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Performance Evaluation of Corporate Debt (Tier-I) Scheme of National Pension System

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Abstract

National Pension System was introduced by Government of India for all its recruits in Central Government Services on or after 1st January, 2004 except for armed forces. The new system was launched on the basis of OASIS report. The earlier system was unaffordable and was limited mainly for the civil servants. Another major old age social security scheme run by EPFO mainly covers the workers of organized sector. In-spite of these merely 15 percent workers were covered by old age social security schemes. Hence, majority of workforce was left behind the coverage of old age social security. These workers are mainly unorganized workers. The NPS was launched to cover this workforce under old age social security scheme and to reduce the financial burden of the government on earlier Defined Benefit Scheme for civil servants. The new scheme was based upon the Defined Contributory System in which both employer and employee contribute a fixed amount for old age social security. A subscriber can open two types of account under NPS namely Tier-I and Tier-II account. Various models of NPS namely "Central Government Model", "State Government Model", "All Citizen Model", "Corporate Model", "Swavalamban Scheme (NPS-Lite)" and Atal Pension Yojna were launched to provide the old age social security to the entire workforce. In the present study the Corporate Debt (Tier-I) Scheme offered under "All Citizen Model" of NPS has been studied. Daily NAVs of seven PFMs running the scheme were taken for the analysis of the scheme. Beta Coefficient, Coefficient of Variation, Coefficient of Determination, Jensen's Alpha, Treynor's Index, Sharpe Ratio and Two-Way ANOVA were also used for the analysis of the data. LIC PF was found as the best performer under the scheme followed by ICICI PF and HDFC PF.

Key Words: National Pension System, NPS, Sharpe Ratio, Jensen's Alpha, Beta Coefficient

1. Introduction

The National Pension System (NPS) was evolved on the basis of OASIS report to replace the earlier Old Pension Scheme of government employees which was a Defined Benefit Pension Scheme (DB Scheme) and to provide the old age social security to the workers of unorganized sector. The Government of India was finding it difficult to provide the pension under earlier DB Scheme to its employees due to the heavy financial burden on the government's exchequer. The Old Pension Scheme was available mainly for the government employees and the workers working in organized sector were mainly covered by the Employee Provident Fund Scheme. The majority of workers working in unorganized sector were remained uncovered by any type of old age social security scheme. At present merely 15 percent workers are covered by some kind of old age social security cover. Around 85 percent of Indian workers are working in unorganized sector and it is expected that more than 90 percent of future workers will work in unorganized sector. It is a great challenge before the Government of India to provide old age social security to this large size of workforce from its own resources.

With the above mentioned objectives, the Government of India introduced NPS for all of its recruits except in armed forces who had joined Central Government Services on or after 1st January, 2004. Later on almost all of the state governments except the States of West Bengal and Tripura have implemented the scheme for their government employees. The scheme has been implemented in these states from the date of notification in this regard. The Central Government Employees and State Government Employees are covered by "Central Government Model" and "State Government Model" of NPS respectively. To cover the unorganized sector workers and general public, various schemes have been launched under the "All Citizen Model", "Corporate Model", "NPS Swavalamban (NPS-Lite)" and "Atal Pension Yojna (APY)". NPS Swavalamban and APY were primarily launched to cover the unorganized sector workers.

Later on NPS Swavalamban scheme was discontinued for new registrations as it was unable to attract the unorganized workers. The absence of guaranteed amount of pension upon attaining the age of 60 was considered as the main cause behind its failure in attracting the workforce towards the scheme. To overcome this deficiency, APY was launched on 9th May, 2015 with the provision of guaranteed pension of Rs. 1000, Rs. 2000, Rs. 3000, Rs. 4000 and Rs. 5000 upon payment of defined contribution which is dependent upon the age and amount of guaranteed pension amount required by the subscriber. Further "All Citizen Model" of NPS was launched to enroll the general public into NPS.

