Measuring the Performance of Pension Funds Using Sharpe Ratio

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Abstract: *Recent years have been seen growing formalisation of the economy through the implementation of Goods and Services Tax and stricter implementation of tax measures. At this juncture, augmenting the capital market exposure of the formal sector pension corpus to map with young demography and long investment horizon would help boost the investing corpus for retirees. This paper provides an overview about the concept of NPS and further tried to examine the performance of Pension Fund Managers operating corporate debt Scheme under NPS. The study is based on secondary data collected from NPS trust.org and annual reports of PFRDA which is further analyzed statistically with mean, standard deviation and Sharpe ratio.*

The study found that all the NPS – C (Tire – I) offered by SBI, LIC, UTI, ICICI, Reliance, Kotak & HDFC gives a positive return compared with benchmark return for all the years. ICICI scored the highest return of 8.09% and the lowest is 6.64% by Reliance limited. In the first year when compared to the benchmark returns for one year period, all the funds are within the limit. For second year, ICICI is highest scorer among all PFs with returns of 12.26%. ICICI PF got the highest return of 9.99% for the period of three years. Since inception; LIC gives the highest return as 11.25% and least return, by RELPF of 9.07%.

The study also revealed that all the NPS – C (Tire – Il) offered by SBI, LIC, UTI, ICICI, Reliance, Kotak & HDFC gives a positive return compared with the benchmark returns for all the years. LICPF scored the highest return of 9.31% and the lowest is 6.65% by Kotak limited. In the first year when compared to the benchmark returns for one year period, all the funds are within the limit. For second year, ICICI crossed the benchmark return with highest scorer as 12.24% among all PFs and least scorer is HDFCPF with 8.32%. ICICI got the highest return of 9.91% compared with benchmark return and the least Return as 8.88% by SBIPF for the period of three years. Since inception, SBIPF gives the highest return as 10.38% and least return, by HDFCPF as 8.45%.Sharpe's performance indexes of all the companies for NPS – C, Tire-I & Tire – II except two are giving a negative index for the first three year periods. In the second year, there seems some improvement compared, to one year and in three years period all the companies performed very well.

Keywords: *Auto and active choice, investment, pension fund managers, standard deviation*

I. INTRODUCTION

An Introduction to NPS

On account of the major issues being took place during 2018-2019 such as demonetisation and the implementation of GST which has slowed down the rate of GDP to 5.7%in the first quarter. However the economic activity picked up in the third quarter and GDP rate goes to 7.2% consequence to the stabilising effect of GST implementation and fading effect of demonetisation. Major macroeconomic trends showed sharp decline in trade deficit for the FY 2017-18 which ultimately has created a pressure on fiscal consolidation where the 3% of achieving target in the current yr has been pushed ahead to 2021. Also the year marked with rise in inflation at the rate of 5.30% and as a result of which oil prices and the price of agricultural commodities sharply increased. The slowdown in the rate of saving in India has made them feel the need to have some for proper arrangement of retirement benefits in order to maintain the same standard of living.

It has been observed that ageing population around the globe has become a worry and India too is facing the similar problem. It has been noticed that the persons above the age of 60 would increase from 8.9% of the population now to 19.4% by 2050 and the persons above 80 are likely to increase from 0.9% to 2.8%. Also the fragmentation of joint families makes it imperative to have a well developed, self sustaining system of pension in the country. The promotion and development of a pension system plays an important role in the growth of Indian economy as it serves the twin objectives of ensuring a sense of social security to the citizens both in formal and informal sector and garnering long term funds for critical, growth-driving sectors of economy as also the capital market.

NPS is a contributory system under which both the employer and employee will have to contribute certain amount from their salary and employee will be provided regular income from their contribution after retirement. The amount of contribution invested in pension funds will depend upon the guidelines prescribed by PFRDA. In order to promote, develop and regulate the pension market in India, PFRDA was established in 2003 and this development authority provides the right to beneficiaries/subscribers to choose any sort of pension funds and investment patterns and it is quite clear that the expected risk and returns depends upon the type of portfolio taken by the subscriber. It is a fact that larger the contribution, higher the returns earned and longer the period of investments, higher will be the retirement benefits available to the employees.

