

# Investment Performance Analysis Of Debt Mutual Funds In India – A Quantitative Approach

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## **Abstract:**

*Mutual funds are investments which allow the investor to have access to a wide range of securities. Among them the debt funds invest particularly in fixed income securities, which help the investor to balance the risk and return in his portfolio. Analysing any investment brings to light its current and future performance and its suitability to the investor. The study takes into consideration 15 schemes belonging to liquid funds, short term income funds and gilt funds. The performance is evaluated using Absolute Return, Standard deviation, beta, R-Squared, Sharpe, Treynor and Jensen's Alpha. The study concludes that the debt funds are more suitable for short term investments as the liquid and short-term funds are able to provide better risk adjusted returns. Moreover, the gilt funds are more prone to be affected by interest rate risk which will in turn lower the returns of the funds.*

**Keywords:** *Liquid Fund, Short Term Income Fund, Gilt Fund, Sharpe, Treynor and Jensen.*

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Date of Submission: 25-11-2024

Date of Acceptance: 05-12-2024

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## **I. Introduction**

To make money is easy. But, saving it and investing for the future requires commitment. It develops a sense of financial discipline. Investing involves committing your savings for causes which will develop an additional income or gain. It is allocating money with the intention of earning returns, which in turn increases your invested corpus to a larger sum.

In India, Inflation is one of the significant reasons which lead an investor to make investments. In order to stay ahead of the inflationary situation in the economy, one should be able to purchase in the future the same quantity of goods you purchase today. For that a person requires more money; which is possible only by earning more returns. Earning returns is the outcome of sound investments. Therefore, in order to beat inflation, you need to have more investments. If in the economy there is 6% inflation, it means that one should earn 6% more money, so as to purchase the same quantity next year. Thus, the returns of your investments must beat the inflation in the economy. This is particularly true in the case of India, as the inflation in the Indian economy is slowly picking up after the covid scenario in the country. With the availability of vaccines, the economy is bound to rise more swiftly.

The primary challenge that any investor faces is the plethora of investment options in the financial market. Markets for equity, real estate, bonds, other fixed income securities, derivatives have all matured and investors are more financially literate, making the financial market more information driven. The reach of the investment avenues have also widened. With globalisation, the interdependence of the world economies has channelized the way for a synergic development of the financial markets. The price fluctuations of the securities are also driven by events happening in distant areas. Therefore, it is an arduous task for an individual investor to keep track of all the changes occurring all over the world so as to make an investment decision. The mutual fund is an ideal answer to this issue. It is a trust form of organisation which collects funds from a large number of investors. The fund managers will invest the funds so collected in a variety of instruments on the basis of the nature of each mutual fund scheme. The returns earned from these securities and the capital appreciation gained, will be shared among the unit holder in accordance with the number of units held by them. Diversification is the key to the working of these funds.

In the current years, the mutual fund industry has shown a tremendous growth in the financial sector. Individual investors have become more information driven. We will be looking at a more evolved industry in the coming years.

## **II. Literature Review**

Adhav & Chauhan (2015) performed a comparative study of mutual funds of selected Indian companies. 390 schemes consisting of 178 equity funds, 138 debt funds and 74 hybrid funds were selected from among 15 AMCs. The analysis was done for a period of 5 years from 2009-10 to 2013-14. BSE Sensex, BSE 100, BSE 200, BSE 500 BSE Small Cap were used as benchmark indices for equity funds. CRISIL Balanced Fund was used as benchmark for hybrid funds and 91 day T-Bill was used as benchmark for debt funds. The T-Bill rate was also used as the risk free return. Tools like standard deviation and Sharpe measure was used for analysis. The study concluded that all the funds generated returns higher than the market returns and the performance of the funds during the period of study was good.

Devi & Kumar (2012) evaluated the performance of debt mutual funds in India. They had taken a sample of 137 mutual fund schemes and classified into five investment styles. The period of study ranged from 2003 to 2007. The performance of the selected funds was analysed using standard deviation, average rate of return, risk/return, Treynor ratio, Sharpe ratio and Jensen ratio. They were able to find that there was significant difference between the returns of debt floating rate funds while the returns of debt institutional, debt long term, debt short term and debt speciality did not significantly differ.

