PERFORMANCE EVALUATION OF DEBT MUTUAL FUND SCHEMES IN INDIA

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ABSTRACT
This study aims to examine the performance of open-ended debt mutual funds in India. To evaluate the performance a sample of 23 schemes have been selected on the basis of weekly returns compared to benchmark returns. For this purpose statistical tools average, standard deviation, beta, co-efficient of determination, systematic and unsystematic risk and the risk adjusted performance measures suggested by Treynor (1965), Sharpe (1966), Jensen (1968) and Fama’s (1972) measures are employed. The return analysis reveals that most of the schemes could not perform better as compared to the benchmark. Whereas the variability in return of market is more than the variability in return of schemes. The beta value of the schemes is less than one and indicates that these are defensive schemes in nature and less sensitive to the market forces. It is found that none of the schemes performed better according to Sharpe and Jensen measures whereas twenty six percent schemes outperformed the market according to Treynor measure. On the basis of $R^2$, the schemes are not so well diversified. These funds are found to be poor in earning better returns either adopting marketing or in selecting under priced securities.

KEY WORDS: beta, co-efficient of determination, standard deviation, systematic risk, unsystematic risk.

INTRODUCTION
Mutual fund is a mechanism for pooling the resources by issuing units to the investors and investing funds in securities in accordance with objectives as disclosed in offer document. Investments in securities are spread across a wide cross-section of industries and sectors and thus the risk is reduced. Investors of mutual funds are known as ‘unit holders’. The profits or losses are shared by the investors in proportion to their investments. The mutual funds normally come out with a number of schemes with different investment objectives which are launched from time to time. A mutual fund is required to be registered with Securities and Exchange Board of India (SEBI) which regulates securities markets before it can collect funds from the public.

Debt schemes are also known as income schemes. Their objective is to provide regular and steady income to investors. Investment is generally made in fixed income securities like bonds and debentures. Such schemes distribute periodically the income earned by them. Capital appreciation in such schemes may be limited. The portfolio management of these schemes does not want to make the investment in venturesome securities and for this reason these schemes are known as defensive schemes and are less sensitive to the market forces. These schemes are less risky as compared to the equity schemes. Investors who want regular returns with less risk prefer to invest in these funds. These are ideal for retired people and
others with a need for capital stability and regular income and who need some income to supplement their earnings.

**Review of Literature**

Review of literature is a brief description about mutual funds research work conducted in India as well as in abroad. Some of these studies have been reviewed in the following paragraphs in order to establish the research gap and need for the present study. **Treynor (1965)** developed a methodology for evaluating mutual fund performance that is popular referred to as reward to volatility ratio. **Sharpe (1966)** carried out a well acknowledged and widely quoted work on performance evaluation. He not only developed a composite measure of performance evaluation (Sharpe's reward to variability ratio) that considers both return & risk. **Jensen’s (1968)** classic studies developed an absolute measure of performance based upon the Capital Asset Pricing Model. The excess fund returns were regressed upon the excess market returns to estimate the characteristics line of the regression model. **J. Williamson (1972)** made an effort on the study of measuring and forecasting of mutual funds performance and test the hypothesis that a fund’s performance affected by net new money. There is a popular belief that the availability of net new money tends to increase performance. Williamson, however, found no correlation. He also sought to determine if net new money was related to past performance with the result that no correlation was found. **Kun and Jen (1978)** estimated the systematic risk and performance of 49 mutual funds over the period 1960-71 by utilizing monthly price data. The result indicated that a very substantial fraction of mutual funds had two level of systematic risk during each of three sub periods. **Kane and Marks (1983)** developed conditions under which Sharpe (1966) measure would correctly and completely capture market timing ability of fund managers. **Lee and Rahman (1989)** examined market timing and selectivity performance of selected mutual funds. The data for the study consisted of monthly returns for 87 months during January 1977 to March 1984 for 93 mutual funds. They concluded that at the individual level, there was some evidence of superior forecasting ability on the part of fund manager. This result had an important implication in those funds with no forecasting skills might consider a totally passive management strategy and just provide a diversification service to their shareholders. In one study, **Sarkar (1991)** critically examined mutual fund performance evaluation methodology. He opined that both Sharpe (1966) and Treynor (1965) performance measures rank mutual funds performance in similar fashion though they differ in the measurement of risk parameter. **Khurana (1996)** reported inverse relationship between probability of managerial replacement and fund performance by taking growth rate in a fund’s asset base and its portfolio returns as two separate measures of performance. **Jatana and Gupta (2003)** found in their study that different investment avenues are available to investors by doing the investment in mutual funds but they also carry certain risks. The investors should compare the risk and expected yields after adjustment of tax in various instruments while taking investment decisions. **Mohanan (2006)** found that Indian mutual fund industry was one of the fastest growing sectors in the Indian capital and financial markets. The mutual fund industry in India has seen dramatic improvements in quantity as well as quality of product and service offerings in recent years. **Parihar, Sharma and Singh (2009)** revealed that mutual funds are financial intermediaries concerned with mobilizing savings of those who have surplus and the canalization of these savings in those avenues where there is a demand for funds.
NEED OF THE STUDY
Mutual Fund industry is a rapidly growing sector in Indian Financial Market. Mutual fund investment is quite popular among small and household investors, who mobilize their savings for investment in the capital market. India has a majority of middle class families who want to yield the maximum returns on their investment by taking the less risk. In banks and post offices investment is safe but due to lower interest rates it is less attractive while in mutual funds through professional and sound fund management, it reduces the risk and yield the high rate of return on the investment. The need of present study of mutual funds cater to reduce the past research gap and also to update the performance of mutual funds in the current scenario. In this study, an attempt has been made to evaluate the performance of open-ended debt schemes of public sector, private sector, banks and other financial institutions.