The investment pattern under Central Government Model, State Government Model and APY are fixed by the Government and individual subscribers are not allowed to change the investment pattern and their Pension Fund Managers (PFMs). Under "All Citizen Model", the investors are free to choose their own investment mix and PFMs to manage the investment. Presently the funds are invested in Assets Backed Securities (A-Class), Corporate Debt Securities (C-Class), Equity (E-Class) and Government Securities (G-Class) in varying proportions. Under "All Citizen Model", the investors can choose the "Auto Choice" or "Active Choice" to allocate the funds into different categories of securities. If the investor select the "Auto Choice" mode of investment than his funds will be invested by the PFMs according to the age of the subscriber which is known as Life Cycle Fund. In Life Cycle Fund, the investment in Equity and Corporate Debt segments reduces with the advancement in age whereas the investment in Government Securities increases with the advancement of age. Three different choices are available under Auto Choice mode namely, LC-25, LC-50 and LC-75 which are also known as conservative, moderate and aggressive investment options. LC-50 is the auto choice for the investors who do not select any option while making investment under All Citizen Model of NPS. If an investor select the active choice mode, than the investor is free to select any investment mix subject to maximum 50 percent investment in Equity (E-Class).

According to the investment guidelines issued by PFRDA, the PFMs may investment the funds received under the Corporate Debt Scheme of All Citizen Model into the following securities:

1. Listed (or proposed to be listed in case of fresh issue) debt securities issued by bodies corporate including banks and public financial institutions which have a minimum residual maturity period of three years from the date of investment.
2. Basel III Tier-I bonds issued by scheduled commercial banks under RBI Guidelines.
3. Rupee Bonds having an outstanding maturity of at least 3 years issued by institutions of International Bank for Reconstruction and Development, International Finance Corporation and Asian Development Bank.
4. Term Deposit Receipts of not less than one year duration issued by scheduled commercial banks upon fulfillment of certain conditions.

5. Units of Debt Mutual Funds as regulated by SEBI.
6. Listed (or proposed to be listed in case of fresh issue) debt securities issued by body corporate engaged mainly in the business of development or operation and maintenance of infrastructure or development construction or finance of low cost housing.
7. Listed and proposed to be listed Credit Rated Municipal Bonds.

The investment in these securities requires to fulfill the condition of having a minimum 'AA' rating and are further subject to certain conditions as mentioned in the investment guidelines issued for investment by Pension Fund Regulatory and Development Authority (PFRDA). Since considerable time has been lapsed from inception of the scheme and no study has been undertaken to review the financial performance of the scheme, hence the present study is undertaken to review the Corporate Debt Scheme (Tier-I) of NPS.

2. Review of Literature

Sondhi (2004), Lakshmi (2007), Jagric, Podobnik, Strasek and Jagric (2007), Kundu (2009), Kandpal and Kavidayal (2011), Kumar (2011), Gohar, Ahmed and Niazi (2011), Nimalathasan and Gandhi (2012) etc. have studied the performance of various mutual funds in India and abroad. Some of them i.e. Sondhi (2004), Kandpal and Kavidayal (2011), Nimalathasan and Gandhi (2012) etc. have evaluated the comparative performance of mutual funds operated by private sector and public sector companies. Most of the researchers have used the Standard Deviation, Beta, Sharpe Ratio, Treynor's Measure, Jensen's Alpha for the comparison of various schemes. Kundu (2009) and Kandpal and Kavidayal (2011) have used the Fama Model to evaluate the stock selection ability of mutual fund houses. Gohar et al. (2011) and Nimalathasan and Gandhi (2012) have also used the Information Ratio in addition to Sharpe Ratio, Treynor's Ratio and Jensen's Alpha. Most of the researchers have used return on T-Bills of varying period as risk free rate of return.

3. Objectives of the Study

The present study is undertaken to review the financial performance of Corporate Debt Scheme (Tier-I) of NPS run by various PFMs.

4. Research Methodology

The present study is based upon the secondary data which have been collected from the website of respective PFM and NPS Trust. The daily NAV from the date of inception of scheme i.e. 1st May, 2009 to 31st December, 2016 has been taken for analysis of performance of the scheme. The S & P BSE India Corporate Bond Index has been used as the proxy for comparison of the scheme. The rate of interest on PPF has been taken as risk free rate of return which is 8.1 percent in present. Various measures like CAGR, Standard Deviation, Correlation Coefficient, Coefficient of Determination, Sharpe Ratio, Jensen's Alpha, Treynor's Ratio have been used for analysis of the scheme.