Glimpse of Corporate Debt Scheme of NPS

There are different transitions under NPS and corporate debt scheme is considered to be one of the majorly part of all India citizen model. The investors who have opted for such scheme are free to choose their own investment mix as well as their PFMs. The investors have two choices either they should go for "Auto Choice" or "Active Choice". Whatever the amount received from the investors, they will go into different classes of securities which are basically known as A, E,C,G securities and if anyone of the subscriber opted for auto choice then automatically their funds goes into different type of securities depending upon the age of that particular investor which are known as conservative, moderate and aggressive life funds. But if investor doesn't go for any of the above mentioned two options then automatically his funds will move into LC-50. The selection of an investment under active choice will be based upon the choice of that investor as there are not strong boundations under that active mode for corporate debt and government securities except the equity one.

Rationale of the study

India is a young country in terms of demography, but ageing population gradually. According to 2011 population Census, the elderly population accounted for around 8.6 per cent of total population in 2011. As the quality of life has increased and gradually medical facilities are also at its improving stage, the expectancy of life has also increased and thus, both the share and size of elderly population is increasing over time. In fact the rate of increase of elderly population (60+ years of age is higher than the general rate of increase of population. The elderly population (60+ years of age) has increased at the rate of 35.10 percent between 1991 and 2001 and at the rate of 35.51 percent between 2001 and 2011 against the increase of total population of 21.53 percent between 1991 and 2001 and 17.64 percent between 2001 and 2011. Consequently, the share of elderly population in total population has increased from 6.8 percent in 1991. to 7.4 percent in 2001 and subsequently to 8.6 percent in 2011. As per the report on Ageing in 21st Century jointly brought out by United Nations Population Fund (UNFPA) and Help Age International in 2012, the number of elders, who have attained 60 years of age, will shoot up by 360 per cent between 2000 and 2050. India had around 100 million elderly populations up to 2012 and the number is expected to increase to 323 million, constituting 20 per cent of the total population, by 2050. Hence it is important that the development of the underpenetrated pension market in India be initiated now, when the situation is ripe.

It is very true that India is a country which doesn't have much access to social security which will be universally applicable to its entire citizen. With such objective keeping in mind, the government of India set up an expert committee in 1998 to devise a new pension system for India. Project Oasis, which was chaired by S.A. Dave, submitted its report in 2000 and the result of the report found to be the fixture of pension system in India based on individual retirement accounts (IRAs) which allow individual to save his income till his entire working life. After that an individual can use this saving, which he had used in buying annuities from ASP in the form of monthly pension. This was a paradigm shift, from the existing defined returns philosophy to a defined contributions philosophy.

It was recommended by committee to create a system which is professionally managed including maintaining a large data base of all the subscribers through centralized record keeping agency. Thus, National Pension System which was a government of India initiative was launched in 2004 and thus, in 2009, made compulsory for all the citizens of country.

Objective of the study

- The main objective of the present study is to know about the National Pension System and further tried to review the performance of the Pension Fund Managers operating NPS Scheme-C since inception of the scheme.

II. RESEARCH METHODOLOGY

The study is descriptive cum analytical in nature and is based on secondary data collected from various sources such as PFRDA reports, NPS trust.org and other concerned websites. Various statistical tools are applied in order to achieve the objectives of the study.

Research Design

- Seven companies are taken for the study.
- Period for the study is taken for three years.
- Bank rate of return is taken for the year 2016 which is 8%.

Statement of the problem

According to the report provided by United Nation's population division World's life expectancy will going to be increased from 65 years to 75 years by 2050 and this increasing life expectancy improve the burden on other such as regular expenses will increase as the cost of living increases and thereby lead to increase in medical aid. Thus, to have some social security after retirement NPS was launched to provide some money in a systematic way through a long term investment. Different companies are offering the NPS. The NPS income depends on which the fund is chosen for investment. This study is an attempt to comprehend the performance of the different pension fund managers over a period of time, from its inception. This study will help the citizen of India to choose the best pension fund manager to plan their post retirement income accordingly.

