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GOVERNMENT SCHEMES IN INDIA: A CASE STUDY OF NATIONAL PENSION SYSTEM

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Abstract
The Government of India has introduced National Pension System (NPS) initially only to the Central Government employees joining the service on or after January 1, 2004. Later on, the scheme has been adopted by the State Governments as well. To reduce its fiscal burden, the Government has introduced NPS in place of Defined Benefit Scheme (DBS) which was offered to the government employees. However, after May 2009, NPS has rolled out pension schemes even for non-Government employees also.
NPS is a defined contribution retirement savings scheme wherein both the employer and employee contribute to NPS based on the guidelines laid down by Pension Fund Regulatory Development Authority of India (PFRDA). The purpose of the scheme is to ensure an adequate income for the post-retirement life of an individual. Therefore, the present study concentrates on evaluating the performance of Pension Schemes under NPS for Government Employees. At present, NPS offers 2 pension schemes namely CG for Central Govt. employees and SG for State Govt. employees and other 10 pension schemes for non-government employees (corporate employees, self-employed, and individuals working in the unorganized sector).
The study is both descriptive and empirical in nature. Secondary data on returns of each scheme is collected from the annual reports of NPS Trust. Primary data has been collected by administering a structured questionnaire to the Government employees of NPS. Purposive sampling method is adopted to select the respondents. The performance of each Pension Scheme is evaluated through the risk-return analysis and also with the performance evaluation models like Sharpe, Treynor and Jensen ratios. Descriptive statistical techniques like Geometric mean, Standard deviation, and Coefficient of Variation have been applied. Factor analysis is employed to analyse the perceptions of Govt. employees. The results help in identifying the scheme that has better and consistent returns along with the best Pension fund for each scheme.
Keywords: NPS, DBS, PFRDA, CG, and SG

I. Introduction

The Government of India offers a wide variety of social security schemes such as affordable housing, affordable health, accidental insurance, skill training programmes for unemployed youth. In addition, there are special schemes that are intended only for the particular section of the society like farmers, weavers, toddy tappers, and scavengers. Every social security scheme has a different purpose but the common objective of all schemes is to improve the standard of living of the low-income individuals. National Pension System (NPS) is one among such social

security initiative of the Government of India to provide an adequate income for the post-retirement life of an employed individual as well as an unemployed individual. It is been almost 12 years that NPS has opened various pension schemes for almost every citizen of India to secure their life and economically independent after attaining the age of 60. The purpose of NPS is to provide old age income security to the employees, so that they become financially independent in their golden years.

NPS is a defined contribution retirement savings scheme wherein both the employer and employee contribute to NPS based on the guidelines laid down by Pension Fund Regulatory Development Authority of India (PFRDA). However, the retirement benefits are subject to the market conditions as the contributions of employees are invested in financial securities like Equity, Alternative Investment Funds (AIFs), Corporate Bonds (CB), and Government Bonds (GB). Initially, NPS was applicable only to Central Government Employees but later on the scheme has been adopted by the State Governments as well. At present, NPS has 7 Pension Funds offering 12 Pension Schemes for different categories of employees/ individuals including Government employees, Corporate employees, Self-employed, and Individuals working in the Unorganized sector.

Earlier the contributions of the Government employees were managed by Public Sector Pension Funds only. However, in the recent past, the Government has given a chance to Government employees to select a Pension Fund even from the Private Sector Pension Funds. Therefore, the present study concentrates on evaluating the performance of Pension Funds towards Pension Schemes for Government employees under NPS and Pension Schemes for non-Government employees. Hence, Government employees can be suggested a better Private sector Pension Fund apart from the default choice of a Public Sector Pension Fund.

II. Review of Literature

Kumar (2023)[1] made an attempt to compare between both old and new pension systems to gauge if there is a noteworthy difference in benefits. Among the variables considered, it is found that the ROI and age of entry into the job exert the most influence on the pension amount.

Mohanty (2023)[2] found that the elderly households to be poorer than the non-elderly households. Economic independence is key for the elderly living independently, but the poor elderly have no choice except to live with their children for their survival.

Ramesh (2023)[3] explained the features Pradhan Mantri Shram Yogi Maan- DhanYojana and National Pension scheme for protecting the unorganised sector workers including traders, shopkeepers and self-employed persons. The schemes provide a minimum monthly pension of Rs.3,000 after attaining the age of 60 years.

Amutha (2022)[4] made a study on awareness level of beneficiaries on APY scheme and to find the motivating factors to subscribe for APY scheme. It is found that less risk, low procedure, transparency, tax deduction, control of central government, and reliability are motivating factors to subscribe to the APY scheme.

Kapasi and Mahato (2022)[5] compared the returns on equity tier –II Pension Scheme offered by the various Pension Funds under NPS. In term of risk, LIC Pension Fund had the high-risk exposure while the lowest risk is associated with the UIT Pension Fund.