Dharmalingam & Gurunathan (2016) studied the performance of monthly income schemes in mutual fund industry in India. Ten income funds were selected for the period 2005-2015. Treynor measure, Sharpe measure and Jensen measure were used to analyse the data. Sortino ratio was also used for a detailed study. It was found that Tata Balanced Fund outperformed all other funds, followed by HDFC Children's Gilt Fund.

Kaur & Pasricha (2018) studied the performance evaluation of gilt mutual fund schemes in India. The study was conducted for a period of 5 years taking 15 gilt schemes from AMCs having highest asset under management. S & P BSE 10 year sovereign bond fund was considered as the benchmark index and 364 day Treasury bill was considered as risk free rate of return. The study concluded that all the gilt schemes had positive returns during the study period. Majority of the schemes also showed positive results with regard to risk adjusted measures like Sharpe, Treynor and Jensen.

Nanadhagopal, Varadharajan & Ramya (2012) studied the performance evaluation of mutual funds in India namely equity, income and gilt funds. Four schemes from each type of fund were selected on purposive sampling basis and on the basis of data availability. Tools like standard deviation, beta, Sharpe measure, Treynor measure, Jensen's Alpha and Fama's Performance Index were used for analysis. The study concluded that all the selected equity funds outperformed the expected return. In the case of income funds, the schemes produced lesser returns compared to equity schemes due to conservative nature of the funds. The gilt funds however, fared well during the 2008 stock market crash but showed a decline in performance during the recovery period due to interest rate fluctuations.

Selvavinayagam (2012) evaluated the performance of debt and equity fund in Coimbatore Capital Ltd. for a period of five years (2007-2011). Tools like beta, standard deviation, Treynor measure, Sharpe measure, and Jensen measure were used. The study concluded that most of the equity and debt schemes selected for the study are less volatile in the market as their beta is less than one.

Wachasundar (2018) studied the performance evaluation of liquid debt mutual fund schemes in India. A sample of 11 liquid debt mutual fund schemes was taken on convenience basis. The study was conducted for a period of 6 years and measures like standard deviation, average, beta, R-squared, Treynor, Sharpe and Jensen were used for the purpose of analysis. The study concluded that the liquid debt mutual funds had outperformed the benchmark indicators and that the returns and risk of the various schemes significantly differ.

### **Objectives of the Study**

1. To evaluate the risk, return and volatility of the selected mutual fund schemes.
2. To examine the risk adjusted performance of the selected debt mutual fund schemes.
3. To study the relationship of the funds with that of the benchmark index.

### **Hypotheses of the Study**

The following hypotheses were set for the effective completion of the study:

1.  $H_0$ : No difference was noticed in the Absolute Returns of the various AMCs.
2.  $H_0$ : No difference was noticed in the Annual Risk of the various AMCs.
3.  $H_0$ : No difference was noticed in the volatility of the various AMCs.
4.  $H_0$ : No difference was noticed in the risk adjusted performances of the AMCs in terms of total risk.
5.  $H_0$ : No difference was noticed in the risk adjusted performances of the AMCs in terms of systematic risk.

6. H<sub>0</sub>: No difference was noticed in the risk adjusted performances of the AMC's in terms of expected return.  
 7. H<sub>0</sub>: No difference existing between various AMC's in terms of relationship of the funds with that of the benchmark index

### III. Methodology Of The Study

In this study, 15 schemes of five AMC's have been taken as the samples. The AMC's with the highest Average AUM were taken as the AMC samples. Accordingly, HDFC Mutual Fund, ICICI Prudential Mutual Fund, SBI Mutual Fund, Aditya Birla Sun Life Mutual Fund and Nippon India Mutual Fund have been selected. Thereafter, three debt schemes, being a Liquid Fund, Short Term Income Fund and Gilt Fund were selected on convenience basis from each of the five AMC's.

#### Period of Study:

The study has been conducted for a period of 60 months, i.e. a total of 5 years. The period ranges from 1<sup>st</sup> April, 2015 to 31<sup>st</sup> March, 2020.

#### Source of Data:

The study is based on secondary data. Daily Net Asset Values for the period of five years from the AMFI website. As market return the CCIL T-Bill Liquidity Weight Index for liquid fund, and S&P BSE India Bond Index for short term income funds and gilt funds were taken. The risk free rate of return has been taken as the 91 Day Treasury Bill rate for liquid funds, and 364 Day Treasury Bill rate for short term income funds as well as Gilt funds, which was collected from the RBI website.

