

CAN MUTUAL FUND PREDICT THE FUTURE? AN EMPIRICAL STUDY

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Abstract *The present study seeks to examine the NAV performance of the selected open-ended mutual fund schemes in India. The study also investigates whether the past return performance of the mutual funds may be used as a reliable indicator to predict the future return. To accomplish these objectives, closing monthly NAV data on 56 open-ended income schemes are considered over a period from January 2001 to December 2009. Then, we compute the average NAV and found a good consistency in performance. With a view to examine the consistency in return performance of the selected mutual fund schemes, auto-regressive model is applied and observed that only 34 schemes out of 56 open-ended income schemes have consistently influenced the return performance.*

Keyword: *Mutual Fund, Performance Evaluation, NAV, Open-Ended, Auto-Correlation.*

INTRODUCTION

The mutual fund institutions have shown to the investors a new and safer destination of investment. All types of investors can get so many benefits by investing in different mutual fund schemes. The most important benefit is reasonable return with a minimum degree of expected risk for which the investors are willing to invest in mutual fund schemes. However, the return of mutual fund schemes is reflected by the performance of net asset value. It is expected that the return of the mutual fund schemes depend on the NAV. If the NAV value increases then return of the mutual fund schemes will increase and vice-versa. Therefore, it may be said that the performance of mutual fund schemes depends on the ups and downs of the net asset value. Hence, it is argued that the NAV may be used as a reliable measure of mutual fund performance. In this study, the NAV performance of the selected open-ended (Income) mutual fund schemes are examined and investigated whether the past NAV assist to predict the future NAV.

In order to accomplish this objective, the present study is designed as follows: after the brief introduction presented, the literature survey is presented. Next section, highlights the specific objectives of the study, which are followed by data description and methodology. Further presented is analysis and interpretation of the results and the study ending with conclusion.

LITERATURE REVIEW

Performance evaluation of mutual fund is a much-studied topic in finance. A large number of academicians as well as professionals are interested to evaluate mutual fund performance because the rapid growth of this industry attracts the researchers to give attention on this aspect. The researchers have examined the mutual fund performance on different grounds and revealed varieties of pictures on this ground. Many research papers are now available worldwide; some of them are discussed here to make the study rational.

The first risk-adjusted model was proposed by Treynor's (1965), popularly known as reward to volatility ratio, distinguished between total risk and systematic risk. It is assumed that the portfolios are well diversified and there is no scope to reduce diversifiable risk. Hence, according to him, beta (a measure of systematic risk) is the appropriate measure of risk. Alternatively, in 1966 William Sharpe proposed another risk-adjusted portfolio performance evaluation model. To evaluate portfolio performance he considered total risk. Thus, according to his model, total variability was the appropriate measure of risk. It may be said that return is not the only parameter by which portfolio performance can be evaluated, risk obviously influence the performance. In 1966, Treynor & Mazuy developed a portfolio performance evaluation model, which was based on CAPM (see, SLM), seeks to examine the ability of the investment managers to predict the marker movement. To

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test this, they selected 57 sample funds. They, however, did not find any statistically significant evidence of market – timing performance of the selected mutual fund managers. In 1996, Howe & Pope examined the rating performance of mutual funds that is given by Forbes over a period from September 1974 to August 1990. They made an attempt to investigate whether performance rating may be used as a predictor of future mutual fund performance. Their study period was sixteen years and they divided the total study periods in four sub-periods i.e. sixteen non-overlapping one-year periods, eight non-overlapping two year periods, four non-overlapping four year periods and two non-overlapping eight year periods. They divided the total sample in two categories namely down-market ratings and up-market ratings. To examine this objective they applied Spearman rank correlation techniques between rating performance with beta, rating performance with return and rating performance with alpha. Their study reported that the correlation between funds' beta and Forbes down-market rating was negative and the correlation between funds' beta and Forbes up-market rating was positive and statistically significant. The study also revealed that the Forbes down-market rating was better than Forbes up-market ratings in respect of return prediction. Finally, their study also focused that Forbes down-market ratings was relatively better than Forbes up-market ratings in respect of risk-adjusted (J_{α}) performance prediction. In 2000, Redman, Gullett & Manakyan examined the risk-adjusted return performance of the global and international mutual funds over a three sub periods starting from 1985 to 1994, 1985-1989 and 1990-1994. To examine the risk-adjusted performance they employed Sharpe, Treynor & Jensen indices. For the estimation of these indices, they obtained data from Morningstar on disc data source and they made seven portfolios by using those data for their study purposes. The portfolios were five international portfolios, a U.S. equity based portfolio and a market portfolio as a surrogate of U.S. equity market. They reported that the risk-adjusted return of international portfolios under both the indices (Sharpe & Treynor) outperformed the market index during the two periods, which were 1985 to 1994 and 1985 to 1989. However, the Jensen alphas of international portfolios were found to be positive but statistically insignificant during the period from 1985 to 1994. It is also found that the Jensen alphas of all the portfolios during the period starting from 1985 to 1989 were positive and statistically significant. The study also revealed that the risk-adjusted returns of international portfolios were lower than the market indices. However, the Jensen alphas of the international portfolios were found to be negative during this time while the alpha values of market indices were found to be positive but not statistically significant. In 2001, Filippas & Psoma examined the market-timing performance of 17 Greek equity mutual funds in Greece and employed Treynor & Mazuy model.