Before using the NAVs available on the website of respective PFMs and NPS Trust for analysis of the scheme, the NAVs were checked for any mistake, abnormality and missing values. The values were adjusted by taking appropriate measures before further analysis. The log returns were used for analysis and the data was checked for stationarity. The log returns were found stationary and the Augmented Dickey Fuller Test was used to reject the hypothesis that the 'Returns has a unit root'. The Two-Way ANOVA method was used to test the following hypotheses:

1. H_0: There is no significant difference in the returns generated by various PFMs.

2. H_0: There is no significant difference in the quarterly returns generated by a PFM.

5. Performance Analysis of Corporate Debt (Tier-I) Scheme of NPS

Table and Figure1 reveal that SBI PF (43.52 percent), ICICI PF (21.78 percent) and HDFC PF (14.95 percent) are the majority assets holder in the Corporate Debt Scheme segment which together holds 80 percent of assets under the segment.

Table 1: Assets Holding of various PFMs under Corporate Debt Scheme (Tier-I) of NPS

as on 31st December, 2016

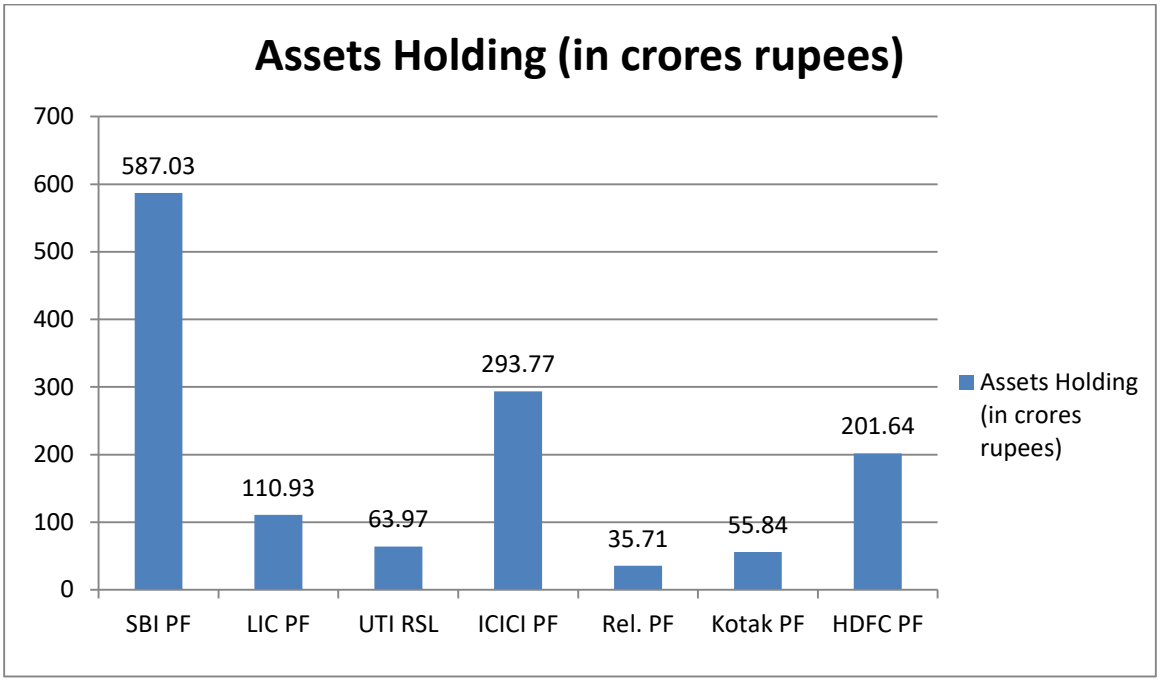
Particulars	**SBIPF**	**LICPF**	**UTI RSL**	**ICICI PF**	**REL. PF**	**KOTAK PF**	**HDFC PF**
Assets (Rs. In Cr.)	587.03	110.93	63.97	293.77	35.71	55.84	201.64
Assets holding (in %)	43.52	8.22	4.74	21.78	2.65	4.14	14.95
Scheme Inception Date	01.05.09	23.07.13	01.05.09	01.05.09	01.05.09	01.05.09	01.08.13

Note. Adapted from "*NPS Scheme – C",* by NPS Trust, 2016. Retrieved from http://www.nps trust.org.in/images/C-1_Dec16.pdf

The other PFMs namely LIC PF (8.22 percent), UTI RSL (4.74 percent), Kotak PF (4.14 percent) and Reliance PF (2.65 percent) are holding together only 20 percent assets under the scheme. LIC PF and HDFC PF have started the scheme in July, 2013 and August, 2013 whereas other PFMs have started the scheme in May, 2009. Further the public sector firms are attracting more funds under the scheme in comparison to private sector firms.