#### Tools for Analysis:

For the analysis Annual Absolute Return, Standard Deviation, Beta, R-Squared, Sharpe's Performance Index, Treynor Performance Index and Jensen's Alpha have been used. Hypotheses have been tested using one way ANOVA. Softwares like MS-Excel and socscistatistics.com have also been made use of.

### IV. Analysis And Findings

The analysis of the study is an evaluation of the 15 schemes on the basis of their performance with regard to certain selected variables; which include return, risk, volatility, correlation of the fund and benchmark and the risk adjusted performance.

#### Absolute Return

The table below depicts the average absolute returns of the funds. The yearly absolute returns were found using the equation:

$$\text{Absolute Return} = \frac{\text{NAV at the end of the year} - \text{NAV at the beginning of the year}}{\text{NAV at the beginning of the year}}$$

**Table 1**  
**Average Annual Absolute Returns of the selected schemes**

Scheme Name	Absolute Return	Rank
<b>SBI</b>		
SBI Liquid Fund	7.08	14
SBI Short Term Debt Fund	7.56	7
SBI Magnum Gilt Fund	8.91	2
<b>HDFC</b>		
HDFC Liquid Fund	7.02	15
HDFC Short Term Debt Fund	8.02	5
HDFC Gilt Fund	7.29	10
<b>ICICI PRUDENTIAL</b>		
ICICI Prudential Liquid Fund	7.11	13
ICICI Prudential Short Term Fund	7.83	6
ICICI Prudential Gilt Fund	8.46	4
<b>ADITYA BIRLA</b>		
Aditya Birla Sun Life Liquid Fund	7.14	12
Aditya Birla Sun Life Short Term Fund	7.50	8
Aditya Birla Sun Life Govt. Sec. Fund	8.74	3
<b>NIPPON INDIA</b>		
Nippon India Liquid Fund	7.15	11
Nippon India Short Term Fund	7.35	9
Nippon India Gilt Securities Fund	9.20	1

*Source: Calculated Data from Daily NAVs*

Table 1 depicts that the gilt funds show the highest absolute returns than the liquid funds and short term income funds. This is true except for the HFDC Gilt Fund which generated the lowest absolute returns among the gilt funds, in most of the years. Nippon India Gilt Fund has generated the highest returns among the selected schemes. The HFDC Short Term Debt Fund has generated average absolute returns almost close to the other selected gilt funds, which shows its exceptionally good performance among the short term income funds.

Based on Table 1 the following hypothesis was tested:

H<sub>0</sub>: No difference was noticed in the Absolute Returns of the various AMCs.

H<sub>1</sub>: Difference was noticed in the Absolute Returns of the various AMCs.

**Table 2**  
**One way ANOVA for Absolute Returns**

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F-Value	P-Value	Table Value	Decision
Between	0.66	4	0.16	0.0578	0.9932	2.87	Failed to reject H <sub>0</sub>
Within	56.64	20	2.83				
Total	57.30	24					

*Source: Calculated Data*

The computed value (0.0578) is lesser than the table value 2.87 at 5 per cent level of significance and P-value is greater than 0.05. Thus, the values failed to reject the null hypothesis. That is, the choice of the AMC does not have an influence on the returns generated.

**Risk Component**

The risk element of the funds was calculated using the standard deviation. The following formula was used for the purpose:

$$\sigma = \sqrt{\frac{\sum(X - \bar{X})^2}{n}}$$

Where,  $\sigma$  = Standard Deviation,  $X$  = Daily NAVs over the year,  $\bar{X}$  = AVERAGE daily return and  $n$  = Time period