After analysis of result, they came into conclusion that only four mutual funds out of 17 sample mutual funds exhibited superior market-timing performance. In 2002, Athanassakos, Carayannopoulos & Racine examined the performance of Canadian mutual funds over a period from January 1985 to December 1996. They divided the total period in three sub-periods, which consisted of four-year non overlapping sub periods starting from January 1985 to December 1988, January 1989 to December 1992 and January 1993 to December 1996 in order to examine the consistency of mutual fund performance and also to investigate whether past performance has any indication for future performance. To examine the above objectives they selected 141, 257 and 302 funds as their sample and employed Treynor & Mazuy model and used an extended version of T&M model. The study reported that there was no consistency in stock selection performance and market-timing performance and revealed that the historical performance had no indication in future performance. In 2004, Jordan, Jorgensen & Smdirra evaluated the risk-return performance of mutual funds over a period ranges between 1995 and 2001. For the purpose of empirical study, they selected those mutual funds, which closed their investment opportunity to the new investors. To examine the above objective, they introduced several performance evaluation models like Sharpe measure, Treynor, Jensen and Fama-French. After analysis of the data, they reported that those mutual funds, which were closed to the new investors for new investment, performed well during the 12 months before closing and also reported that the funds' performances were declined in comparison to previous performance after closing. In 2005, Santos, Costa, Tusi & Silva examined the mutual fund performance in Brazil over a period from April 2001 to July 2003. They employed stochastic frontier approach on 307 Brazilian mutual funds for the evaluation of performance. After analysis they pointed out that the managers of 10 actively managed funds and bottom 10 managed funds would perform well if the management skills of those funds increases and it is expected that those funds ultimately beat the market index easily. In 2005, G.Artikis evaluated the market-timing and selectivity performances of bond mutual fund managers in Greece over a period ranges between 15/03/1997 to 31/12/2001. To examine the above objectives, he applied Treynor & Mazuy model and reported that 90% of the fund managers of sample funds had the ability to select under priced securities and the 20% of the managers of sample mutual funds had also the ability to beat the market at correct time and finally, 20% of the fund managers of sample funds were efficient to select under priced securities as well as to beat the market at right time. In 2007, Jagric, Podobnik, Strasek & Vita Jagric examined the performance of 9 mutual funds in Slovenia over a period from 1st January 1997 to 31st December 2003 by employing the risk-adjusted performance measures of Sharpe, Treynor, Jensen and Treynor & Mazuy

and used Ljubljana stock exchange as market surrogate and then computed risk-adjusted performance measures and then ranked them according to their performances and reported that performance of all the funds were quite same on both the measures (Sharpe & Treynor). Their study also revealed that the fund managers achieved superior stock-selection skills. In 2008, Thanou evaluated 17 Greek mutual funds performance over a period from 1997 to 2005 and the data collected from Association of Greek Institutional Investors and ensured continuity and uniformity and employed risk-adjusted performance measures of Sharpe, Treynor, Jensen and Treynor & Mazuy. For his study, he divided the total periods in three sub-periods and also divided the market in two categories namely up-market condition and down-market condition. He used monthly return data for analysis purposes and finally the study reported that the ranks were given to all the mutual funds as per various performance measures were almost same and concluded that the mutual funds were well diversified. The study also revealed that there was non-existence of market-timing performance and only two mutual funds out-performed the market index. In 2008, Seghal & Jhanwar examined the stock-selection and market-timing performances of 60 open-ended mutual fund schemes. To examine these performances they considered daily as well as monthly data and employ Jensen, Carhart-four factor model, Treynor & Mazuy model, Henrikson & Merton model and Bollen & Busee model for statistical analysis purposes. Their study reported that the stock-selection performance and market-timing performance would improve if they use daily data instead of monthly data. In 2009, Zakri Y. Bello examined the performance of 5 categories of U.S. Equity mutual funds during the recessions of 1990 and 2001 and during the 12 months after each recession that was identified by the National Bureau of Economic Research (NBER). After analysis of data the study reported that the return performance of all the mutual funds was significantly higher during the post recession period of 1990 and he also reports that the return performance of the mutual funds was higher than the market index during the recession of 2001, he reported that the performances of entire samples (mutual fund, market) were declined in post recession period and it was also observed that only one category of fund (small company) has positive return during recession and the remaining samples were experienced negative return during the recession and post recession period.

