, Himalaya Publishing House, Mumbai, Edition 2009 (Revised)
[6] Khatri Dhanesh Kumar, Investment Management & Security Analysis: Text & Cases, Macmillan India Ltd., New Delhi, Edition 2006
[7] Sundar Sankaran, Indian Mutual Funds Handbook: A guide for industry professionals and intelligent investors, Vision Books, New Delhi, Edition 2015 (Reprint)
[8] Sadhak H, Mutual Funds in India: Marketing Strategies and Investment Practices, Response Books, New Delhi, Edition 2012 (Reprint)
[9] Ahmed Marhfor, Portfolio Performance Measurement: Review of Literature and Avenues of Future Research, American Journal of Industrial and Business Management, Vol 6, No 2, 2016, pp 432-438.
[10] S. P. Kothari and Jerold B. Warner, Evaluating Mutual Fund Performance, The Journal of Finance, Vol 56, No 5, Oct 2001, pp 1985-2010
[11] Stéphane Chrétien and Manel Kammoun, Mutual Fund Performance Evaluation and Best Clienteles, Journal of Financial and Quantitative Analysis, Vol 52, No 4, (Aug 2017), pp 1577-1604.
[12] Bruce N. Lehmann, David M. Modest, Mutual Fund Performance Evaluation: A Comparison of Benchmarks and Benchmark Comparisons, NBER Working Paper No. 1721, 1985.
[13] Oleksandra Lemeshko & Oldřich Rejnuš, Performance Evaluation of Equity Mutual Funds in Countries with Emerging Economies: Evidence from BRIC, CEE, sea and MENA Regions, Procedia Economics and Finance, Vol 30, 2015, pp 476-486.
[14] Dr Vikas Choudhary and Preeti Sehgal Chawla, Performance Evaluation of Mutual Funds: A Study of Selected Diversified Equity Mutual Funds in India, International Conference on Business, Law and Corporate Social Responsibility (ICBLCSR'14) Oct 1-2, 2014 Phuket (Thailand)
[15] Md. Qamruzzaman ACMA, Comparative Study on Performance Evaluation of Mutual Fund Schemes in Bangladesh: An Analysis of Monthly Returns, Journal of Business Studies Quarterly, Vol 5, No 4, 2014, pp 190-209

 DOI : 10.18231/2454-9150.2018.1219