OBJECTIVES OF THE STUDY
To evaluate the performance of the mutual funds, the following are the main objectives of the present study:

i) To examine the risk and return component among these mutual funds.

ii) To study the relationship between NAV and market portfolio return (BSE Sensex).

iii) To evaluate the return of these mutual funds according to the Fama’s model.

SCOPE OF THE STUDY
The present study comprises of 23 mutual fund schemes launched by different public sector, private sector, financial institutions and banks and Unit Trust of India. The time period for the research work is from 1st July 2010 to 30th June 2011. The weekly returns are compiled on the basis of NAV. Then these schemes are compared with Bombay Stock Exchange Sensitive Index to evaluate the performance of these schemes. An attempt has been made to draw a conclusion which reflects the clear picture of the mutual fund industry in the current scenario.

SAMPLE SELECTION
There are different types of mutual fund schemes available in India which is classified under different categories. In the present study, 23 open-ended debt schemes have been selected for the study period. The convenience sampling method is used for the sample selection.

DATA COLLECTION
The present study is based on secondary data which is collected from various sources like published annual reports of the sponsoring agencies, online bulletins, journals, books, magazines, brochures, newspapers and other published and online material. The weekly data for the mentioned schemes have been collected from the website www.mutualfundsindia.com. The data has been collected from 1st July 2010 to 30th June 2011.

METHODOLOGY
In the present study an attempt has been made to analyze and interpret the behaviour of different mutual fund schemes with the market during the period under study. In order to achieve the pre-determined objectives an analysis has been made to compare these schemes with the market on the basis of risk and return. Different statistical and financial tools are used to evaluate the performance of these mutual fund schemes under the present study. These tools and techniques include percentage method,
arithmetic mean, standard deviation, beta, co-efficient of determination, Sharpe, Treynor, Jensen Alpha and Fama’s Measure.

**AVERAGE RETURN:**
The most common method of calculating the return is average simple return. This method is easy to compute and understand. Hence, schemes are compared on the basis of average weekly return generated by the schemes under the study as:

Average Scheme Return has been computed as:

\[ \text{ARp} = \frac{\sum \text{Rp}}{n} \]

Where

- \( \text{ARp} \) = Average Portfolio Return
- \( \text{Rp} \) = portfolio return
- \( n \) = number of observations

Average Market Return has been computed as:

\[ \text{ARm} = \frac{\sum \text{Rm}}{n} \]

Where

- \( \text{ARm} \) = Average Market Return
- \( \text{Rm} \) = Market Return
- \( n \) = number of observations

**STANDARD DEVIATION:**
It is measure of total risk of a fund. It measures the fluctuation of the NAV as compared to the average returns of the schemes during a particular period. A higher standard deviation characterize that the returns of the fund have been more unstable and risky than fund having lower standard deviation. Hence, low standard deviation means low risk in funds return. It has been calculated with the usage of MS excel 2007 ‘STDEV” function where the cell range caters to the weekly fund returns over the period under study.

**BETA:**
Beta is a measure of systematic risk of a portfolio. It determines the volatility of a fund in comparison to that of its index or benchmark. Where the beta value of fund is very close to 1, it indicates that the fund’s performance closely matches the market index. Beta value of fund less than 1 indicates less volatility of the fund than the market index. For example, if stock’s beta is 1.3, it is theoretically 30% more volatile than the market. Negative beta reflects an inverse relationship between the security and the market.

Beta is computed by following formula:

\[ \text{Beta} = \frac{\text{Covariance (Stock, Index)}}{\text{Variance (Index)}} \]

Where, Covariance (Stock, Index) means covariance between scheme and market returns, while Variance (Index) means variance of Index.