OBJECTIVES OF THE STUDY

More specifically the objectives of the study as under:

1. To examine the uniformity in NAV performance.
2. To investigate whether the past performance may be used as a predictor to measure future performance.

DATA AND STUDY PERIOD

This study examines the consistency of NAV performance of the open-ended (income) mutual fund schemes and also examines whether the past return performance of NAV can be used as a predictor of future performance. The study period ranges between January 2001 and December 2009. However, some of the schemes do not continue nine years period because they closed to the new investors and some of the schemes started their journey from 2003 or 2004 also taken into consideration. In this study, those schemes are selected that offered to the investors' higher rate of return than the risk-free rate. The sample consists of 56 open-ended income schemes and their monthly observations vary between 36 and 108. In this study, the monthly closing net asset values are considered and the data relating to NAV are obtained from the website of Association of Mutual Funds in India (AMFI).

METHODOLOGY

In this study, the monthly closing net asset values of the open-ended income schemes are taken into consideration. After that, the year wise average net asset values of all the schemes are computed to examine whether there is any increase or decrease in NAV performance. The average net asset value of the open-ended schemes for a particular year is computed as under:

$$\overline{NAV} = \frac{NAV_i}{n} \quad (1)$$

Where, $n = 1, 2, 3 \dots 12$

Where, \overline{NAV} = Average NAV of i^{th} scheme.

n = number of observation.

It is generally assumed that the performance of a mutual fund scheme is represented by the NAV whenever an investor willing to invest in mutual fund scheme, he thinks about historical NAV performance of that particular scheme. If the historical NAV performance is well then it may be expected that this good signal on performance may be occurred in future. It is a perception that depends on investor psychology. Actually, the nature of perception is different for different types of investors. But, in a nutshell, it may be said that if the past NAV increases then it is assumed that in future it will be increased. It is a general assumption that follows most of the investors. Although, in statistical sense, this outlook may or may not be sustained in future. In this study, an attempt is taken to investigate whether historical return performance of NAV may be used as a predictor to forecast the future return performance of NAV. To investigate this, net asset values of all the successful open-ended income schemes are collected during a period from January 2001 to December 2009. Then

monthly return is computed from the NAV value by using this formula:

$$R_i = \frac{\text{Nav}(t) - \text{Nav}(t-1)}{\text{Nav}(t-1)} * 100 \quad (2)$$

Where, Nav(t) = net asset value at time t (current month)

Nav(t-1) = net asset value at time (t-1) (previous month)

To examine this, first of all linear regression model is applied. The model is formulated as under:

$$R_{i(2001)} = \alpha_0 + \beta_1 R_{i(2002)} + e_i \quad (3)$$

Where, $R_{i(2001)}$ = return of i^{th} schemes in 2001 (previous year),

$R_{i(2002)}$ = NAV of 2002 (current year),

α_0 = intercept,

β_1 = Beta coefficient,

e_i = error term with zero mean and constant standard deviation.

Similarly, the second regression equation of the scheme as under:

$$R_{i(2002)} = \alpha_0 + \beta_1 R_{i(2003)} + e_i \quad (4)$$

Where, $R_{i(2003)}$ = NAV of i^{th} scheme of the year 2003 (current year) ,

$R_{i(2002)}$ = NAV of i^{th} scheme of the year 2002 (previous year), and the other variables are same as equation 4.

In the same way, the third regression equation may be written as:

$$R_{i(2003)} = \alpha_0 + \beta_1 R_{i(2004)} + e_i \quad (5)$$

Where, $R_{i(2004)}$ = NAV of the i^{th} scheme of the year 2004 (current year).

Again, the 4th regression equation can be shown as;

$$R_{i(2004)} = \alpha_0 + \beta_1 R_{i(2005)} + e_i \quad (6)$$

Where, $R_{i(2005)}$ = NAV of the i^{th} scheme of the year 2005 (current year).