Figure 1: Assets Holding of various PFMs under Corporate Debt (Tier-I) Scheme

as on 31st December, 2016



Source: Calculated using the data of Table 1.

Table 2 shows the returns generated by each PFM under different time periods. The table shows that all the PFMs are generating more returns than their benchmark return under all categories. All the PFMs have generated more than 13 percent return in last one year time period with Kotak PF at top (14.19 percent). LIC PF (12.49 percent) has generated the highest return in "Since Inception" category followed by HDFC PF (12.33 percent), SBI PF (11.48 percent), ICICI PF (11.43 percent), Kotak PF (11.41 percent), UTI RSL (10.06 percent) and Reliance PF (9.91 percent). However, all the PFMs are beating their benchmark return in all categories.

Table 2: Returns Generated by various PFMs under Corporate Debt (Tier-I) Scheme of NPS

Particulars	SBIPF	LICPF	UTI RSL	ICICI PF	REL. PF	KOTAK PF	HDFC PF
Last 6 Months Return	7.95	7.77	7.69	8.2	7.99	8.4	7.58
Bench. Return for all PFMs	6.05						
Last 1 Year Return	13.44	13.38	13.44	13.73	13.54	14.19	13.33
Bench. Return for all PFMs	11.13						
Last 2 Year Return	11.46	12.0	11.47	12.30	11.54	11.98	11.6
Bench. Return for All PFMs	10.07						
Last 3 Year Return	12.54	12.59	12.39	13.06	12.44	12.85	12.42
Bench. Return for all PFMs	11.16						
Since Inception Return	11.48	12.49	10.06	11.43	9.91	11.41	12.33
Bench. Return	9.29	10.76	9.29	9.29	9.29	9.29	10.88

Note. Adapted from "*NPS Scheme – C",* by NPS Trust, 2016. Retrieved from http://www.nps trust.org.in/images/C-1_Dec16.pdf

Note: (1) Scheme returns for more than one year are annualized. (2) Benchmark return shown in each place corresponds to its just preceding return.

Table 3 shows that the LIC PF and HDFC PF have the lowest variations in their returns as their Coefficient of Variation are considerably lower than others. The value of Beta Coefficient of LIC PF (0.27) is the lowest in the segment followed by HDFC PF (0.33). The Beta Coefficient of SBI PF (0.91) is the highest among all the PFMs. LIC PF (3.67) is generating the highest value of Jensen's Alpha followed by HDFC PF (3.31) whereas their Beta Coefficient are on lower side. The value of Treynor's Index is the highest in case of LIC PF followed by HDFC PF. The Sharpe Ratio of LIC PF is the lowest among all the PFMs and it is also lower than the Sharpe Ratio of benchmark which indicates that the PFM is underperformed the market. The higher value of Treynor's Index with low Sharpe Ratio indicates the larger unique risk of LIC PF. Other PFMs are generating higher Sharpe Ratio than Sharpe Ratio of benchmark index which means they are outperforming the market.