Kaur (2022)[6] mentioned that the unorganised sector respondents are more in favour of NPS than those in the organised sector. It was also observed that gender, age, and monthly income have a significant relation with factors of NPS in both the sectors.

Aggarwal and Khanna (2021)[7] did a survey to find the employees' awareness about the features and satisfaction of NPS for Central and State government employees. The results revealed that demographic variables majorly affected the awareness level of the scheme.

Bodhgire (2021)[8] emphasized the functions of national pension scheme and performance of pension fund managers in terms of its return in 2020. ANOVA tool is applied for analyzing differences in return by pension funds. The study is inferred that HDFC pension fund earned more returns than other pension funds.

III. Research Gap

Most of the earlier studies were made on describing the features of NPS, Retirement planning Behaviour, and importance of NOAPS and APY schemes for the beneficiaries. There are very few studies on evaluating the performance of Pension Funds under NPS and barely any studies on evaluating the performance of Pension schemes for Government employees and suggesting the best Pension Fund, if they like switch over to other Pension Fund. Hence, the present study on Government schemes for post-retirement income security of the individual with special emphasis on NPS has been carried out to fill the research gap.

IV. Objectives of the Study

1. To evaluate the performance of Pension Schemes under NPS
2. To analyse the satisfaction of Government Employees towards NPS

V. Research Methodology

Method of Research

The study is both Descriptive and Empirical in nature as the secondary data pertaining to returns earned on various Pension Schemes describes the risk and returns characteristics of investing a particular scheme for the study period.

It is an empirical study as the primary data collected from the respondents are analysed to know their level of satisfaction towards NPS.

Sources of Data

The Secondary data pertaining to returns on investment of various pension schemes is obtained from annual reports of NPS Trust, annual reports of Pension Funds, and PFRDA website.

Primary data is collected from the government Employees of NPS by administering a structured questionnaire.

Sampling

All the Pension Schemes pertaining to the Government employees have been selected for the study except Tier II-Tax Saver (TTS) scheme as it is introduced in the last year. Purposive method of sampling is adopted in selecting the respondents to elicit their opinion towards NPS. Sample Size for the purpose of the study are taken at 400. Based on Krejcie and Morgan sample size table, a sample of 400 is suffice if the size of the population is equal to or more than 10,00,000. The number of Government Employees including Central and State Government employees are 84,93,114, as reported in the NPS Trust Website.

Quantitative Techniques

Descriptive statistical techniques like Geometric Mean (GM), Standard Deviation (SD), and Coefficient of Variation (CV) are employed to understand the risk return profile of the Pension Schemes.

Further, Independent Samples t-test has applied to find if there is any significant difference in mean returns generated by public sector pension funds and private sector pension funds. To analyse the primary data, factor analysis has been adopted to identify the underlying factors among the statements related to overall satisfaction level of Government Employees.

Performance Evaluation Models like Sharpe, Treynor, and Jensen have been applied to find the best pension fund for the Govt. Employees.

Scope of the Study

Main focus of the study is confined to analyse the performance of NPS towards Government employees. However, side by side, risk-return analysis of Private Sector Pension Funds is also made to suggest a best Private Sector Pension Fund for Government employees, if they would like to switch over to a Private Sector Pension Fund.

Period of the Study

The returns data is collected for the period of 13 years that is from 2010-11 to 2022-23 as the annual reports are available from the financial 2010 onwards.

VI. Hypotheses

1. H_0: There is no significant difference in mean returns of Pension Schemes for Government Employees and Pension Schemes for non-Government Employees

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2. H_0: There is no significant difference in mean returns of Public Sector Pension Funds and Private Sector Pension Funds

H_0: There is a significant difference in mean returns of Public Sector Pension Funds and Private Sector Pension Funds

VII. Data Analysis

Data analysis consists of returns and risk analysis also made for the pension schemes of Government employees and non-Government employees. In addition, the share of Government employees in total number of subscribers and their Assets under Management (AUM) in total value as on 31st March, 2023 is presented in table 1.

Table 1. Number of Employees and AUM at the end of FY2022-23

Sector	No of Employees	% share	AUM (Rs in Crs)	% share
Central Government	23,97,125	13.85	2,57,638	29.56
State Government	60,95,989	35.22	4,49,186	51.54
Corporate Sector	16,81,865	9.72	1,17,281	13.46
Unorganised	29,57,449	17.08	42,623	4.88
NPS Swavalamban	41,75,845	24.13	4,915	0.56
Total	**1,73,08,273**	**100**	**8,71,462**	**100**

Source: NPStrust.org.in retrieved on 20-04-2023

From the above table it can be noted that the Government employees has share in both total number of employees (49.07% i.e., 13.85% + 35.22%) and total value of AUM (81.10% i.e., 29.56% + 51.54%).