In addition to this, the 5th regression equation is designed as under;

$$R_{i(2005)} = \alpha_0 + \beta_1 R_{i(2006)} + e_i \quad (7)$$

Where, $R_{i(2006)}$ = NAV of the i^{th} scheme of the year 2006 (current year)

By using the same technique, the 6th regression equation can be formulated by taking into account the NAV of 2006

as dependent variable and NAV of 2007 as independent variable respectively. The equation as under:

$$R_{i(2006)} = \alpha_0 + \beta_1 R_{i(2007)} + e_i \quad (8)$$

Where, $R_{i(2007)}$ = NAV of i^{th} scheme of the year 2007 (current year)

Finally, the last regression equation of a particular scheme can be formed by considering the NAV of 2001 as dependent variable and NAV of 2007 as independent variable respectively. The equation as under:

$$R_{i(2001)} = \alpha_0 + \beta_1 R_{i(2007)} + e_i \quad (9)$$

Where, $R_{i(2007)}$ = NAV of the i^{th} scheme for the year 2007 (current year).

Here, seven regression equations are formulated and analyzed the results obtained from regression equations for the examination of historical return performance, which may or may not be occurred in future. It is found that some of the schemes have got success and some of them have failed. However, this regression model is not suitable because the data range is very small and not helpful to predict future performance not only that but also the error term suffers from auto-correlation. In this study, time-series data is considered and it is generally accepted that such data follow a natural ordering over time. It is assumed that in classical linear regression model (CLRM) there is no auto-correlation in the disturbances (e_i). Symbolically,

$$E(e_i e_j) = 0 \quad i \neq j \quad (10)$$

In CLRM, it is assumed that the error term (e_i) relating to any observation is not influenced by the disturbance term relating to any other observation. Although, in some cases where the error term relating to any observation is influenced by the error term relating to any other observation. In such a situation it is argued that auto-correlation exist in the error term. Symbolically,

$$E(e_i e_j) \neq 0 \quad i \neq j \quad (11)$$

It has been found from the regression results that the standard errors are biased; as a result the estimated 't' ratios are unreliable. Therefore, it is needed to test whether the time series data suffer from auto-correlation or not. To test auto-correlation Durbin-Watson (d) statistic has been applied developed by Durbin-Watson, popularly known as Durbin-Watson 'd' statistic, which as under :

$$d = \frac{\sum_{t=2}^{t=n} (\hat{e}_t - \hat{e}_{t-1})^2}{\sum_{t=1}^{t=n} \hat{e}_t^2} \quad (12)$$

In 'd' statistic the error term (e_t) has been generated by using first order autoregressive scheme AR_1 .

$$e_t = \rho e_{t-1} + \varepsilon_t \quad (13)$$

Where, ρ (rho) = coefficient of auto-covariance.

ε_t = stochastic disturbance term that satisfies standard OLS assumptions.

The limits of 'd' are 0 and 4.

Symbolically:

$$0 \leq d \leq 4 \quad (14)$$

From the above limits of 'd' it may be said that any estimated 'd' value lies between this limits. However, Durbin-Watson were successfully derived a lower bound ' d_L ' and upper bound ' d_U ' such that if the computed 'd' value lies outside these critical values, then a decision can be made regarding presence of positive or negative auto-correlation. But the upper and lower limits depend on the number of observations (N) that ranges from 0 to 200 and up to 20 explanatory variables only. In this study the observation ranges from 0 to 108 and confined to one explanatory variable only. From the regression results it has been observed that the computed 'd' statistic of the open-ended income schemes lies below the lower limit of 'd' and some time it lies above the upper limit at 5% level of significance that indicates presence of auto-correlation in the time series data.

From the above results, it may be said that OLS model is not appropriate here. To remove this problem, OLS model is changed and introduced autoregressive (AR_1) model. But here, year-wise regression equation does not run. In autoregressive model all the monthly observations of a particular scheme has been regressed and observed presence of autocorrelation that has been provided by 'd' statistic and to observe the past performance may be used as a predictor of future performance or not. The model as under:

$$R_{it} = \alpha_0 + \beta_1 R_{mt} + cR_{i(t-1)} + e_t \quad (15)$$

Where, R_{it} = return of i^{th} mutual fund scheme in time 't',

α_0 = intercept term.

β_1 = beta coefficient

c = coefficient of one period lagged value $R_{i(t-1)}$.