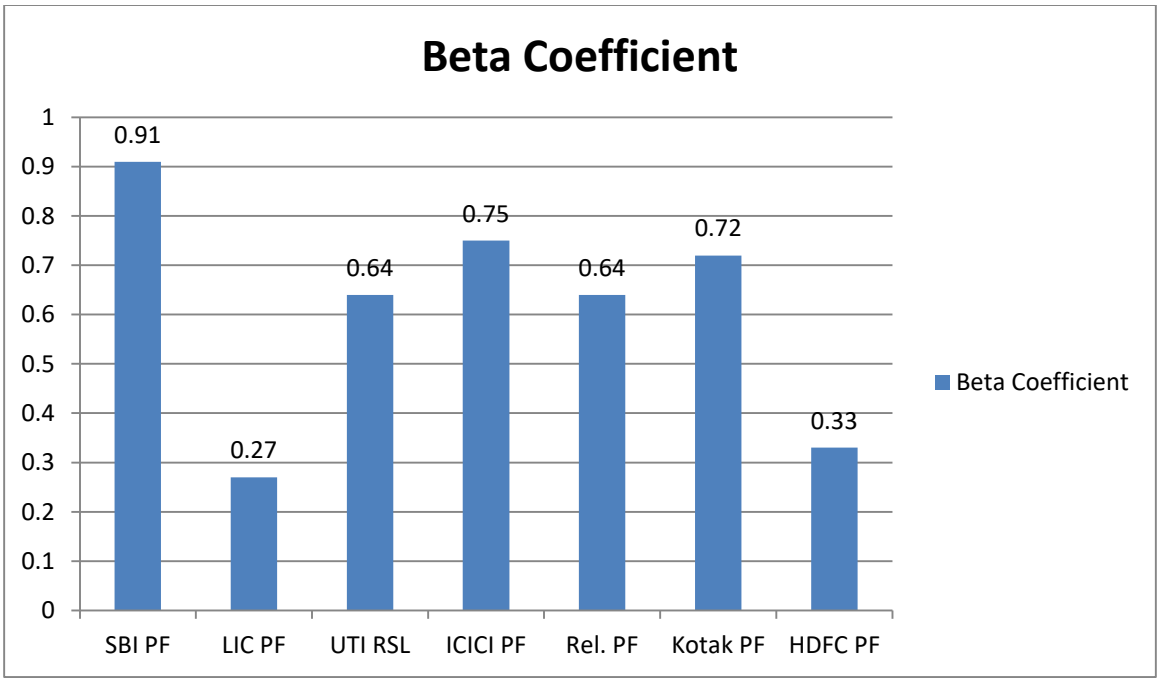
Table 3: Risk and Return Analysis of various PFMs operating Corporate Debt (Tier-I) Scheme of NPS

Particulars	SBIPF	LICPF	UTI RSL	ICICI PF	REL. PF	KOTAK PF	HDFC PF
Coefficient of Variance	23.76	12.21	22.50	23.97	22.33	23.14	11.64
R^2	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Beta Coefficient	0.91	0.27	0.64	0.75	0.64	0.72	0.33
Jensen's Alpha	2.3	3.67	1.2	2.44	1.05	2.45	3.31
Treynor's Index (TI-(R_m-R_f))	3.71 (2.52)	16.26 (13.6)	3.06 (1.87)	4.44 (3.25)	2.83 (1.64)	4.60 (3.41)	12.82 (10.04)
Sharpe Ratio of PFMs Returns	0.89	0.30	0.71	0.81	0.55	0.97	1.65
Sharpe Ratio of Bench. Returns	0.43	0.97	0.43	0.43	0.43	0.43	1.04

Note. Adapted from "*NPS Scheme – C",* by NPS Trust, 2016. Retrieved from http://www.nps trust.org.in/images/C-1_Dec16.pdf

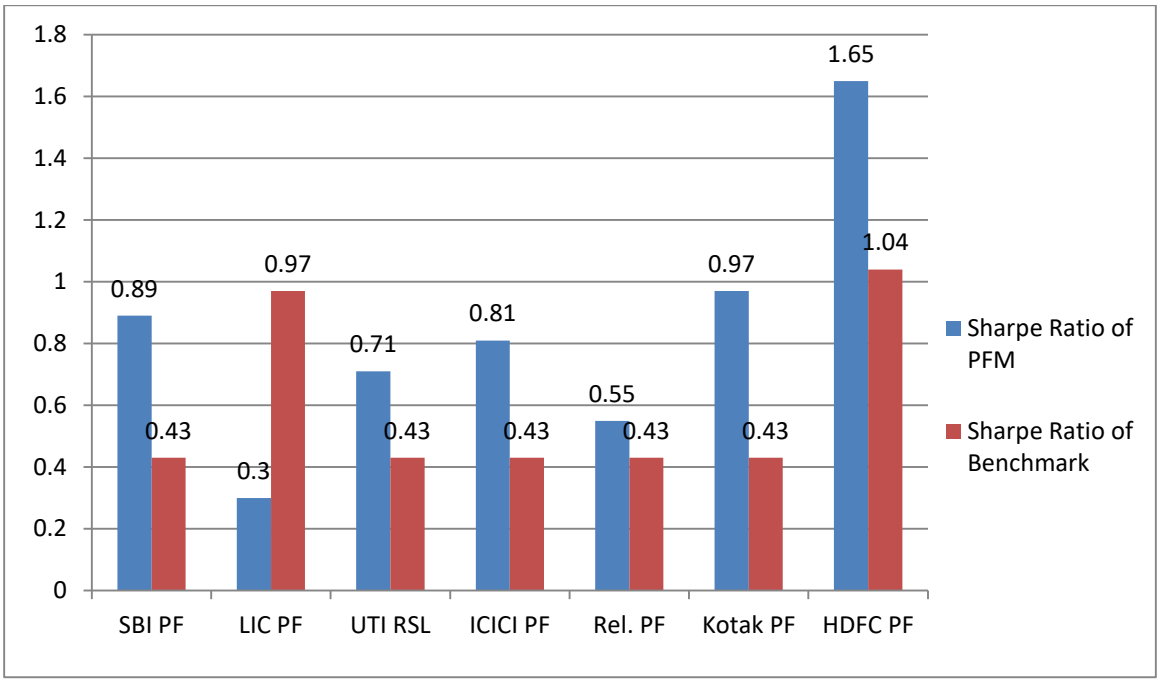
Note: (1) Scheme returns for more than one year are annualized.