**CO-EFFICIENT OF DETERMINATION (R-SQUARE):**
R-Square of a fund advises investors if the beta (or systematic risk) of a mutual fund is measured against an appropriate benchmark, thus helps in testing the validity of the comparison. Funds with the high R-square value indicate that the portfolio is well diversified with low company specific risk and vice versa. Hence, schemes with high R-square value are preferred. A low R-square value indicates that the fund has further scope for diversification.
RISK FREE RATE:
Risk free rate is measured by the bank rate prevailing during the period under study. It is also measured on weekly basis so as to have a compatibility with the weekly returns of the mutual fund schemes.

SHARPE RATIO:
It is developed by Nobel laureate William F. Sharpe to measure risk adjusted performance. It is a measure of a fund’s return per unit of risk assumed. Sharpe ratio is calculated by deducting the risk free rate of return from the average weekly return for a portfolio and dividing the result by the standard deviation of the portfolio returns. Higher ratio indicates the better the fund’s historical risk-adjusted performance. The Sharpe ratio tells us whether the portfolio’s returns are due to smart investment decisions or a result of excess risk. This measurement is very useful because although one portfolio can reap higher returns than its peers, it is treated as a good investment if those higher returns do not come with too much additional risk. If fund’s Sharpe ratio is greater than the benchmark, the fund’s performance is superior over the market. If it is less than the benchmark, the fund’s performance is not good in the market. Sharpe ratio is calculated with the usage of following equation:

\[ S_p = \frac{(AR_p - AR_f)}{\sigma_p} \]

Where,
- \( AR_p \) = Average Fund Return
- \( AR_f \) = Average risk-free return
- \( \sigma_p \) = Standard deviation of fund returns

The benchmark comparison is \( S_m = \frac{(AR_m - AR_f)}{\sigma_m} \)

TREYNOR RATIO:
Treynor ratio is developed by Jack Treynor that measures return per unit of systematic risk. It is similar to the Sharpe ratio, with the difference that the Treynor ratio uses beta as the measurement of volatility. The scheme with the higher Treynor ratio offers a better risk-reward equation for the investor. It is also known as the “reward-to-volatility ratio”. It is more appropriate for diversified funds, where the systematic risks have been eliminated. For a completely diversified portfolio, one without any unsystematic risk, the two measures give identical ranking. Alternatively, a poorly diversified portfolio could have a high ranking based on Treynor ratio and a low ranking based on Sharpe ratio. The difference in rank is because of the difference in diversification. Hence, both ratios provide complementary yet different information. Treynor ratio is calculated for various funds as:

\[ T_p = \frac{AR_p - AR_f}{\beta_p} \]

Where,
- \( AR_p \) = Average fund return
- \( AR_f \) = Average risk-free return
- \( \beta_p \) = beta of the fund

The benchmark comparison is \( (AR_m - AR_f) \)

JENSEN’S ALPHA:
Jensen’s Alpha is a measure of differential return earned by the fund. It helps in evaluating the ability of the fund manager in identifying the undervalued securities and there by generating excess returns than the benchmark. Hence, the ability of stock selection can be known with the help of Jensen’s Alpha. It is appropriate for portfolios which are fully diversified and where the non-systematic risk would be zero. The value of alpha indicates differential return of the portfolio between the equilibrium return and actual return. Equilibrium return is the return that the benchmark portfolio is expected to earn within the
given level of systematic risk. The additional return over equilibrium return earned by the fund manager can be attributed to his ability to select the securities. A positive value of alpha indicates that the portfolio has average return greater than the benchmark which indicates the superior performance. Alternatively, a negative value of alpha would indicate that the fund has a return less than the benchmark. In other words, a positive alpha of 1.0 means the fund has performed well as compared to its benchmark index by 1 percent while a negative alpha would indicate a poor performance of 1 percent. Expected return from the scheme based on its beta is calculated as:

\[ ER_p = \text{AR}_f + [\beta_p \times (\text{AR}_m - \text{AR}_f)] \]

Formula for calculating Alpha is as following

\[ \alpha_p = (\text{AR}_p - \text{AR}_f) - \beta_p (\text{AR}_m - \text{AR}_f) \]

Where,
\[ \alpha_p = \text{the Jensen measure (alpha), intercept measuring the forecasting ability of the manager} \]
\[ \text{AR}_p = \text{average portfolio return} \]
\[ \text{AR}_f = \text{average risk free return} \]
\[ \beta_p = \text{portfolio beta} \]
\[ \text{AR}_m = \text{average market return.} \]

**FAMA’S SEGREGATION OF RETURNS (Fama’s Components of Investment Performance):**

The risk adjusted performance measures used above reflects the overall performance of the sample schemes. According to Fama (1972), portfolio return constitutes four components namely risk free return, compensation for systematic risk, compensation for inadequate diversification and returns due to net selectivity. The different components have been worked out as follows:

(i) Risk free return: \( \text{AR}_f \)

Risk Free asset is the one where investor purchases the asset in the beginning of the holding period and knows exactly the terminal value of the asset at the end of the period. It includes bank deposits, post office savings schemes, government securities, debentures etc. An investor invests in assets other than risk free assets in the hope of obtaining excess returns for taking additional risk.