**Table 3**  
**Average Annual Risk of the selected schemes**

Scheme Name	Average Annual Risk	Rank
<b>SBI</b>		
SBI Liquid Fund	0.10	15
SBI Short Term Debt Fund	1.32	9
SBI Magnum Gilt Fund	3.80	4
<b>HDFC</b>		
HDFC Liquid Fund	0.18	11
HDFC Short Term Debt Fund	1.18	10
HDFC Gilt Fund	3.36	5
<b>ICICI PRUDENTIAL</b>		
ICICI Prudential Liquid Fund	0.15	13
ICICI Prudential Short Term Fund	1.60	7
ICICI Prudential Gilt Fund	4.54	1
<b>ADITYA BIRLA</b>		
Aditya Birla Sun Life Liquid Fund	0.14	14
Aditya Birla Sun Life Short Term Fund	1.72	6
Aditya Birla Sun Life Govt. Sec. Fund	4.37	2
<b>NIPPON INDIA</b>		
Nippon India Liquid Fund	0.16	12
Nippon India Short Term Fund	1.37	8
Nippon India Gilt Securities Fund	4.05	3

*Source: Calculated Data*

Table 2 depicts that the highest risk component is displayed by the gilt funds which may be attributed to its long maturity period. They are followed by the short term income funds and liquid funds. The ICICI Prudential Gilt Fund shows the highest variability in return closely followed by Aditya Birla Sun Life Government securities fund. However, all the liquid funds show negligible risk. Therefore, investors who do not prefer risk may opt for liquid funds or short term income funds.

Based on Table 3 the following hypothesis was tested:

H<sub>0</sub>: No difference was noticed in the Annual Risk of the various AMCs.

H<sub>1</sub>: Difference was noticed in the Annual Risk of the various AMCs.

**Table 4**  
**One way ANOVA for Annual Risk**

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F-Value	P-Value	Table Value	Decision
Between	1.00	4	0.25	1.0275	0.4173	2.87	Failed to reject H <sub>0</sub>
Within	4.85	20	0.24				
Total	5.85	24					

Source: Calculated Data

The computed value (1.0275) is lesser than the table value 2.87 at 5 per cent level of significance and P-value is greater than 0.05. Thus, the values failed to reject the null hypothesis. That is, the choice of the AMC does not have an influence on the risk.

**Volatility of the fund**

Beta is an important tool to determine the non-diversifiable risk (Volatility) of an investment. It is commonly expressed as:

$$\beta = \frac{Cov. (x, y)}{Var. (x)}$$

Where, x = Return of scheme x, y = Return of market index and Cov. = Covariance

**Table 5**  
**Average Annual Beta of the selected schemes**

Scheme Name	Average Annual Beta	Rank
<b>SBI</b>		
SBI Liquid Fund	0.26	10
SBI Short Term Debt Fund	0.31	8
SBI Magnum Gilt Fund	0.80	4
<b>HDFC</b>		
HDFC Liquid Fund	0.29	9
HDFC Short Term Debt Fund	0.25	11
HDFC Gilt Fund	0.80	4
<b>ICICI PRUDENTIAL</b>		
ICICI Prudential Liquid Fund	0.24	12
ICICI Prudential Short Term Fund	0.38	6
ICICI Prudential Gilt Fund	0.97	1
<b>ADITYA BIRLA</b>		
Aditya Birla Sun Life Liquid Fund	0.23	13
Aditya Birla Sun Life Short Term Fund	0.39	5
Aditya Birla Sun Life Govt. Sec. Fund	0.95	2
<b>NIPPON INDIA</b>		
Nippon India Liquid Fund	0.22	14
Nippon India Short Term Fund	0.32	7
Nippon India Gilt Securities Fund	0.88	3

Source: Calculated Data

Table 5 portrays that of the selected funds, the gilt funds are the most volatile; the highest among them being the ICICI Prudential Gilt Fund. It is closely followed by Aditya Birla Sun Life Government Securities Fund. The gilt funds have beat the market in most of the years under study. The least volatile schemes are the liquid fund. An exceptional scheme to this scenario is the HDFC Short Term Debt Fund, which is less volatile than even the liquid fund. It is the least risky short term fund among the lot. The HDFC Liquid Fund however is the most volatile liquid fund.

Based on Table 5 the following hypothesis was tested:

H<sub>0</sub>: No difference was noticed in the Annual Beta of the various AMCs.

H<sub>1</sub>: Difference was noticed in the Annual Beta of the various AMCs.

**Table 6**  
**One way ANOVA for Annual Beta**

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F-Value	P-Value	Table Value	Decision
Between	0.03	4	0.01	0.2689	0.8945	2.87	Failed to reject H <sub>0</sub>
Within	0.55	20	0.03				
Total	0.58	24					

Source: Calculated Data

The computed value (0.2689) is lesser than the table value 2.87 at 5 per cent level of significance and P-value is greater than 0.05. Thus, the values failed to reject the null hypothesis. That is, the choice of the AMC does not have an influence on the Volatility.