Delimitation

- The study is limited to apprehend the performance of PFMs operating corporate debt scheme only.
- The study is considered for Tire I and Tier II accounts.
- Seven companies are taken for study.
- The results are pertaining to the available data only.
- The study period covers only three years.

Tools Used for the Study

In order to understand the performance of pension funds, percentage analysis, mean, standard deviation and Sharpe ratio has been used.

Formulae for Sharpe ratio is:

$$Sharpe\ Ratio = \frac{R_p - R_f}{\sigma_p}$$

Portfolio rate of return – risk free rate of return/standard deviation of that portfolio

III. DATA ANALYSIS AND INTERPRETATION

NPS Scheme - C (Tier-I)

Table1: showing returns generated by pension fund managers

Period	SBIPF	LICPF	UTIRSL	ICICIPF	RELPF	KOTAK PF	HDFC PF	Benchmark Returns
1	6.64	7.55	6.99	8.09	7.13	7.35	7.34	6.12
2	11.71	11.94	11.53	12.26	11.70	11.87	11.71	12.32
3	9.41	Nil	9.54	9.99	9.73	9.55	Nil	9.48
Since Inception	10.83	11.25	9.32	10.75	9.07	10.61	11.08	

Source: npstrust.org.in (Returns as on 29.02.2016)

All the NPS – C (Tire – I) offered by SBI, LIC, UTI, ICICI, Reliance, Kotak & HDFC gives a positive return compared with benchmark return for all the years.

ICICI scored the highest return of 8.09% and the lowest is 6.64% by Reliance limited

In the first year when compared to the benchmark returns for one year period, all the funds are within the limit.

For second year, ICICI is highest scorer among all PFs with returns of 12.26%.

ICICI PF got the highest return of 9.99% for the period of three years.

Since inception, LIC gives the highest return as 11.25% and least return, by RELPF of 9.07%.

Mean and Standard Deviation of NPS-C (Tier-I)

Table2: showing mean and standard deviation of NPS-C Tier-I

Company	SBI	LIC	UTI	ICICI	Reliance	Kotak	HDFC
Mean	9.25	9.75	9.35	10.11	9.52	9.59	9.53
Standard Deviation	0.0253	0.0310	0.0227	0.0208	0.0229	0.0226	0.0309

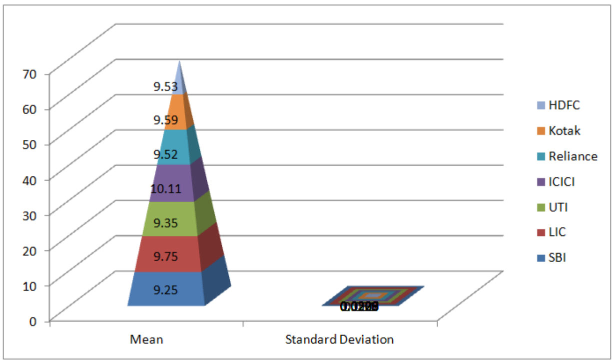

Figure1: Showing Mean and Standard deviation of NPS-C of NPS tier-1

ICICI has the highest mean return of 10.11 and the lowest mean return by SBI which is 9.25. The lowest variation from mean is 0.0208 by ICICI and the highest variation from mean is 0.0310 by LIC.