(ii) Compensation for systematic risk: \( \beta_p (\text{AR}_m - \text{AR}_f) \)

This measure helps to access returns generated by the fund managers due to their decision to take risk. They assume risk in the expectations of generating excess returns on their portfolios.

(iii) Compensation for inadequate diversification: \[ \text{AR}_m - \text{AR}_f \] \[ \beta_p \sigma_p / \sigma_m - \beta_p \]

The potential advantage of mutual fund investment to the investor is diversification of the portfolio. Diversification reduces the unique risk of the portfolio, and thus improves the performance of the mutual fund schemes. The compensation for diversification measures is additional return that compensates the portfolio manager for bearing the diversifiable risk.

(iv) Net Selectivity: \[ \text{AR}_p - \text{AR}_f \] \[ \sigma_p / \sigma_m \] \[ \text{AR}_m - \text{AR}_f \]

The ability to identify the undervalued securities to earn the excess returns is known as the ability of net selectivity of the fund managers. A positive net selectivity indicates superior performance. The investors are benefited out of the selectivity exercised by the fund managers, which reflects the true stock selection ability of the mutual fund managers. However, in case of negative net selectivity, it means that fund managers have taken diversifiable risk which has not been compensated by extra returns.
RETURN ANALYSIS:
The average weekly return is calculated on the basis of NAV. It is evident from the table that out of 23 debt schemes four schemes (19.05 percent) have performed well as compared to the market index on the basis of average weekly return whereas the remaining 17 schemes (80.95 percent) have not been able to perform up to the benchmark portfolio. The top performer with the highest average weekly returns is HDFC Balanced Fund (G) followed by ICICI Prudential Balanced Fund (G), ICICI Prudential Balanced Fund (D), Birla Sun Life 95 Fund (G) and Tata Balanced Fund (D).

RISK ANALYSIS:
The risk is analysed with the help of standard deviation, beta, co-efficient of determination, systematic risk and unsystematic risk (Table 1). Out of 23 debt schemes, all schemes have a less standard deviation than the market index and are less risky as compared to the benchmark. Overall, variability in return of market is more than variability in return of portfolio of schemes. High value of standard deviation shows high degree of risk. Standard deviation allows portfolios with similar objective to be compared over a particular time frame. The analysis reveals that beta value on the basis of NAV in all the schemes is less than one which indicates that these are defensive schemes in nature and less sensitive to the market forces. In six schemes, the value of beta is less than one which reveals that these schemes had inverse relationship with the market. The value of $R^2$ based on NAV is highest in Birla Sun Life Income Fund (G) followed by Birla Sun Life Income Fund (Div-Qty), HDFC Income Fund (G), HDFC Income Fund (D) and Templeton Income Fund (G) which indicates that systematic risk in these schemes is highest as compared to other schemes in which the value of $R^2$ is lowest.