**Risk Adjusted Returns in terms of Total Risk**

The risk adjusted returns in terms of total risk was found using the Sharpe's Performance Index. The formula for the same is given below:

$$\text{Sharpe Ratio} = (\text{Portfolio Return} - \text{Risk free return}) / \text{Standard Deviation}$$

**Table 7**  
**Average Annual Sharpe Values of the selected schemes**

Scheme Name	Average Annual Sharpe Values	Rank
<b>SBI</b>		
SBI Liquid Fund	17.76	1
SBI Short Term Debt Fund	0.76	7
SBI Magnum Gilt Fund	0.55	12
<b>HDFC</b>		
HDFC Liquid Fund	5.66	5
HDFC Short Term Debt Fund	1.47	6
HDFC Gilt Fund	0.22	15
<b>ICICI PRUDENTIAL</b>		
ICICI Prudential Liquid Fund	10.18	4
ICICI Prudential Short Term Fund	0.75	8
ICICI Prudential Gilt Fund	0.40	14
<b>ADITYA BIRLA</b>		
Aditya Birla Sun Life Liquid Fund	10.81	2
Aditya Birla Sun Life Short Term Fund	0.61	10
Aditya Birla Sun Life Govt. Sec. Fund	0.49	13
<b>NIPPON INDIA</b>		
Nippon India Liquid Fund	10.53	3
Nippon India Short Term Fund	0.57	11
Nippon India Gilt Securities Fund	0.63	9

Source: Calculated Data

Table 7 point out that the SBI Liquid Fund portrays the best risk adjusted performance in terms of standard deviation. It can be noted that all the liquid funds show the best Sharpe values, followed by the short term income funds and the gilt funds. However, the Nippon India Gilt Securities Fund is an exception to this trend. It shows a better risk adjusted performance than some of the short term income funds.

Based on Table 7 the following hypothesis was tested:

H<sub>0</sub>: No difference was noticed in the risk adjusted performances of the AMCs in terms of total risk.

H<sub>1</sub>: Difference was noticed in the risk adjusted performances of the AMCs in terms of total risk.

**Table 8**  
**One way ANOVA for Annual Sharpe Values**

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F-Value	P-Value	Table Value	Decision
Between	39.85	4	9.96	0.7944	0.5427	2.87	Failed to reject H <sub>0</sub>
Within	250.83	20	12.54				
Total	290.68	24					

Source: Calculated Data

The computed value (0.7944) is lesser than the table value 2.87 at 5 per cent level of significance and P-value is greater than 0.05. Thus, the values failed to reject the null hypothesis. That is, the choice of the AMC does not have any bearing on the Sharpe values.

**Risk Adjusted Performance in terms of Systematic Risk**

The risk adjusted performance in terms of Systematic Risk is measured by the Treynor’s Performance Index. The formula used is:

$$\text{Treynor Ratio} = (\text{Average Returns of Portfolio} - \text{Average Risk Free Rate}) / \text{Beta}$$

**Table 9**  
**Average Annual Treynor Values of the selected schemes**

Scheme Name	Average Annual Treynor Values	Rank
<b>SBI</b>		
SBI Liquid Fund	5.23	5
SBI Short Term Debt Fund	3.71	6
SBI Magnum Gilt Fund	2.89	11
<b>HDFC</b>		
HDFC Liquid Fund	3.65	7
HDFC Short Term Debt Fund	7.71	2
HDFC Gilt Fund	1.02	15
<b>ICICI PRUDENTIAL</b>		
ICICI Prudential Liquid Fund	5.53	4
ICICI Prudential Short Term Fund	3.48	8
ICICI Prudential Gilt Fund	2.11	14
<b>ADITYA BIRLA</b>		
Aditya Birla Sun Life Liquid Fund	5.80	3
Aditya Birla Sun Life Short Term Fund	2.92	10
Aditya Birla Sun Life Govt. Sec. Fund	2.56	13
<b>NIPPON INDIA</b>		
Nippon India Liquid Fund	9.27	1
Nippon India Short Term Fund	2.69	12
Nippon India Gilt Securities Fund	3.42	9

Source: Calculated Data

Table 9 portrays that the Nippon India Liquid Fund presents the best risk adjusted performance in terms of beta, owing to the low beta the fund has. Generally, the liquid funds portray better Treynor values depicting better risk adjusted performance. However, an exception to this is the HDFC Short Term Debt Fund, which portrays better risk adjusted performance than the other liquid funds. The Nippon India Gilt Securities Fund and the SBI Magnum Gilt Fund also show better returns after adjusting for the beta values.