By applying the above autoregressive model, first of all we have estimated the parameters along with r, r^2 , adjusted r^2 , standard error of the estimate, F statistic, RSS, ESS and also 'd' statistic that provides an indication of existence autocorrelation in the time series data. After running autoregressive model that has been presented in equation eleven, observed that 'd' values of all the selected open-ended income schemes' are near about two and in some cases it has just crossed two which provides information about no

autocorrelation in the time series data. For more meaningful result, the above autoregressive model is changed a little and independent variable (market index) in model eleven is totally excluded in the new model. It is also an autoregressive model (AR_1) that included only the one period lagged value of dependent variable. The model as under:

$$R_{it} = \alpha_0 + \beta_1 R_{i(t-1)} + e_t \quad (16)$$

Here, scheme's return is the dependent variable (R_{it}) and one period lagged value of the scheme's $R_{i(t-1)}$ is the independent variable and the remaining is the same as above. After applying this regression equation, it is found that, the above mentioned parameters and values are found to be better than the former regression result and also found that there is no autocorrelation in time series data. From here, it may be said that model twelve is more appropriate than model eleven. Then again, the above autoregressive model is changed a little for the expectation of more realistic result. The new autoregressive model after change as under:

$$R_{it} = \alpha_0 + \beta_1 R_{m(t-1)} + \beta_1 (R_{it-1}) + e_t \quad (17)$$

Where, R_{it} = return of a particular mutual fund scheme in time 't',

α_0 = intercept term,

β_1 = beta coefficient,

$R_{m(t-1)}$ = one period lagged value of market return (independent variable),

$R_{i(t-1)}$ = one period lagged value of a particular mutual fund scheme,

β_1 = coefficient of one period lagged value of $R_{i(t-1)}$.

The justification of using this autoregressive model is that it will estimate better parameters' values than the above two models along with these it will also provide more appropriate 'd' values of the selected open-ended income schemes and the resulting error terms will reflect a systematic pattern due to the influence of lagged return on current return and it is also assumed that the model is suitable to predict whether past return performance has any influence to predict the future return performance. It is expected that the results provided by applying this model is more realistic than the above models. The values of the estimated parameters are better than others models and 'd' statistic provided by applying this model indicates totally autocorrelation free in the time series data. But in case of autoregressive model, the computed 'd' value generally tends towards two (2) that is the value of 'd' expected in a truly random sequence. So, there is a bias to detect first order serial correlation. To overcome this type of problem Durbin has proposed 'h' statistic to detect autocorrelation and this test can be applied in case of large sample, which is a powerful test to detect autocorrelation. The 'h' statistic is computed as under:

$$h = \hat{\rho} \sqrt{\frac{n}{1 - n[\text{var}(\hat{\beta}_1)]}} \quad (18)$$

Where, n = number of observations,

$\text{var}(\hat{\beta}_1)$ = variance of the coefficient of the lagged $R_{i(t-1)}$,

$\hat{\rho}$ = estimate of the first order autocorrelation.

$$h \sim N(0, 1) \quad (19)$$

The ‘h’ statistic follows standard normal distribution. From the properties of standard normal distribution the probability of $|h| > 1.96$ at 5% level, if the computed $|h|$ statistic is greater than 1.96 then we don’t reject the null hypothesis that $\rho = 0$ and concluded that there is evidence of first order autocorrelation. The ‘ ρ ’ value has been estimated by using ‘d’ value as under:

$$\hat{\rho} \sim 1 - \frac{d}{2} \quad (20)$$

After computation of ‘h’ statistic of the selected open-ended income schemes then it has been observed that there is any auto-correlation exist or not and critically examined that the past return performance may be used as a predictor of future return performance or not.

RESULTS AND DISCUSSIONS

In order to examine the NAV performance of the open-ended income schemes, first of all the average NAV (μ) of each scheme for each year is computed up to the year from 2001 to 2009 separately then again the average NAV of all the years (2001+02+...+2009/9) for each scheme is computed and given ranks to them according to such performance in descending order. Then again, year wise average NAV performance is computed for all the schemes for the purpose of measuring overall performance along with the trend of such performance. The result is presented in table one (Tab.1) in detail and then analyzed accordingly. It is found from the table that the average NAV of all the open-ended income schemes that were successful in terms of return in between the period of 2001 and 2009 are upward rising year after year up to the year 2009 because the study is restricted to the year 2009. But in case of individual scheme, it is observed that the upward rising trend of 40 schemes out of 56 are continued in nature and the remaining are not. It is also noticed that the year-wise average NAV value of all the open-ended income schemes in increasing trend up to the year 2007 and after that decreasing trend in 2008 and then again increasing. This trend is continuous for 16 schemes. From this result, it may be said that the individual year-wise average NAV performance of all the open-ended income schemes are well except the year 2008. From the