Table No.1 Return & Risk on Portfolios

| Sr. No | Name of the Scheme                  | Average Portfolio Return | Standard Deviation ($\sigma$) | Beta ($\beta$) | $R^2$ (Systematic Risk) | $R^2$ (Unsystematic Risk) |
|--------|------------------------------------|--------------------------|-----------------------------|---------------|------------------------|--------------------------|
| 1      | Birla Sun Life Income Fund (G)     | 0.001139                 | 0.002220                    | 0.03300       | 0.107000               | 0.000000                 |
| 2      | Birla Sun Life Income Fund (Div-Qty) | 0.000569                | 0.001638                    | -0.023000     | 0.097000               | 0.000000                 |
| 3      | HDFC Income Fund (G)              | 0.000926                 | 0.005967                    | -0.079000     | 0.085000               | 0.000000                 |
| 4      | HDFC Income Fund (D)              | 0.000256                 | 0.001885                    | 0.023000      | 0.074000               | 0.000000                 |
| 5      | Templeton India Income Fund (G)   | 0.001076                 | 0.001498                    | 0.018000      | 0.072000               | 0.000000                 |
| 6      | Templeton India Income Fund (D)   | 0.000402                 | 0.001632                    | 0.019000      | 0.064000               | 0.000000                 |
| 7      | SBI Magnum Income Fund (G)        | 0.000984                 | 0.002380                    | 0.027000      | 0.062000               | 0.000000                 |
| No. | Fund Name                  | Value 1 | Value 2 | Value 3 | Value 4 | Value 5 | Value 6 |
|-----|----------------------------|---------|---------|---------|---------|---------|---------|
| 8   | SBI Magnum Income Fund (D) | 0.000248| 0.00137 | 0.01500 | 0.0540  | 0.00000 | 0.00002 |
| 9   | ICICI Prudential Income Plan (G) | 0.000629| 0.00127 | 0.01100 | 0.0390  | 0.00000 | 0.00002 |
| 10  | ICICI Prudential Income Plan (D) | - 0.000237| 0.00284 | 0.02500 | 0.0380  | 0.00000 | 0.000008 |
| 11  | UTI Bond Fund (G)          | 0.001213| 0.00110 | 0.00900 | 0.0340  | 0.00000 | 0.000001 |
| 12  | UTI Bond Fund (D)          | 0.000356| 0.00110 | 0.00900 | 0.0340  | 0.00000 | 0.000001 |
| 13  | Reliance Income Retail (Annual) | - 0.000077| 0.00182 | 0.01400 | 0.0290  | 0.00000 | 0.000003 |
| 14  | Reliance Income Retail GP- (G) | 0.000781| 0.00120 | 0.00900 | 0.0260  | 0.00000 | 0.000001 |
| 15  | Tata Income Fund (G)       | 0.000719| 0.00333 | 0.02200 | 0.0200  | 0.00000 | 0.000011 |
| 16  | Tata Income Fund (HY)      | 0.000098| 0.00124 | 0.00800 | 0.0200  | 0.00000 | 0.000002 |
| 17  | Sundaram BNP Income Plus (G) | 0.000809| 0.00064 | 0.00400 | 0.0170  | 0.00000 | 0.000000 |
| 18  | Sundaram BNP Income Plus (D) | 0.000803| 0.00286 | 0.01200 | 0.0080  | 0.00000 | 0.000008 |
| 19  | LICMF Bond Fund (G)        | 0.000883| 0.00285 | 0.01100 | 0.0080  | 0.00000 | 0.000008 |
| 20  | LICMF Bond Fund (D)        | 0.000702| 0.00283 | 0.01100 | 0.0080  | 0.00000 | 0.000008 |
| 21  | JM Income (G)              | 0.000718| 0.00292 | 0.01100 | 0.0070  | 0.00000 | 0.000009 |
| 22  | Canara Robeco Income (G)   | 0.000932| 0.00477 | 0.00100 | 0.0000  | 0.00000 | 0.000023 |
| 23  | Canara Robeco Income (I)   | - 0.001045| 0.00276 | 0.00100 | 0.0000  | 0.00000 | 0.000008 |
|     | Market Index               | 0.001335| 0.02198 | 0.00000 | 0.0000  | 0.00000 | 0.000008 |
The systematic risk on the basis of NAV is lowest in case of almost all schemes which indicate that these schemes followed proper diversifications which ultimately reduce the unsystematic risk to some extent. The systematic risk is undiversifiable and unavoidable.

**Application of Sharpe Model:**

**Table No. 2 Application of Sharpe Model**

| Sr. No. | Name of the Scheme          | Sharpe Ratio | Benchmark | Performance |
|---------|-----------------------------|--------------|-----------|-------------|
| 1       | Birla Sun Life Income Fund (G) | -0.207666    | -0.002450 | 0           |
| 2       | Birla Sun Life Income Fund (Div-Qty) | -0.434790    | -0.002450 | 0           |
| 3       | HDFC Income Fund (G)         | -0.194460    | -0.002450 | 0           |
| 4       | HDFC Income Fund (D)         | -0.396792    | -0.002450 | 0           |
| 5       | Templeton India Income Fund (G) | -0.226609    | -0.002450 | 0           |
| 6       | Templeton India Income Fund (D) | -0.602194    | -0.002450 | 0           |
| 7       | SBI Magnum Income Fund (G)   | -0.317344    | -0.002450 | 0           |
| 8       | SBI Magnum Income Fund (D)   | -0.402072    | -0.002450 | 0           |
| 9       | ICICI Prudential Income Plan (G) | -0.465763    | -0.002450 | 0           |
| 10      | ICICI Prudential Income Plan (D) | -0.487544    | -0.002450 | 0           |
| 11      | UTI Bond Fund (G)            | -0.096287    | -0.002450 | 0           |
| 12      | UTI Bond Fund (D)            | -0.362788    | -0.002450 | 0           |
| 13      | Reliance Income Retail (Annual) | -0.306820    | -0.002450 | 0           |
| 14      | Reliance Income Retail GP- (G) | -0.273842    | -0.002450 | 0           |
| 15      | Tata Income Fund (G)         | -0.447177    | -0.002450 | 0           |
| 16      | Tata Income Fund (HY)        | -0.466162    | -0.002450 | 0           |
| 17      | Sundaram BNP Income Plus (G) | -0.522092    | -0.002450 | 0           |
| 18      | Sundaram BNP Income Plus (D) | -0.529059    | -0.002450 | 0           |
| 19      | LICMF Bond Fund (G)          | -0.176330    | -0.002450 | 0           |
| 20      | LICMF Bond Fund (D)          | -0.234521    | -0.002450 | 0           |
| 21      | JM Income (G)                | -1.040233    | -0.002450 | 0           |
| 22      | Canara Robeco Income (G)     | -0.365096    | -0.002450 | 0           |
| 23      | Canara Robeco Income (I)     | -0.407791    | -0.002450 | 0           |

Note: 1 stands for good performance and 0 stands for poor performance.