Return and Risk Analysis

Mean Returns are calculated using Geometric Mean (GM) which is calculated by taking the annual returns for each financial year. As returns data is expressed in percentage terms, GM has

to be used to find the average returns. But for few years equity scheme has reported negative returns. Consequently, GM cannot be calculated with negative returns data. Hence, Decimal Multiplier Equivalent Approach (DMEA) has applied to fit the data to calculate GM. In this approach, first data is converted into decimals and then added with value 1. Therefore, the entire returns data can be expressed in positive figures as shown in table 1. Then GM of returns is calculated.

Subsequently, Standard deviation and Coefficient of Variation (CV) is calculated. Coefficient of Variation (CV) indicates the risk per unit of return. Smaller the CV higher the consistency in returns. Higher the CV, greater is the dispersion around the mean return. The calculation of GM of returns for the schemes for Government employees is presented in Table 2 and GM of returns for the schemes for non-Government employees is presented in Table 3.

Return and Risk (Overall) are calculated for the Pension funds in Table 4 and for all the Pension Schemes in Table 5.

Table 2. Return-Risk analysis: Pension Schemes for Government Employees

Year	CG			SG		
	SBI	**LIC**	**UTI**	**SBI**	**LIC**	**UTI**
2010-2011	1.081	1.083	1.085	1.099	1.108	1.113
2011-2012	1.058	1.058	1.055	1.068	1.067	1.060
2012-2013	1.128	1.121	1.123	1.130	1.128	1.132
2013-2014	1.039	1.059	1.050	1.038	1.059	1.047
2014-2015	1.194	1.190	1.186	1.198	1.194	1.188
2015-2016	1.065	1.060	1.062	1.066	1.060	1.063
2016-2017	1.131	1.132	1.136	1.132	1.133	1.136
2017-2018	1.061	1.059	1.063	1.059	1.058	1.061
2018-2019	1.089	1.087	1.088	1.088	1.086	1.088
2019-2020	1.083	1.065	1.070	1.086	1.066	1.071
2020-2021	1.136	1.156	1.151	1.133	1.152	1.149
2021-2022	1.068	1.072	1.067	1.068	1.071	1.067
GM of Returns	1.094	1.094	1.094	1.096	1.098	1.097
GM %	9.357	**9.425**	9.391	9.641	**9.755**	9.714
Rank	3	**1**	2	3	**1**	2
SD %	4.228	4.236	**4.191**	***4.237***	4.269	4.285
Rank	2	3	**1**	***1***	2	3
CV	0.452	0.449	**0.446**	0.439	**0.438**	0.441
Rank	3	2	**1**	2	**1**	3

Source: NPS Trust Annual reports

Table 3. Risk-Return Analysis: Pension Schemes for non-Government Employees

		SBI	**LIC**	**UTI**	**HDFC**	**ICICI**	**Kotak**	**Birla**
E-I	GM%	10.983	12.521	10.947	**14.05**	13.34	13.48	13.95
	SD%	***21.507***	27.868	23.662	25.59	26.87	26.21	32.95
	CV	1.958	2.226	2.162	**1.82**	2.01	1.94	2.36

E-II	GM%	10.938	11.867	11.182	**13.46**	13.39	13.35	**13.93**
	SD%	**21.796**	27.877	23.864	25.25	26.88	25.79	33.03
	CV	1.993	2.349	2.134	**1.88**	2.01	1.93	2.37
CB-I	GM%	**10.102**	9.692	9.489	9.97	9.91	9.32	9.02
	SD%	3.139	3.040	2.843	2.81	2.94	2.96	**1.98**
	CV	0.311	0.314	0.300	0.28	0.30	0.32	**0.22**
CB-II	GM%	9.763	9.409	9.369	9.18	**9.82**	9.42	8.72
	SD%	3.386	2.869	2.938	2.06	3.04	3.11	**1.78**
	CV	0.347	0.305	0.314	0.22	0.31	0.33	**0.20**
GB-I	GM	9.248	**10.626**	8.886	9.88	9.90	9.94	8.91
	SD	5.368	5.594	5.372	5.20	5.28	5.02	**3.88**
	CV	0.580	0.526	0.605	0.53	0.53	0.50	**0.44**
GB-II	GM	9.141	**10.638**	9.233	9.72	9.89	9.74	8.81
	SD	5.303	5.534	5.762	5.01	5.25	5.02	**3.69**
	CV	0.580	0.520	0.624	0.51	0.53	0.52	**0.42**
AIF	GM	**10.160**	8.004	6.602	9.18	7.64	7.69	6.83
	SD	3.346	1.746	2.428	**1.67**	3.70	1.79	2.62
	CV	0.329	0.218	0.368	**0.18**	0.48	0.23	0.38
NPS-Lite	GM	9.855	**10.175**	9.848	-	-	10.08	-
	SD	**4.437**	4.521	4.439	-	-	4.69	-
	CV	0.450	**0.444**	0.451	-	-	0.47	-
Corp-CG	GM	9.554	**9.728**	-	-	-	-	-
	SD	4.800	4.806	-	-	-	-	-
	CV	0.502	**0.494**	-	-	-	-	-
APY	GM	**9.728**	9.585	9.578	-	-	-	
	SD	2.976	3.476	3.720	-	-	-	-
	CV	**0.306**	0.363	0.388	-	-	-	-