Figure 2: Beta Coefficient of various PFMs operating the Scheme



Source: Calculated using data of Table 3

Figure 3: Sharpe Ratio of various PFMs operating the Scheme



Source: Calculated using data of Table 3

On the basis of above discussion, it can be concluded that LIC PF is generating the highest returns in 'Since Inception' category followed by HDFC PF at the lowest Beta. Other PFMs are also beating their benchmark return in 'Since Inception' category. Their other indicators are also in affirmative except the Sharpe Ratio of LIC PF which is lower than the Sharpe Ratio of the benchmark index.

The above analysis is based upon the NAVs of PFMs starting from the actual date of inception of the scheme by the respective PFM to 31st December, 2016. To confirm the earlier discussed position, a common date of inception should be used for comparison of the results.

Table 4 shows the performance of all the PFMs by taking 1st August, 2013 which is the earliest common date of inception of the scheme when all the PFMs become operative under the segment. Table 4 shows that the performance of LIC PF is superior among all other PFMs in terms of return since 1st August, 2013. It has the lowest value of Beta Coefficient and the highest value of Jensen's Alpha. The Sharpe Ratio of LIC PF is lower than the Sharpe Ratio of Benchmark. The higher value of Treynor's Index with lower value of Sharpe Ratio shows the larger unique risk of LIC PF.