The performance of these schemes is compared with the market. The scheme having more than one value indicates that it has good performance in the market and less than one value indicates the poor performance. On the basis of NAV, none of the schemes have more than one value, therefore, could not perform well in the market hence have shown poor performance as compared to the market index.

**Application of Treynor Model:**

The performance of debt schemes on the basis of Treynor’s index is shown as per Table 3, which provides the excess return over risk free rate for one unit of systematic risk.

The performance of these schemes when compared with the benchmark portfolio shows that on the basis of performance indicator, i.e. NAV, majority of the schemes, i.e. 17 out of 23 schemes (73.91 percent) have shown poor performance because their relative index value is less than one whereas six schemes (26.09 percent) have outperformed the market. The top
four performers are SBI Magnum Income Fund (D), HDFC Income Fund (D), ICICI Prudential Income Plan (D) and Templeton India Income Fund (D)

Table No. 3 Application of Treynor Model

| Sr. No. | Name of the Scheme                  | Treynor Ratio | Benchmark | Performance |
|---------|-------------------------------------|---------------|-----------|-------------|
| 1       | Birla Sun Life Income Fund (G)      | -0.027751     | -0.000054 | 0           |
| 2       | Birla Sun Life Income Fund (Div-Qty)| -0.035637     | -0.000054 | 0           |
| 3       | HDFC Income Fund (G)                | -0.017143     | -0.000054 | 0           |
| 4       | HDFC Income Fund (D)                | 0.102969      | -0.000054 | 1           |
| 5       | Templeton India Income Fund (G)     | -0.020831     | -0.000054 | 0           |
| 6       | Templeton India Income Fund (D)     | 0.042881      | -0.000054 | 1           |
| 7       | SBI Magnum Income Fund (G)          | -0.036769     | -0.000054 | 0           |
| 8       | SBI Magnum Income Fund (D)          | 0.103706      | -0.000054 | 1           |
| 9       | ICICI Prudential Income Plan (G)    | -0.039998     | -0.000054 | 0           |
| 10      | ICICI Prudential Income Plan (D)    | 0.073876      | -0.000054 | 1           |
| 11      | UTI Bond Fund (G)                   | -0.012540     | -0.000054 | 0           |
| 12      | UTI Bond Fund (D)                   | 0.041298      | -0.000054 | 1           |
| 13      | Reliance Income Retail (Annual)     | -1.465262     | -0.000054 | 0           |
| 14      | Reliance Income Retail GP- (G)      | -0.018423     | -0.000054 | 0           |
| 15      | Tata Income Fund (G)                | -0.037215     | -0.000054 | 0           |
| 16      | Tata Income Fund (HY)               | -1.290262     | -0.000054 | 0           |
| 17      | Sundaram BNP Income Plus (G)        | -0.057986     | -0.000054 | 0           |
| 18      | Sundaram BNP Income Plus (D)        | -0.065040     | -0.000054 | 0           |
| 19      | LICMF Bond Fund (G)                 | -0.042122     | -0.000054 | 0           |
| 20      | LICMF Bond Fund (D)                 | -0.062406     | -0.000054 | 0           |
| 21      | JM Income (G)                       | -0.167615     | -0.000054 | 0           |
| 22      | Canara Robeco Income (G)            | -0.057020     | -0.000054 | 0           |
| 23      | Canara Robeco Income (I)            | 0.030801      | -0.000054 | 1           |

Note: 1 stands for good performance and 0 stands for poor performance.

Application of Jensen’s Alpha:
Alpha measures differential return earned by the scheme while beta measures the systematic risk of the scheme. The parameters of the model have been estimated by standard regression techniques. Positive and significant alpha reflects superior performance.
Table No. 4 Application of Jensen’s Alpha Model