Source: NPS Trust Annual Reports

Geometric Mean returns generated by all the Pension funds on CG scheme is settled around at 9.4%. The mean returns are higher at 9.42% for LIC pension fund followed by UTI and SBI

with 9.39% and 9.35%, respectively. Standard deviation of UTI is lowest at 4.19%, while SBI & LIC posted 4.32% and 4.33%, respectively. As the returns and risk positions for the schemes are different, Coefficient of Variation (CV) is taken up for assessing the fund in respect of the Pension Schemes for Government Employees. UTI took the first position for the scheme.

For SG Pension Scheme, LIC Pension Fund has higher yield of 9.75% while UTI took 2nd position with 9.71% and SBI vested with 3rd position with 9.64% returns. SBI, UTI, and LIC Pension Funds are in 1st, 2nd, and 3rd position in order of lowest standard deviation. The return and risk though different for the funds in respect of SG Scheme, LIC and SBI have least CV of 0.43 indicating they are equally good.

HDFC Pension Fund has reported a higher yield of 14.05% and 13.46% on Equity tier-I and tier–II schemes with the standard deviations of 25.59% and 25.25%, respectively. The consistency in returns are also from HDFC Pension Fund as shown by the CV of around 1.8.

SBI earned better returns of 10.10% on Corporate Bond Tier-I scheme with the standard deviation of 3.13%. However, Birla Pension fund has better consistency of returns (CV=0.2) on both Corporate Bond tier-I and tier-II schemes.

For Government Bond tier-I and tier II schemes, LIC Pension Fund earned higher return of 10.62% and 10.63%, respectively. Similarly, Standard Deviations were moderate at 5.59% and 5.53% for both the scheme. However, Birla Pension Fund had better CV of 0.4 for both the schemes.

SBI earned maximum return of 10.16% on Alternative Investments Scheme with the moderate standard deviation of 3.35%. However, HDFC Pension Fund can be an optimal choice for the employees as it has lowest risk per unit of return (CV=0.18).

Among all the pension funds offering NPS Lite Scheme, LIC pension fund has earned higher return of 10.17% followed by Kotak, SBI, and UTI with the returns of 10.08%, 9.85%, and 9.84%, respectively. On positive note, LIC can be the optimal choice for the scheme as it has lowest CV of 0.44 for maximum returns.

In absolute terms, LIC was the clear winner in earning extra returns on Corporate-CG scheme comparing to SBI. LIC has the returns of 9.73% with a lowest standard deviation of 4.80% and lowest CV value of 0.49 when compared to SBI Pension Fund.

For APY scheme, maximum returns of 9.72% is earned by SBI pension Fund with the lowest standard deviation of 2.97% and least CV of 0.30. UTI and LIC were in next best option for the scheme in terms of consistency of returns.

Table 4. Risk-Return Analysis: Pension Fund wise (Overall)

	Public Sector Pension Funds			**Private Sector Pension Funds**			
	SBI	**LIC**	**UTI**	**HDFC**	**ICICI**	**Kotak**	**Aditya Birla**
GM	9.87	10.14	9.63	**10.85**	9.97	9.79	9.99
Rank	5	2	7	1	4	6	3
SD	10.26	11.86	11.51	14.66	13.55	12.48	18.38
Rank	1	3	2	6	5	4	7
CV	**1.04**	1.17	1.19	**1.35**	1.36	1.28	1.84
Rank	**1**	2	3	**5**	6	4	7

Source: NPS Trust Annual Reports

From the above table it is clear that HDFC Pension Fund generated highest average returns of 10.85% followed by LIC Pension Fund. These two funds could yield mean returns of more than 10.00%, while the remaining Pension Funds earned mean returns of less than 10%. Conversely, the lowest standard deviation and coefficient of variation is associated with SBI Pension Fund.

Table 5. Risk-Return Analysis: Pension Schemes (Over all)

Pension scheme	**GM**	**Rank**	**SD**	**Rank**	**CV**	**Rank**
CG	9.39	9	4.22	5	0.45	6
SG	9.70	5	4.26	6	0.44	5
E-I	**11.87**	**1**	24.49	11	2.06	11
E-II	**11.69**	**2**	24.5	12	2.10	12
CB-I	9.78	4	2.95	3	**0.30**	**1**
CB-II	9.49	8	2.92	2	0.31	2
GB-I	9.32	10	5.24	9	0.56	9
GB-II	9.24	11	5.28	10	0.57	10
Alt	8.04	12	**2.83**	**1**	0.35	3
Lite	9.97	3	4.52	7	0.45	6
Corp-CG	9.64	6	4.80	8	0.50	8
APY	9.63	7	3.41	4	0.35	3

Source: NPS Trust Annual Reports

Out of the 12 Pension Schemes offered by NPS, Equity tier-I & II schemes got maximum returns of 11.87% and 11.69%, respectively. These two schemes are associated with higher risk. The remaining schemes earned returns of less than 10%. The lowest returns and standard deviation were earned on Alternative Investments scheme. The lowest CV is recorded with CB-I scheme that shows the consistency in returns earned.