past record of the index, it is observed that the year 2008 is a year of worldwide recession and it may be expected that the effect of recession has fallen in mutual fund industry as a result the NAV value has decreased in the year 2008. In addition to this, the average NAVs of all the schemes have been computed and given ranks to each schemes according to their performances in descending order to find out best performer. According to such performance the first rank is given to JM Income growth-bonus option whose average NAV is found to be 26.46 and so on.

The result of regression analysis is presented in table two (Tab.2). Here, it is examined whether the past return performance may be used as an indicator to predict the future return performance. To examine this objective, autoregressive model is applied. It is observed from the table that the ‘t’ values of the lagged coefficient (β_1) of 34 open-ended income schemes are found to be statistically significant at 5% level. It indicates that the schemes have offered higher return from 2001 to 2009 to the investors that indicate a strong influence that past return performance of 34 schemes has a positive influence to predict future return performance. From the table, it has also been observed that the time series data is totally unbiased because there is no autocorrelation among the error terms after using one period lagged autoregressive model that has been tested by the ‘d’ statistic along with ‘h’ statistic. From the table, it is also observed that the ‘ r^2 ’ values of the open-ended income schemes are found to be satisfactory and the correlation coefficients of those schemes are satisfactory except some of the schemes, which delivered low correlation coefficient.

CONCLUSION

The last section deals with concluding remarks of the research study. It may be concluded from table one that a mix result is observed. It is found from the analysis that year-wise NAV performance of all the open-ended income schemes is upward rising but in case of individual scheme, a larger portion of the schemes produced higher NAV consistently but some of the schemes have failed to produce attractive NAV. This is caused because of recession in 2008. From this result, it may be concluded that all the open-ended income schemes have performed well during this period. Therefore, the investors have got higher returns. From table two, it is observed that 34 schemes out of 56 schemes have offered to the investors continuously higher returns and their ‘t’ values of the lagged variables are found to be statistically significant that indicates that past return performance of the open-ended income schemes have a strong indication to occur in future.

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Table 1: NAV Performance of the Open-Ended Income Schemes

Sl. No.	2001	2002	2003	2004	2005	2006	2007	2008	2009	Avg. NAV	Rank
1	-	10.27	10.92	11.47	12.00	12.66	-	-	-	11.46	51
2	10.88	12.37	14.09	15.58	16.74	18.23	20.31	19.35	21.08	16.51	26
3	11.11	12.38	14.22	16.12	17.18	19.58	22.06	21.18	21.75	17.29	22
4	11.13	12.63	14.21	15.96	17.26	18.93	21.00	20.00	20.39	16.83	25
5	11.27	13.05	14.75	15.45	15.96	16.81	17.46	-	-	14.96	32
6	10.51	10.79	11.92	14.01	15.18	-	-	-	-	12.48	42
7	10.44	11.17	12.45	13.65	14.74	16.09	17.25	16.12	16.98	14.32	33
8	11.12	12.49	13.61	14.12	14.49	15.03	15.99	15.53	15.69	14.23	34
9	10.26	10.88	11.34	11.92	12.98	13.14	13.94	14.16	14.47	12.57	40
10	10.25	11.17	11.67	12.27	13.35	13.51	14.33	14.63	14.74	12.88	37
11	-	10.01	10.43	10.97	11.69	12.41	13.47	14.25	14.79	12.25	44
12	10.00	10.41	11.19	11.78	12.18	-	-	-	-	11.11	56
13	-	10.47	11.30	11.41	11.95	12.73	-	-	-	11.57	49
14	-	10.21	10.90	11.49	11.56	12.76	13.74	-	-	11.78	47
15	10.62	11.47	12.15	12.62	-	-	-	-	-	11.72	48
16	10.38	11.26	11.92	12.23	-	-	-	-	-	11.45	50
17	10.54	11.41	12.29	12.88	13.47	14.19	15.31	14.06	14.84	13.30	36
18	11.56	13.27	14.99	15.51	15.76	16.32	17.43	17.59	18.10	15.61	30
19	11.00	12.24	13.26	13.98	-	-	-	-	-	12.62	39
20	11.50	14.38	16.33	17.15	17.36	17.80	18.30	19.59	20.18	16.95	24
21	-	10.40	11.11	11.62	12.14	12.80	13.71	14.52	14.77	12.63	38