Table 4: Performance Analysis of Corporate Debt Scheme (Tier-I) of NPS

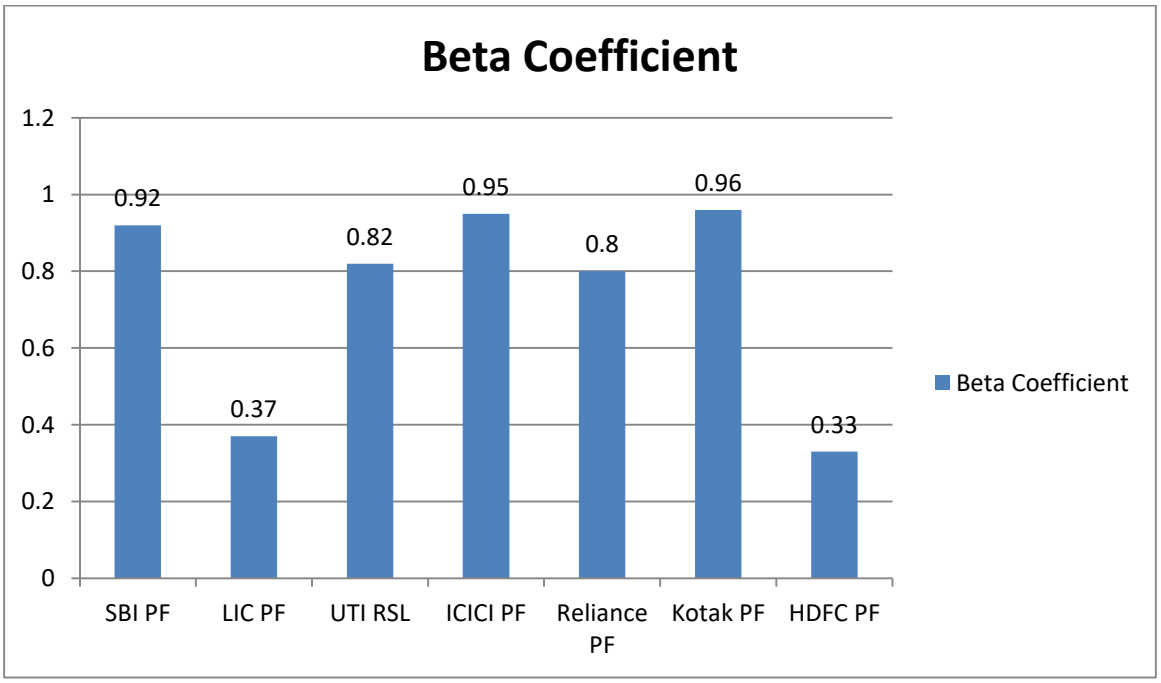
Since 1st August, 2013

Particulars	SBIPF	LICPF	UTI RSL	ICICI PF	REL. PF	KOTAK PF	HDFC PF
Return since 01.08.2013	11.89	12.58	11.85	12.40	11.97	12.22	12.33
Bench. Return	10.88						
Coefficient of Variance	11.54	11.71	11.36	12.04	11.49	12.24	11.64
R^2	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Beta Coefficient	0.92	0.37	0.82	0.95	0.80	0.96	0.33
Jensen's Alpha	1.23	3.45	1.47	1.66	1.65	1.45	3.31
Treynor's Index (TI-(R_m-R_f))	4.12 (1.34)	12.11 (9.33)	4.57 (1.79)	4.53 (1.75)	4.84 (2.06)	4.29 (1.51)	12.82 (10.04)
Sharpe Ratio of PFMs Returns	1.08	0.31	1.44	1.20	1.10	1.29	1.65
Sharpe Ratio of Bench. Returns	1.04						

Note. Adapted from "*NPS Scheme – C",* by NPS Trust, 2016. Retrieved from http://www.nps trust.org.in/images/C-1_Dec16.pdf

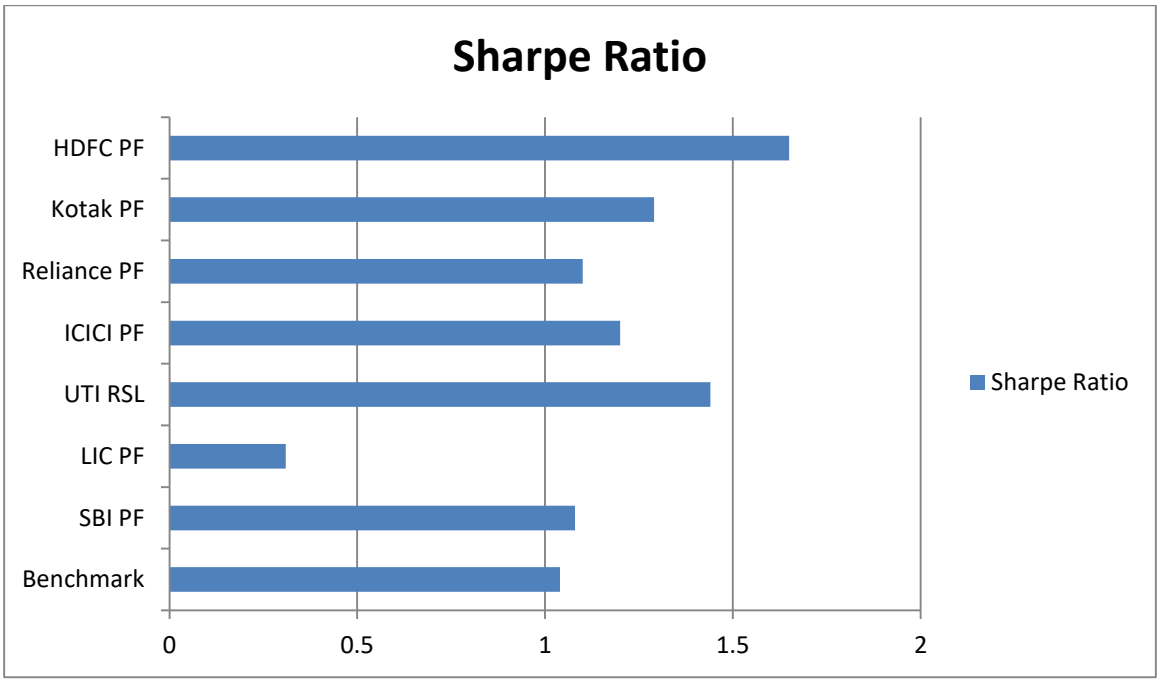
Note: (1) Scheme returns for more than one year are annualized.