Based on Table 9 the following hypothesis was tested:

H<sub>0</sub>: No difference was noticed in the risk adjusted performances of the AMC’s in terms of systematic risk.

H<sub>1</sub>: Difference was noticed in the risk adjusted performances of the AMC’s in terms of systematic risk.

**Table 10**  
**One way ANOVA for Annual Treynor Values**

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F-Value	P-Value	Table Value	Decision
Between	6.75	4	1.69	0.1497	0.9610	2.87	Failed to reject H <sub>0</sub>
Within	225.34	20	11.27				
Total	232.09	24					

Source: Calculated Data

The computed value (0.1497) is lesser than the table value 2.87 at 5 per cent level of significance and P-value is greater than 0.05. Thus, the values failed to reject the null hypothesis. That is, the choice of the AMC does not have any bearing on the Treynor values.

**Risk Adjusted Performance in terms of Expected Return**

The risk adjusted performance in terms of expected return is found using the Jensen’s Alpha. The formula used to calculate the alpha values of the fund is given below:

$$\text{Jensen’s Index} = (\text{Total return} - \text{Risk free rate}) - [\text{Portfolio } \beta * (\text{Market return} - \text{Risk free rate})]$$

**Table 11**  
**Average Annual Alpha Values of the selected schemes**

Scheme Name	Average Annual Alpha Values	Rank
<b>SBI</b>		
SBI Liquid Fund	1.49	1
SBI Short Term Debt Fund	0.13	8

SBI Magnum Gilt Fund	0.35	6
<b>HDFC</b>		
HDFC Liquid Fund	1.46	3
HDFC Short Term Debt Fund	0.62	4
HDFC Gilt Fund	-1.09	13
<b>ICICI PRUDENTIAL</b>		
ICICI Prudential Liquid Fund	1.46	3
ICICI Prudential Short Term Fund	0.26	7
ICICI Prudential Gilt Fund	-0.37	12
<b>ADITYA BIRLA</b>		
Aditya Birla Sun Life Liquid Fund	1.47	2
Aditya Birla Sun Life Short Term Fund	-0.19	11
Aditya Birla Sun Life Govt. Sec. Fund	-0.14	10
<b>NIPPON INDIA</b>		
Nippon India Liquid Fund	1.47	2
Nippon India Short Term Fund	0.00	9
Nippon India Gilt Securities Fund	0.42	5

Source: Calculated Data

Table 11 depicts that the liquid funds show better risk adjusted performances in terms of expected returns of which the SBI liquid fund portrays the best Alpha value. It is closely followed by Aditya Birla Sun Life Liquid Fund and Nippon India Liquid Fund. The HDFC Short Term Debt Fund shows a good risk adjusted performance among the short term income funds. However, it is to be noted that the Nippon India Gilt Securities Fund and the SBI Magnum Gilt Fund have outperformed most of the short term funds in terms of Alpha values, portraying a good risk adjusted performance.

Based on Table 11 the following hypothesis was tested:

H<sub>0</sub>: No difference was noticed in the risk adjusted performances of the AMC's in terms of expected return.

H<sub>1</sub>: Difference was noticed in the risk adjusted performances of the AMC's in terms of expected return.

**Table 12**  
One way ANOVA for Annual Alpha Values

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F-Value	P-Value	Table Value	Decision
Between	0.44	4	0.11	0.1239	0.9722	2.87	Failed to reject H <sub>0</sub>
Within	17.59	20	0.88				
Total	18.03	24					

Source: Calculated Data

The computed value (0.1239) is lesser than the table value 2.87 at 5 per cent level of significance and P-value is greater than 0.05. Thus, the values failed to reject the null hypothesis. That is, the choice of the AMC does not have any bearing on the Alpha values.