22	-	10.18	10.82	11.49	11.89	12.31	12.85	13.19	13.65	12.05	46
23	-	10.19	10.81	11.49	11.89	12.31	12.85	13.24	14.43	12.15	45
24	-	10.17	10.83	11.26	12.01	12.82	13.57	14.35	14.85	12.49	41
25	-	10.86	12.34	13.22	15.14	17.78	21.11	23.64	24.06	17.27	23
26	-	10.27	11.12	11.61	11.92	12.42	13.40	13.75	13.92	12.30	43
27	-	10.16	10.66	11.32	11.82	12.25	-	-	-	11.24	55
28	10.93	12.05	13.93	14.66	16.01	17.97	19.78	20.20	21.15	16.30	28
29	-	11.27	11.91	15.02	16.47	21.32	26.93	28.25	28.93	20.01	14
30	16.96	19.56	21.93	22.82	23.22	-	-	-	-	20.90	12
31	16.97	19.54	21.94	22.83	23.21	-	-	-	-	20.91	11
32	16.85	19.38	21.72	22.65	23.23	24.41	26.94	26.50	27.12	23.20	4
33	13.73	15.48	17.82	20.07	21.57	23.85	26.83	27.93	28.52	21.76	8
34	20.58	23.76	26.83	27.76	28.25	29.48	21.84	19.30	18.12	23.99	2
35	17.11	19.48	21.83	22.71	23.01	23.63	24.23	24.89	25.33	22.80	6
36	4.62	6.52	10.18	11.51	13.10	15.67	18.21	21.11	21.71	13.63	35
37	5.57	7.61	12.08	13.66	15.50	18.62	21.57	24.21	24.43	15.92	29
38	14.74	16.62	18.64	20.16	21.08	22.04	23.33	23.12	23.83	20.40	13
39	16.96	19.65	22.25	23.20	23.68	24.33	25.53	25.93	26.13	23.07	5
40	17.60	20.16	20.63	23.57	24.19	24.98	26.61	27.21	28.10	23.67	3
41	12.34	14.23	15.98	16.68	17.25	17.86	19.11	20.92	22.03	17.38	21
42	12.51	14.49	16.34	17.15	17.82	18.75	20.22	21.39	22.15	17.87	19
43	13.38	15.40	17.28	17.93	18.49	19.49	20.66	20.50	20.98	18.23	18
44	13.16	14.41	15.23	16.04	16.52	17.30	-	-	-	15.44	31
45	13.76	15.79	17.65	18.19	18.61	19.24	20.21	20.72	21.82	18.44	17
46	14.45	16.37	18.04	18.68	19.95	21.02	22.26	23.13	24.35	19.81	15
47	16.51	16.88	18.53	18.17	19.29	19.25	19.54	18.90	19.30	11.44	52
48	16.84	18.84	20.69	21.62	22.64	24.26	25.68	26.19	26.82	22.62	7
49	15.25	17.43	19.47	20.45	21.44	22.48	23.94	24.13	25.51	21.12	9
50	19.21	22.42	25.22	26.40	26.46	28.02	29.21	30.03	31.19	26.46	1
51	10.56	11.63	12.09	-	-	-	-	-	-	11.43	53
52	14.46	16.65	18.80	19.46	20.00	20.82	22.24	21.04	22.03	19.50	16
53	10.34	10.31	10.71	10.99	11.39	11.80	11.98	12.10	12.53	11.35	54
54	13.77	16.37	18.87	19.07	19.28	19.70	-	-	-	17.84	20
55	15.81	18.11	20.55	21.24	21.55	22.15	23.27	23.05	24.15	21.10	10
56	13.81	15.84	17.65	18.42	-	-	-	-	-	16.43	27

** Schemes' name in Table 2.

Table 2: Regression result of the open-ended income schemes

Schemes Name	O.B.	R	r ²	Adj.r ²	t -statistic	h -statistic
Alliance short term fund-Growth	58	.635	.403	.380	-.064	1.3806
Birla MIP-Plan C (Growth)	108	.541	.293	.279	5.746*	-2.3416
FT Indi monthly income pl-Growth	108	.636	.405	.393	8.104*	-3.3803
Templeton monthly income plan-G	108	.516	.266	.252	2.880*	-1.2527
Principal inc fnd-gr plan-growth	74	.258	.067	.039	2.161*	-.2984
Uti senior citizen unit plan	51	.549	.301	.270	1.269	-.4034
SBI Magnum monthly income pl-G	108	.156	.024	.005	1.050	.5113
Reliance MF-retail -G pl-Gr Option	108	.716	.513	.503	10.335*	-5.0126