Figure 4: Beta Coefficient of various PFMs operating the Scheme since 1st August, 2013



Source: Calculated using the data of Table 4

Figure 5: Sharpe Ratio of Benchmark Index and various PFMs operating the Scheme since 1st August, 2013



Source: Calculated using the data of Table 4

In terms of return, the performance of ICICI PF stood at the 2nd position further followed by HDFC PF, Kotak PF, Reliance PF, SBI PF and UTI RSL with minor differences. Their all other indicator are also affirmative. The Sharpe Ratios of these PFMs are also higher than the Sharpe Ratio of benchmark index. The performance of SBI PF which is the majority assets holder is at the lowest level although with negligible differences from other PFMs. Hence, it is reaffirmed that LIC PF and HDFC PF are performing better in the segment.

Two-Way ANOVA has been used in the present study to validate the hypothesis as mentioned above. The differences between the quarterly returns of different PFMs and the differences between quarterly returns under the segment have been studied for any statistically significant differences. The results of the Two-Way ANOVA are given in the Table 5 and 6.

Table 5: Results of Two-Way ANOVA of Corporate Debt (Tier-I) Scheme taking Actual Date of Inception of the Scheme

Dependent Variable: Quarterly Return

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	345.037(a)	35	9.858	15.224	.000
Intercept	1070.130	1	1070.130	1652.598	.000
PFM	5.695	6	.949	1.466	.194
QUARTER	339.029	29	11.691	18.054	.000
Error	91.304	141	.648		
Total	1738.573	177			
Corrected Total	436.341	176			

a R Squared = .791 (Adjusted R Squared = .739)

Source: Calculated using SPSS from NAVs of various PFMs

Table 5 shows that the difference between the quarterly returns of various PFMs was statistically insignificant at 5 percent level of significance when actual date of inception of the scheme by a particular PFM was taken for analysis as the p-value was higher than 0.05. However, the difference between returns of the segment on different quarter dates was found to be statistically significant.

Table 6: Results of Two-Way ANOVA of Corporate Debt (Tier-I) Scheme taking Common Date (01.08.2013) of Inception of the Scheme

Dependent Variable: Quarterly Return

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	155.178(a)	18	8.621	311.721	.000
Intercept	825.029	1	825.029	29831.713	.000
PFM	.292	6	.049	1.759	.120
QUARTER	154.886	12	12.907	466.702	.000
Error	1.991	72	.028		
Total	982.198	91			
Corrected Total	157.169	90			

a R Squared = .987 (Adjusted R Squared = .984)

Source: Calculated using SPSS from NAVs of various PFMs

Similarly Table 6 shows that the difference between the quarterly returns of various PFMs was statistically insignificant at 5 percent level of significance when a common date of inception i.e. 1st August, 2013 was taken for analysis. However, the difference between returns of the segment on different quarter dates was found to be statistically significant.

6. Conclusion

From the above discussion it can be concluded that the performance of all the PFMs varies marginally in terms of returns and all the PFMs are beating their benchmark returns. The performance of LIC PF is superior to others however it has larger unique risk as it is generating highest value of Jensen's Alpha and Treynor's Index at the lowest Beta and Sharpe Ratio. The LIC PF is followed by ICICI PF and HDFC PF in terms of performance. The majority assets holder i.e. SBI PF is also performing well in terms of return but its performance is lower as compared to other PFMs which should be taken care of by SBI PF and PFRDA. Efforts should be made by LIC PF, UTI RSL, Kotak PF and Reliance PF to increase the assets holding as their assets holding is negligible in the segment. Further the difference between the quarterly returns of various PFMs was statistically insignificant whereas the difference between the returns of the segment on different quarter dates was statistically significant.

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