Testing the equality of mean returns

A statistical analysis is carried out to find (a) If there is any significant difference in mean returns of the Pension Schemes for Government Employees and Pension Schemes for non-Government Employees and (b) If there is any significant difference in mean returns of the Public Sector Pension Funds and Private Sector Pension Funds. Independent samples t-Test can be applied for hypothesis testing.

(a) Group Statistics

Pension Schemes	N	Mean	Std. Deviation	Std. Error Mean
Pension Schemes for Govt. Employees	72	9.63	4.2	0.5
Pension Schemes for non-Govt. Employees	521	10.75	13.2	0.5

From the above table it can be noted that there are 72 observations in Pension Schemes for Government Employees and 521 observations for Pension Schemes for non-Government Employees. Pension Schemes for Government Employees has mean returns of 9.63% with a

standard deviation of 4.2%. Pension Schemes for non-Government Employees has returns of 10.75% with a standard deviation of 13.2%.

t- test for equality of mean returns

	Leven's Test for Equality of variance		t- test for Equality of Means						
	F	Sig.	T	df	Sig. (2-tailed)	Mean Diff	Std. Error Diff	95%Confidence Interval	
								Lower	Upper
Equal Variance assumed	7.32	0.007	-0.71	591	0.476	-0.0119	0.015	-0.042	0.019
Equal Variance not assumed			-1.45	308	0.146	-0.0119	0.007	-0.026	0.003

As per the test results, Leven's test is significant (because p=0.007, which is lesser than 0.05) and so the test statistics in the row equal variances not assumed will be interpreted. Therefore, it can be inferred that on an average, returns of Pension Schemes for non-Government Employees is more (M = 10.75%, SE = 0.5), than the mean returns of Pension Schemes for Government Employees (M = 9.63%, SE = 0.5). The mean difference, 0.011 (1.1%), is not significant, t (308) = 1.45, p = 0.146.

(b) Group Statistics

Pension Schemes	N	Mean	Std. Deviation	Std. Error Mean
Public Sector Pension Funds	348	10.4	11.19	0.6
Private Sector Pension Funds	245	10.92	14.11	0.9

From the above table it can be observed that there are 348 observations in Public Sector Pension Funds and 245 observations for Private Sector Pension Funds. Public Sector Pension Funds has mean returns of 10.4% with a standard deviation of 11.19%. Private Sector Pension Funds has returns of 10.92% with a standard deviation of 14.11%.

t- test for equality of mean returns

	Leven's Test for Equality of variance		t- test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Diff	Std. Error Diff	95%Confidence Interval	
								Lower	Upper
Equal Variance assumed	2.83	0.09	-0.50	591	0.617	-0.0052	0.010	--0.025	0.015
Equal Variance not assumed			-0.48	446	0.630	-0.0052	0.010	-0.026	0.016

As per the test results, Leven's test is not significant (because p=0.09, which is more than 0.05) and so the test statistics in the row equal variances assumed will be interpreted. Therefore, it

can be inferred that on an average, returns of Private Sector Pension Funds is more (M = 10.92%, SE = 0.9), than the mean returns of Public Sector Pension Funds (M = 10.40%, SE = 0.6). The mean difference, 0.005 (0.5%), is not significant, t (591) = 0.5, p = 0.617.

Performance Evaluation Models

To identify the maximum rewards on each Pension Scheme from each Pension Fund is calculated using Sharpe, Treynor, and Jensen's model. Further, best Pension Fund for each Pension Scheme can be found from the analysis.

Sharpe Ratio – Reward to risk ratio

Sharpe ratio helps in finding the best performer in terms of optimum returns among the peer participants. It is the ratio of risk premium to total risk.

$$\text{Sharpe ratio} = \frac{\text{Return on fund } (R_p) - \text{Risk free rate of return } (R_f)}{\text{Standard deviation } (\sigma_p)}$$