Libra bond fund – dividend	102	.097	.009	-.011	0.340	-.1083
Libra bond fund –growth	102	.118	.014	-.007	0.256	.0067
Reliance short term fund-growth	86	.145	.021	-.003	-1.163	.2388
II&FS bond fund-stp-growth	44	.175	.031	-.019	-0.798	.5024
II&FS bond fund-bonus plan	58	.434	.188	.157	-3.258	-2.6985
JM short term fund-growth	93	.395	.156	.137	3.771*	-2.1415
Prudential icici fixed matu pl-yrly	48	.572	.327	.296	3.815*	.5243
Prudential icici fmp yearly series	40	.353	.125	.075	0.964	.7364
GSSIF-ST-Growth	108	.698	.488	.478	9.748*	-4.3537
GSSIF-Growth	108	.459	.211	.195	5.155*	-2.2735
Sun f&c monthly income-growth	40	.219	.048	-.006	0.833	.4593
HDFC Income fund-growth	105	.378	.143	.126	3.968*	1.7041
HDFC short term pl-growth	94	.350	.123	.102	-3.487	-1.4843
BOB Income fund-dividend plan	95	.692	.478	.467	8.983*	-3.5709
BOB income fund-growth	95	.626	.392	.378	7.438*	-2.7710
Can income-growth plan	88	.102	.010	-.014	-0.829	-.3696
Can cigo-growth plan	96	.242	.059	.038	2.265*	.4591
Sahara income fund-growth	93	.331	.109	.089	3.254*	-.3749
Sahara short term plan-growth	46	.289	.084	.039	1.902	1.2477
Prudential icici mip- cumulative	108	.428	.184	.168	-4.695	-2.7021
Uti-mahila unit scheme(UMS)	94	.328	.108	.088	2.785*	-4.4473
Alliance income fund-growth	56	.378	.143	.110	2.049*	-3.0992
Alliance income fund-54EA-Growth	56	.401	.161	.128	2.005*	-2.4636
Alliance income fund-54EB-Growth	108	.452	.204	.189	4.821*	-1.7340
Alliance monthly income-Growth	108	.652	.426	.415	8.726*	-3.8318
Birla income plus-retai l(gr)	108	.629	.395	.384	7.950*	-2.7110
DBS chola triple ace-regular-cumulative	108	.362	.131	.114	3.897*	-1.8617
Escorts income bond-dividend	97	.493	.243	.226	5.430*	1.3323
Escorts income bond-growth	97	.138	.019	-.002	1.329	-.3412
Escorts income plan-growth	108	.284	.080	.063	-2.992	-.3267
Templeton India income build a/c-g	108	.464	.215	.200	4.904*	-3.1985
Templeton India inc fund-growth	108	.517	.267	.253	5.694*	-2.0729
Kotak bond-deposit-growth	108	.276	.076	.059	2.653*	1.8781
Kotak bond-regular-growth	108	.416	.173	.157	4.388*	1.5124
LIC Mutual fund bond fund-growth	108	.363	.131	.115	3.741*	-1.9326
Principal depo fund-plan 54EA/EB	72	.559	.313	.292	4.428*	-3.7207
Sbi magnum income fund-growth	108	.519	.269	.255	5.747*	-1.6937
UTI-bond fund-g(rep.after 6 month)	108	.136	.018	-.001	0.379	.2281
UTI-retirement benefit pension fund	108	.142	.020	.001	1.304	.4846
Tata income fund-growth	108	.473	.224	.209	5.250*	.4610
Reliance income fund ret pl-g pl-g op)	108	.506	.256	.242	5.796*	-2.2615
JM income growth-bonus option	108	.084	.007	-.012	0.554	-2.0526
Prudential icici fixed matty pl-quarterly	36	.137	.030	-.032	0.833	.2822
Prudential icici income plan-G option	108	.375	.140	.124	3.946*	-3.7088
Prudential icici mip-dividend-qtrly	108	.111	.012	-.007	0.709	.1520
PNB Debt fund-growth	62	.296	.088	.055	2.012*	-1.3347
Sundaram bnp paribas bond sa-growth	108	.506	.256	.241	5.416*	-2.7916
Sun f&c mon val fnd-bnd op – growth	40	.289	.083	.031	-0.437	1.4100

*Significant at 5% level.