| Sr. No. | Name of the Scheme                              | Actual Return | Expected Return | Jensen Alpha |
|---------|-------------------------------------------------|---------------|-----------------|--------------|
| 1       | Birla Sun Life Income Fund (G)                   | 0.001139      | 0.001388        | -0.000249    |
| 2       | Birla Sun Life Income Fund (Div-Qty)             | 0.000569      | 0.001387        | -0.000818    |
| 3       | HDFC Income Fund (G)                            | 0.000926      | 0.001387        | -0.000461    |
| 4       | HDFC Income Fund (D)                            | 0.000256      | 0.001389        | -0.001133    |
| 5       | Templeton India Income Fund (G)                  | 0.001076      | 0.001388        | -0.000312    |
| 6       | Templeton India Income Fund (D)                  | 0.000402      | 0.001390        | -0.000988    |
| 7       | SBI Magnum Income Fund (G)                       | 0.000984      | 0.001388        | -0.000404    |
| 8       | SBI Magnum Income Fund (D)                       | 0.000248      | 0.001389        | -0.001141    |
| 9       | ICICI Prudential Income Plan (G)                 | 0.000629      | 0.001387        | -0.000759    |
| 10      | ICICI Prudential Income Plan (D)                 | -0.000237     | 0.001390        | -0.001626    |
| 11      | UTI Bond Fund (G)                               | 0.001213      | 0.001388        | -0.000175    |
| 12      | UTI Bond Fund (D)                               | 0.000356      | 0.001390        | -0.001034    |
| 13      | Reliance Income Retail (Annual)                  | -0.000077     | 0.001388        | -0.001465    |
| 14      | Reliance Income Retail GP- (G)                   | 0.000781      | 0.001387        | -0.000606    |
| 15      | Tata Income Fund (G)                            | 0.000719      | 0.001387        | -0.000669    |
| 16      | Tata Income Fund (HY)                            | 0.000098      | 0.001388        | -0.001290    |
| 17      | Sundaram BNP Income Plus (G)                     | 0.000809      | 0.001388        | -0.000579    |
| 18      | Sundaram BNP Income Plus (D)                     | 0.000803      | 0.001388        | -0.000585    |
| 19      | LICMF Bond Fund (G)                             | 0.000883      | 0.001388        | -0.000505    |
| 20      | LICMF Bond Fund (D)                             | 0.000702      | 0.001388        | -0.000686    |
| 21      | JM Income (G)                                   | 0.000718      | 0.001388        | -0.000670    |
| 22      | Canara Robeco Income (G)                        | 0.000932      | 0.001388        | -0.000456    |
| 23      | Canara Robeco Income (I)                        | -0.001045     | 0.001393        | -0.002438    |

Table 4 gives the results pertaining to Jensen measure. Out of the total 23 schemes, alpha value for all the selected schemes is negative thereby indicating inferior performance. In other words these schemes have generated returns less than the equilibrium returns. Equilibrium return is a return that is expected to be earned by a fund with a given level of systematic or market risk. These are the results of alpha when market returns are calculated on the basis of BSE Sensex.

**Application of Fama’s Segregation of Returns Model:**

Table 5 presents break up of portfolio returns with the help of Fama’s decomposition measures. In total 23 debt schemes, 20 schemes have positive growth rate while 3 schemes have negative growth rate in their NAV during study period. Further all schemes have less return than risk free rate of return. Due to net selectivity all selected schemes have shown poor performance. None of the schemes have been able to show positive return on the account of risk bearing activity of fund managers. Addendum, in all the schemes diversification is very poor and it shows the negative return. Thus it is concluded that these schemes could not earn more because of the improper diversification. There is a scope to the fund managers to increase the return of these schemes by applying the aspects of portfolio management like systematic risk, net selectivity and proper diversification.
Table No. 5 Application of Fama’s Segregation of Return Model