Table 6. Sharpe Ratio: Scheme-wise and Fund-wise

	SBI	LIC	UTI	HDFC	ICICI	Kotak	Birla	Best PF
CG	0.42	0.43	0.42	-	-	-	-	**LIC**
SG	0.48	0.51	0.50	-	-	-	-	**LIC**
E-I	0.16	0.18	0.14	0.46	0.21	0.22	0.19	**HDFC**
E-II	0.15	0.15	0.15	0.44	0.22	0.22	0.19	**HDFC**
CB-I	0.80	0.69	0.67	0.24	0.79	**0.58**	0.72	**SBI**
CB-II	0.64	0.63	0.60	0.17	0.73	**0.59**	0.63	**ICICI**
GB-I	0.31	0.54	0.24	0.23	0.44	0.47	0.34	**LIC**
GB-II	0.29	0.55	0.28	0.22	0.44	0.43	0.33	**LIC**
AIF	0.77	0.24	-0.41	0.17	0.01	0.05	-0.29	**SBI**
NPS-Lite	0.51	0.57	0.51	-	-	0.53	-	**LIC**
Corp-CG	0.41	0.44	-	-	-	-	-	**LIC**
APY	0.72	0.57	0.53	-	-	-	-	**SBI**
Best PS	**CB-I**	**CB-I**	**CB-I**	**E-I**	**CB-I**	**CB-I**	**CB-I**	

Source: NPS Trust Annual Reports

From Table, it is evident that the highest return per unit of total risk (Sharpe ratio) on CG, SG, GB-I, GB-II, NPS-Lite, and Corp-CG pension schemes were generated by LIC pension fund. The best reward on Equity tier-I & tier-II scheme made by HDFC pension fund. Corporate Bond tier –I scheme, Alt. Investments, and APY schemes got better rewards from SBI. Corporate Bond tier-II has better results from ICICI Pension Fund. Except HDFC, remaining pension funds generated maximum rewards on CB-I scheme.

Treynor Ratio- Reward to variability ratio

Treynor ratio is another financial metric used to evaluate performance of financial product or fund performance. This ratio helps in ranking the performance of funds based on maximum risk premium per unit of systematic risk, which is measured by beta.

$$\text{Return on fund } (R_p) - \text{Risk free rate of return } (R_f)$$

Treynor ratio = $\frac{\text{Risk Premium}}{\text{Systematic Risk } (\beta_p)}$

Table. 7. Treynor Ratio Scheme-wise and Fund-wise

	SBI	LIC	UTI	HDFC	ICICI	Kotak	Birla	**Best PF**
CG	1.98	2.04	2.01	-	-	-	-	**LIC**
SG	2.35	2.44	2.40	-	-	-	-	**LIC**
E-I	3.69	3.56	3.31	6.83	8.58	6.07	6.81	**HDFC**
E-II	3.59	3.10	3.51	6.31	5.82	6.04	6.77	**HDFC**
CB-I	3.66	2.54	2.73	3.30	3.31	2.57	2.17	**SBI**
CB-II	3.33	2.54	2.51	4.44	3.28	2.44	1.91	**HDFC**
GB-I	1.71	2.92	1.34	2.41	2.40	2.50	1.58	**LIC**
GB-II	1.61	3.00	1.69	2.33	2.37	2.31	1.54	**LIC**
NPS-Lite	2.58	2.95	2.55	-	-	2.57	-	**LIC**
Corp-CG	1.92	2.05	-	-	-	-	-	**LIC**
APY	4.44	3.40	3.21	-	-	-	-	**SBI**
Best PS	**E-I**	**E-I**	**E-II**	**E-I**	**E-I**	**E-I**	**E-I**	

Source: NPS Trust Annual Reports

Note: In the absence of benchmark returns for Alternative Investments Scheme, Treynor ratio could not be calculated.

CG, SG, Government bond tier-I & tier-II, NPS Lite, and Corp-CG schemes realized greater rewards per unit of systematic risk from LIC pension fund. The maximum rewards on Equity tier-I & tier-II and Corporate bond tier-II scheme obtained from HDFC pension Fund. Corporate bond tier-I APY schemes got better returns from SBI Pension Fund. All the Pension Funds generated maximum rewards per unit of beta on Equity tier I scheme.

Jensen Ratio – Jensen's Differential returns model

This measure is based on Differential Returns and is known as Jensen's Alpha, which is based on the difference between the actual return of a portfolio and required return of a portfolio in view of the risk of the fund.

[

or

$$\alpha_p = R_p - E(R_p)$$

Where Rp = Actual or realized return on Pension Fund

$E(R_p)$ as per CAPM = $R_f + \beta\ (R_m - R_f)$

Table 8. Jensen Ratio: Scheme-wise and Fund-wise

	SBI	LIC	UTI	HDFC	ICICI	Kotak	Birla	**Best PF**
CG	0.33	0.38	0.37	-	-	-	-	**LIC**
SG	0.65	0.75	0.71	-	-	-	-	**LIC**