Sharpe's Performance Index NPS-C (Tier-I)

Years	SBI	LIC	UTI	ICICI	Reliance	Kotak	HDFC
1	-0.53	-0.14	-0.45	0.043	-0.37	-0.28	-0.21
2	1.46	1.27	1.55	2.04	1.61	1.71	1.2
3	0.56	Nil	0.67	0.95	0.75	0.68	Nil

Table3: showing sharpe performance index for NPS-C (Tier-I)

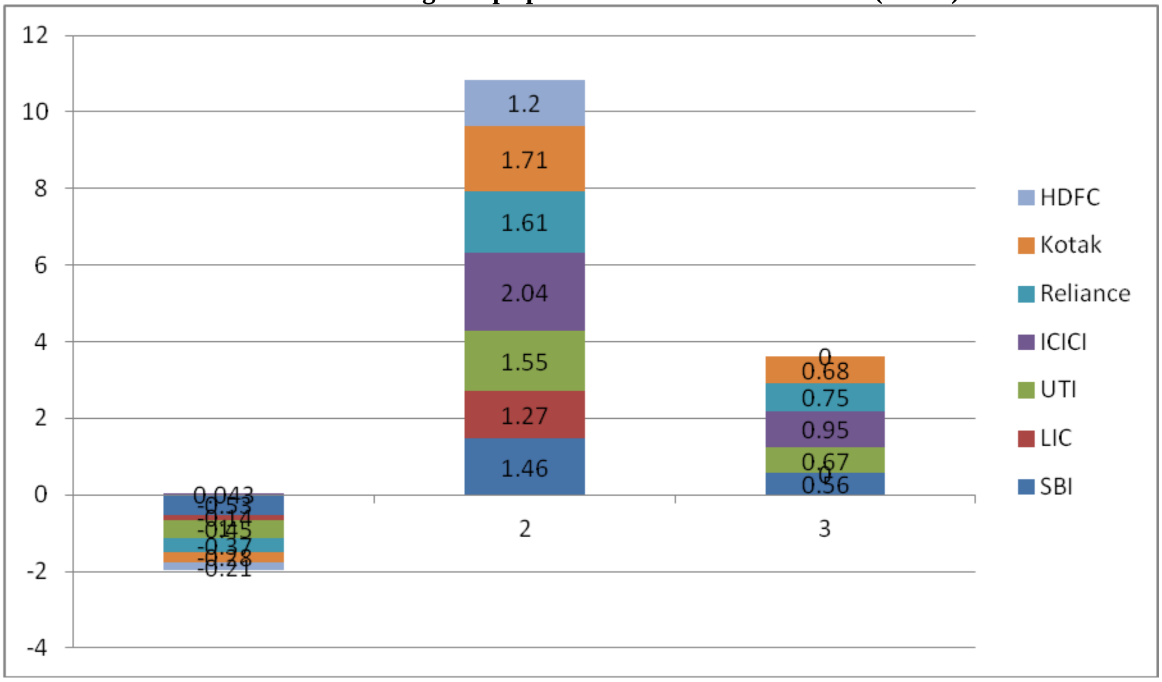

Figure2: Showing Sharpe ratio of NPS-C Tier-I

Sharpe's performance indexes of all the companies except ICICI is giving a negative index for the first year period has the highest index as 0.043 and rest of them has low index.

In the second year also all the funds have positive index and showed improvement compared to first year. ICICI being the top ranker among all the pension funds with index of 2.04 and the lowest being the HDFC with 1.2 indexes.

In three years period, all the pension funds yield positive index and again ICICI gives the highest index among all the PF's with 0.95 and the lowest index being the 0.56 given by SBI.

NPS Scheme - C (Tier-II)

Table4: showing returns generated by Pension fund Managers

Period	SBIPF	LICPF	UTIRSL	ICICIPF	RELPF	KOTAK PF	HDFC PF	Benchmark Returns
1	6.86	9.31	6.73	7.98	7.17	6.65	7.69	6.12
2	11.60	9.66	11.52	12.24	11.60	11.34	8.32	12.32
3	8.88	Nil	9.36	9.91	9.46	9.26	Nil	9.48
Since Inception	10.38	8.78	9.45	10.73	8.75	9.06	8.45	

Source: npstrust.org.in (Returns as on 29.02.2016)

All the NPS – C (Tire – Il) offered by SBI, LIC, UTI, ICICI, Reliance, Kotak & HDFC gives a positive return compared with the benchmark returns for all the years.