#### Relationship between Fund and Benchmark Index

The correlation between the fund and the benchmark index is calculated using the R-Squared value. It depicts the reliability of the beta value.

**Table 13**  
Average Annual R-Squared Values of the selected schemes

Scheme Name	Average Annual R-Squared Values	Rank
<b>SBI</b>		
SBI Liquid Fund	34.79	5
SBI Short Term Debt Fund	35.12	4
SBI Magnum Gilt Fund	29.22	10
<b>HDFC</b>		
HDFC Liquid Fund	19.88	15
HDFC Short Term Debt Fund	27.67	11
HDFC Gilt Fund	36.25	1
<b>ICICI PRUDENTIAL</b>		
ICICI Prudential Liquid Fund	22.47	12
ICICI Prudential Short Term Fund	36.02	2
ICICI Prudential Gilt Fund	29.54	9
<b>ADITYA BIRLA</b>		
Aditya Birla Sun Life Liquid Fund	21.04	13
Aditya Birla Sun Life Short Term Fund	33.91	6



Aditya Birla Sun Life Govt. Sec. Fund	30.55	8
<b>NIPPON INDIA</b>		
Nippon India Liquid Fund	20.08	14
Nippon India Short Term Fund	35.87	3
Nippon India Gilt Securities Fund	31.25	7

*Source: Calculated Data*

Table 13 depicts that The R-Squared values of all the funds are lower than 40 per cent, which shows that there is low correlation between the fund and the benchmark index. The funds movements cannot be accurately explained by the benchmark index. So the reliability of the beta value is low.

Based on Table 13 the following hypothesis was tested:

H<sub>0</sub>: No difference existing between various AMC's in terms of relationship of the funds with that of the benchmark index.

H<sub>1</sub>: Difference existing between various AMC's in terms of relationship of the funds with that of the benchmark index

**Table 14**  
**One way ANOVA for Annual R-Squared Values**

Source of Variation	Sum of Squares	Degree of Freedom	Mean Squares	F-Value	P-Value	Table Value	Decision
Between	81.00	4	20.25	0.3703	0.8270	2.87	Failed to reject H <sub>0</sub>
Within	1093.73	20	54.69				
Total	1174.73	24					

*Source: Calculated Data*

The computed value (0.3703) is lesser than the table value 2.87 at 5 per cent level of significance and P-value is greater than 0.05. Thus, the failed to reject the null hypothesis. That is, the choice of the AMC does not have any bearing on the R-Squared value.

## V. Conclusion

There are numerous debt schemes belonging to various Asset Management Companies available in the market. Selecting the best from among them is a tedious task. The present study considers fifteen schemes belonging to three maturity classes. From the study it can be generally stated that, the debt funds perform better for a short duration. This is because, even though the gilt funds produce higher absolute returns, the presence of higher risk lowers their risk adjusted returns. In such a scenario, the liquid funds and the short term debt funds are more beneficial due to their better risk adjusted performances. Also, the performance of certain AMC's is more consistent among the various categories of funds. In the study the SBI Mutual fund has shown the most consistency in performance across the various categories of debt funds.

Since 2020, the debt mutual fund sector is picking up its market among the individual investors. Initially this market was open mostly to the institutional investors. However, the opening of certain debt instruments for individual trading especially the bonds has improved the participation of the individuals in the debt mutual fund sector. The coming years are also bound to show an uptrend in the individual participation in the debt market. Even in these years the performance of the short term funds will be better than long term and gilt funds due to its higher risk adjusted return The results of this study therefore will also have a bearing in the trend shown in 2024.

### Scope for Further Research

The study can be extended to include other categories of debt funds like the overnight funds or the sectoral wise debt funds. That will give a more complete picture of the debt mutual fund market. There are certain objective-oriented funds like the dynamic funds or the capital-oriented funds or the hybrid funds or even the monthly income plans. Such funds can be analysed to evaluate its performance and find out whether it is actually able to achieve its objectives. The performance evaluation study can also be conducted as a comparison of the equity funds and the debt funds. Such a study will throw light on the differences in the operations of these funds. It will also help investors to decide whether to invest in equity or in debt. The study can also be designed in such a way as to compare the performances of the public sector mutual funds and private sector mutual funds in the debt market, which will give new insights on their performances and an aid in decision making.

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