E-I	-0.06	1.07	-0.46	2.90	3.22	2.24	2.85	**HDFC**
E-II	-0.16	0.43	-0.26	2.37	2.05	2.18	2.82	**Birla**
CB-I	1.28	0.74	0.71	1.13	1.12	0.57	0.51	**SBI**
CB-II	1.00	0.65	0.56	1.06	1.07	0.52	0.22	**ICICI**
GB-I	0.99	2.34	0.64	1.65	1.64	1.70	0.78	**LIC**
GB-II	0.89	2.37	0.98	1.51	1.62	1.50	0.71	**LIC**
Lite	0.70	1.03	0.68	-	-	0.75	-	**LIC**
Corp-CG	-0.40	-0.11	-	-	-	-	-	**LIC**
APY	1.02	-0.08	-0.15	-	-	-	-	**SBI**
Best PS	**CB-I**	**GB-II**	**GB-II**	**E-I**	**E-I**	**E-I**	**E-I**	

Source: NPS Trust Annual Reports

Note: In the absence of benchmark returns for Alternative Investments Scheme, Jensen ratio could not be calculated.

CG, SG, Government Bond tier-I and tier-II Schemes, NPS-Lite, and Corporate-CG Scheme earned best rewards from LIC Pension Fund. HDFC Pension Fund is a best choice for Equity tier-I while Birla is best for tier-II Scheme. SBI Pension Fund recorded maximum returns on Corporate Bond tier-I Scheme and APY Scheme. ICICI earned higher rewards of on Corporate Bond tier-II Scheme. LIC become the leading Pension Fund for most of the non-risky securities. SBI, LIC, and UTI were doing well with CB-I, GB-II while the remaining funds got better rewards from Equity scheme.

Government Employees: Overall Satisfaction towards NPS

Earlier the Government employees do not have the option of selecting their choice of Pension Fund, Pension Scheme, investment Pattern in different asset classes without any restrictions. However, recently Central Government employees got a choice to select the Pension funds among the currently operating funds under NPS. Amidst of these limited choices given to the government employees, an attempt is made to analyse the satisfaction of Government employees towards NPS. In this connection the nature and characteristics of the respondents covered under the study, an analysis of the information regarding their socio-economic background is carried out as a part of the research work. The table below gives the details relating to the profile of the investors.

Table 9. Profile of the Employees: Government Employees

Category		**No. of Respondents**	**Percentage**
Gender	Male	235	58.75
	Female	165	41.25
	Total	**400**	**100**
Age	Up to 30	149	37.25
	31-40	164	41.00
	41-50	77	19.25

	Above 50	10	2.5
	Total	**400**	**100**
Academic Qualification	School Final	0	0
	Graduate	195	48.75
	Post-Graduate	148	37.00
	Professional Degree	57	14.25
	Total	**400**	**100**
Marital Status	Married	314	78.5
	Unmarried	79	19.75
	Widow/Widower	5	1.25
	Divorce	2	0.05
	Total	**400**	**100**
Annual Income	Up to 250000	8	2.0
	250001-300000	90	22.5
	300001-500000	139	34.75
	Above 500001	163	40.75
	Total	**400**	**100**
Annual Savings	Up to 25000	65	16.25
	25001 to 50000	79	19.75
	50001-100000	117	29.25
	Above 100000	139	34.75
	Total	**400**	**100**

Source: Primary Data

From the Table 9 it is found that out of 400 respondents, 58.75 percent of the respondents were male and 41.25 percent of the respondents were female. The prime respondents were in the age group of up to 31-40 years (41.00 percent) and 30 years (37.25 percent) and. The remaining 19.25 percent and 2.5 percent respondents were in the age group of 41-50 and above 50. All the respondents were literates whereas a predominant literacy group was Graduate (48.75 percent) followed by Post Graduates (31 percent) and Professional degree (14.25 percent). Majority of the respondents were married i.e., 78.5 percent followed by unmarried respondents (19.75 percent) and a few belongs to widow/ widower category.

A majority of the investors (163) fall in the income group of above Rs.500001 followed by 139 employees in the income group Rs.300001-Rs500000 and 90 employees in Rs.250001-Rs.300000. It is observed that 34.75% of the employees were in the saving group of up to more than Rs.100000 and 29.25% of the employees were saving in between Rs.50,001 to Rs.1,00,000 per annum.

Government Employees: Overall Satisfaction level towards NPS

Government Employees are obliged to subscribe for the NPS to create a retirement corpus. They have limited choice in terms of selecting the Pension Funds till the recent past, Pension Schemes, Proportion of investment in asset classes, and option of changing their choices made earlier. Hence, an analysis is carried out to analyse the satisfaction level of Government employees about NPS. The opinion of respondents towards NPS are collected using 20

statements. The respondents need to mention their level of satisfaction based on the score given to each statement. The statements were asked using a 5 point Lickert scale. Extremely Dissatisfied (ED), Dissatisfied (D), Neutral (N), Satisfied (S), Extremely Dissatisfied (ED) were given the score of 5,4,3,2, and 1, respectively. The frequency of the responses are presented in the following tables followed by Factor analysis.