LICPF scored the highest return of 9.31% and the lowest is 6.65% by KotakPF limited.

In the first year when compared to the benchmark returns for one year period, all the funds are within the limit.

For second year, ICICI crossed the benchmark return with highest scorer as 12.24% among all PFs and least scorer is HDFCPF with 8.32%.

ICICI got the highest return of 9.91% compared with benchmark return and the least Return as 8.88% by SBIPF for the period of three years.

Since inception, SBIPF gives the highest return as 10.38% and least return, by HDFCPF as 8.45%.

Mean and Standard Deviation of NPS-C (Tier-II)

Table5: showing mean and standard deviation of NPS-C (Tier-II)

Company	SBI	LIC	UTI	ICICI	Reliance	Kotak	HDFC
Mean	9.11	9.49	9.2	10.04	9.41	9.08	8.01
Standard Deviation	0.0237	0.0024	0.0239	0.021	0.022	0.0234	0.0044

ICICI has the highest mean return of 10.04 and the lowest mean return by HDFC which is 8.01. The lowest variation from mean is 0.0024 by LIC and the highest variation from mean is 0.0239 by UTI.

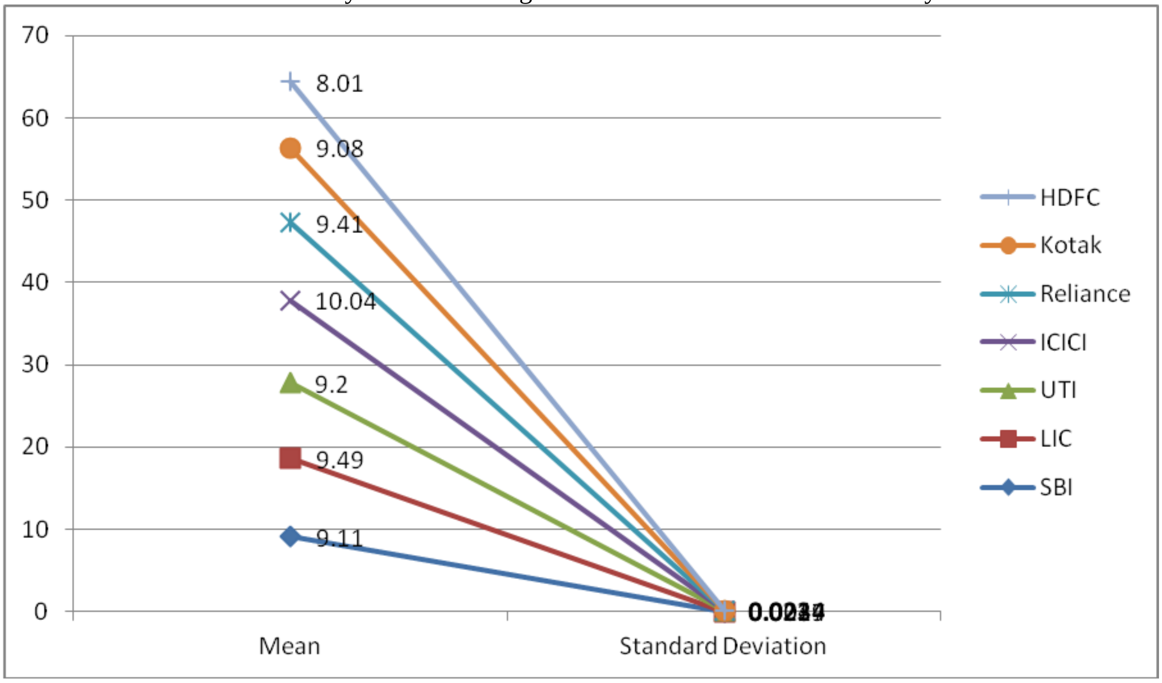

Figure3: showing mean and standard deviation of NPS-C (tier-II)

Sharpe's Performance Index NPS-C (Tier-II)