| Sr. No | Name of the Scheme                      | Funds Return | Risk Free Return | Net Selectivity | Systematic Risk | Imperfect Diversificatin |
|--------|-----------------------------------------|--------------|------------------|-----------------|----------------|--------------------------|
| 1      | Birla Sun Life Income Fund (G)          | 0.001139     | 0.00138          | 8               | 0.000247       | 0.000000                 | -0.000002               |
| 2      | Birla Sun Life Income Fund (Div-Qty)    | 0.000569     | 0.00138          | 8               | 0.000815       | -0.000001                | -0.000003               |
| 3      | HDFC Income Fund (G)                    | 0.000926     | 0.00138          | 8               | 0.000457       | -0.000001                | -0.000004               |
| 4      | HDFC Income Fund (D)                    | 0.000256     | 0.00138          | 8               | 0.001126       | 0.000001                 | -0.000008               |
| 5      | Templeton India Income Fund (G)         | 0.001076     | 0.00138          | 8               | 0.000309       | -0.000001                | -0.000003               |
| 6      | Templeton India Income Fund (D)         | 0.000402     | 0.00138          | 8               | 0.000982       | 0.000001                 | -0.000005               |
| 7      | SBI Magnum Income Fund (G)              | 0.000984     | 0.00138          | 8               | 0.000401       | -0.000001                | -0.000003               |
| 8      | SBI Magnum Income Fund (D)              | 0.000248     | 0.00138          | 8               | 0.001134       | 0.000001                 | -0.000008               |
| 9      | ICICI Prudential Income Plan (G)        | 0.000629     | 0.00138          | 8               | 0.000756       | -0.000001                | -0.000003               |
| 10     | ICICI Prudential Income Plan (D)        | -0.000237    | 0.00138          | 8               | 0.001617       | 0.000001                 | -0.000009               |
| 11     | UTI Bond Fund (G)                       | 0.001213     | 0.00138          | 8               | 0.000171       | -0.000001                | -0.000004               |
| 12     | UTI Bond Fund (D)                       | 0.000356     | 0.00138          | 8               | 0.001025       | 0.000001                 | -0.000008               |
| 13     | Reliance Income Retail (Annual)         | -0.000077    | 0.00138          | 8               | 0.001454       | 0.000000                 | -0.000012               |
| 14     | Reliance Income Retail GP- (G)          | 0.000781     | 0.00138          | 8               | 0.000603       | -0.000002                | -0.000004               |
| 15     | Tata Income Fund (G)                    | 0.000719     | 0.00138          | 8               | 0.000666       | -0.000001                | -0.000003               |
| 16     | Tata Income Fund (HY)                   | 0.000098     | 0.00138          | 8               | 0.001283       | 0.000000                 | -0.000007               |
| 17     | Sundaram BNP Income Plus (G)            | 0.000809     | 0.00138          | 8               | 0.000577       | -0.000001                | -0.000002               |
| 18     | Sundaram BNP Income Plus (D)            | 0.000803     | 0.00138          | 8               | 0.000583       | 0.000000                 | -0.000002               |
| 19     | LICMF Bond Fund (G)                     | 0.000883     | 0.00138          | 8               | 0.000498       | -0.000001                | -0.000006               |
| 20     | LICMF Bond Fund (D)                     | 0.000702     | 0.00138          | 8               | 0.000679       | -0.000001                | -0.000007               |
| 21     | JM Income (G)                           | 0.000718     | 0.00138          | 8               | 0.000669       | 0.000000                 | -0.000001               |
| 22     | Canara Robeco Income (G)                | 0.000932     | 0.00138          | 8               | 0.000453       | 0.000000                 | -0.000003               |
| 23     | Canara Robeco Income (I)                | -0.001045    | 0.00138          | 8               | 0.002419       | 0.000004                 | -0.000019               |
Conclusions
From the above analysis, it can be noted that open-ended debt mutual funds have not performed better than the benchmark indicators. The average return of the schemes is less than the market index. The empirical results show that on the basis of total risk the schemes are less volatile than the market. The value of $R^2$ ranges within 0.007 to 0.107, it shows that some of the schemes are well diversified and reduces the unsystematic risk. The beta value of the schemes is less than one indicates that the schemes are less affected by the market ups and downs. Further, the fund managers are found to be poor in terms of their ability of market timing and selectivity.

References
1. Jatana, Renu and Gupta, Nitin (2003), “Exchange Traded Funds- A Block of Stock and Mutual Funds”, The Indian Journal of Commerce, Volume 56, Number 2&3, pp.123.
2. Jensen, Michal, C. (1968), “The Performance of Mutual Funds in the period 1954-1964”, Journal of Finance, Volume 23, pp. 389-416.
3. Kane, Alve and Marks Gay (1983), “Performance Evaluation of Market Times- Theory & Evidence”, Journal of Financial and Quantitative Analysis, Volume 4, pp. 425-435.
4. Khurana Ajay, (1996), “Top Management turnover-An Empirical Investigation of Mutual Fund Managers”, Journal of Financial Economics, Volume 3.
5. Kun, Stanly J. and Frank C. Jen (1978), “Estimation of Time Varying Systematic Risk and Performance of Mutual Fund Portfolios: An Application of Switching Regression”, Journal of Finance, Volume 3, pp. 457-475.
6. Lee, Cheng-Few and Sahfiqur Rahman (1989), “Market Timing, Selectivity and Mutual Fund Performance: An Empirical Investigation”, Journal of Business, Number 21, pp. 261-278.
7. Mohanan, S. (2006), “Mutual Fund Industry in India: Development and Growth”, Global Business and Economic Review, Volume 8, Number 3/4, pp. 280-289.
8. Parihar, B. B. S., Sharma, Rajeev and Singh Parihar, Deepika (2009), “Analyzing Investors’ Attitude towards Mutual Funds as an Investment Option”, The ICFAI Journal of Management Research, Volume VIII, Number 7, pp. 56-64.
9. Sarkar, A.K. (1992), “Should We Invest in Mutual Funds”, The Management Accountant, Volume 27, Number 10, pp. 738.
10. Sharpe, William F. (1966), “Mutual Fund Performance”, Journal of Business, Volume 39, Supplement, pp. 119-138.
11. Treynor, J. (1965), “How to Rate Management of Investment Funds”, Harvard Business Review, Volume 43, pp. 63-75.
12. Williamson, J. (1972), “Measuring and Forecasting of Mutual Fund Performance Choosing and Investment Strategy”, Financial Analysis Journal, pp. 78-84.