Table6: Showing sharpe performance index of NPS-C (Tier-II)

Years	SBI	LIC	UTI	ICICI	Reliance	Kotak	HDFC
1	-0.49	5.45	-0.52	-0.009	-0.37	-0.57	0.70
2	1.56	6.91	1.46	1.99	1.62	1.42	0.72
3	0.38	Nil	0.05	0.89	0.63	0.53	Nil

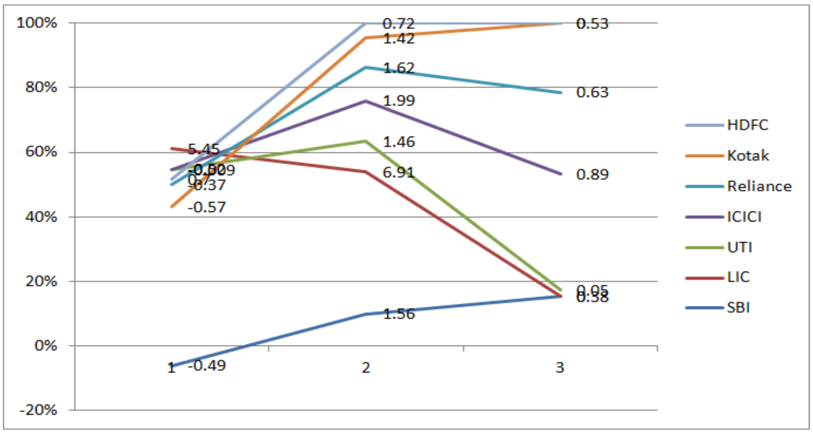

Figure4: showing sharpe performance index for NPS-C (Tier-II)

Sharpe's performance indexes of all the companies except LIC and HDFC is giving a negative index for the first year period and LIC has the highest index as 5.45 and rest of them has low index.

In the second year also all the funds have positive index and showed improvement compared to first year. LIC being the top ranker among all the pension funds with index of 6.91 and the lowest being the HDFC with 0.72.

In three years period, all the pension funds yield positive index and again ICICI gives the highest index among all the PF's with 0.89 and the lowest index being the 0.05 given by UTI.

IV. FINDINGS

- All the NPS – C (Tire – I) offered by SBI, LIC, UTI, ICICI, Reliance, Kotak & HDFC gives a positive return compared with benchmark return for all the years. ICICI scored the highest return of 8.09% and the lowest is 6.64% by Reliance limited. In the first year when compared to the benchmark returns for one year period, all the funds are within the limit. For second year, ICICI is highest scorer among all PFs with returns of 12.26%. ICICI PF got the highest return of 9.99% for the period of three years. Since inception; LIC gives the highest return as 11.25% and least return, by RELPF of 9.07%.
- All the NPS – C (Tire – Il) offered by SBI, LIC, UTI, ICICI, Reliance, Kotak & HDFC gives a positive return compared with the benchmark returns for all the years. LICPF scored the highest return of 9.31% and the lowest is 6.65% by Kotak limited.

  In the first year when compared to the benchmark returns for one year period, all the funds are within the limit. For second year, ICICI crossed the benchmark return with highest scorer as 12.24% among all PFs and least scorer is HDFCPF with 8.32%. ICICI got the highest return of 9.91% compared with benchmark return and the least Return as 8.88% by SBIPF for the period of three years. Since inception, SBIPF gives the highest return as 10.38% and least return, by HDFCPF as 8.45%.
- Sharpe's performance indexes of all the companies for NPS – C, Tire-I & Tire – II except two are giving a negative index for the first three year periods. In the second year, there seems some improvement compared, to one year and in three years period all the companies performed very well.

V. CONCLUSION

At last it can be concluded by saying that NPS is a unique platform and offer various investment opportunities to the investors so that they can choose the best out of different pension funds available to them. Also, PFRDA is taking major initiatives from time to time so that country can take step in moving closer towards providing social security in the old age.

VI. REFERENCES

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