Table 10. Factor-Freedom of Selection

Statements		ED	D	N	S	ES	Total
Choice of the Pension Funds	F	8	4	131	166	91	400
	%	2	1	32.75	**41.5**	22.75	100
Choice of the Pension Schemes	F	38	13	80	168	101	400
	%	9.5	3.25	20	42	25.25	100
Choice of Investment mix	F	46	37	80	143	94	400
	%	11.5	9.25	20	35.75	23.5	100
Choice of Investment (Active /Auto Choice)	F	25	60	72	131	112	400
	%	6.25	15	18	32.75	28	100
Choice of asset classes	F	13	36	87	143	121	400
	%	3.25	9	21.75	35.75	30.25	100
Choice of selecting Annuity service provider	F	23	46	82	127	122	400
	%	5.75	11.5	20.5	31.75	30.5	100

Source: Primary data

Note: For calculating overall satisfaction the figures related to S and ES are added

From the above Frequency table it can be seen that 64.25% (41.5+22.75) of the respondents are satisfied with Choice of Pension Fund given to them to invest their contributions while 32.75% of the respondents were could not take any decision. For the statements about Choice of Pension Scheme, Choice of Investment mix, Choice of Investment (Active /Auto Choice), Choice of asset classes, and Choice of selecting Annuity service provider, the percentage of respondents satisfied are equal to 67.25%, 59.25%, 60.75%, 66% and 62.25%, respectively.

Table 11. Factor-Financial Charges

Statements		ED	D	N	S	ES	Total
Initial Contribution Processing Charges	F	28	51	89	113	119	400
	%	7	12.75	22.25	28.25	29.75	100
Subsequent Contribution Processing Charges	F	28	43	105	114	110	400
	%	7	10.75	26.25	28.5	27.5	100
Non-financial charges	%	22	44	102	119	113	400
	F	5.5	11	25.5	29.75	28.25	100
Exit/ Withdrawal charges	%	24	44	89	121	122	400
	F	6	11	22.25	30.25	30.5	100

Source: Primary data

From the above Frequency table, it can be seen that 58% (28.25+29.75) of the respondents are satisfied with Initial Contribution Processing Charges while 22.25% of the respondents could not take any decision. For the statements on Subsequent Contribution Processing Charges, Non-

financial charges, and Exit/ Withdrawal charges, 56%, 58%, and 60.75% of the respondents are satisfied.

Table: Factor-Timeliness

Statements		ED	D	N	S	ES	Total
Time period to open the NPS account	F	32	39	89	119	121	400
	%	8	9.75	22.25	29.75	30.25	100
Time period to process the monthly contribution amount	F	17	42	109	120	112	400
	%	4.25	10.5	27.25	30	28	100

Source: Primary data

From the above Frequency table it can be seen that 60% (29.75+30.25) of the respondents are satisfied with Time period to open the NPS account, 22.25% of the respondents could not take any decision. For the statement on Time period to process the monthly contribution amount, 58% of the respondents said they are satisfied.

Table 12. Factor- Other Aspects enhancing the Retirement Benefits

Statements		ED	D	N	S	ES	Total
Option of Changing the Investment Mix	F	50	79	78	98	95	400
	%	12.5	19.75	19.5	24.5	23.75	100
Option of changing the Pension Fund	F	47	70	91	100	92	400
	%	11.75	17.5	22.75	25	23	100
Option of changing the asset class	F	24	29	98	144	105	400
	%	6	7.25	24.5	36	26.25	100
Crediting the Units in employees account	F	38	42	85	112	123	400
	%	9.5	10.5	21.25	28	30.75	100
Rate of return	F	30	69	93	103	105	400
	%	7.5	17.25	23.25	25.75	26.25	100

Source: Primary data

From the above Frequency table it can be seen that 48.25% (24.5+23.75) of the respondents are satisfied with Option of Changing the Investment Mix, 19.5% of the respondents could not take any decision. For the statements relating to the satisfaction with regard to Option of changing the Pension Fund, Option of changing the Asset Class, and Crediting the Units in employees account, 48%, 62.25%, and 58.75% of the respondents are agreed to it. However, only half of the respondents (i.e., 52%) are satisfied with the rate of return earned on investments.

Factor Analysis

Factor analysis is carried out to identify the underlying factors among the 20 statements related to NPS. However, 3 statements did not have the have the factor loading of at least 0.5 to any

factor. Hence the results of Factor analysis shows only 17 statements merged in four components.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.931
Bartlett's Test of Sphericity	Approx. Chi-Square	3559.427
	Df	190
	Sig.	0.000

The Barletts test of sphericity and Kaiser- Meyer Olkin (KMO) measure of sampling adequacy derived the approximate chi-square statistics value of 3559.427 with 190 degrees of freedom, which is significant at 0.000 levels. The KMO statistic (0.931) is also large (>0.5) hence factor analysis an appropriate technique for further analysis data.

Factor Loading	Attributes leading at 0.5 or more	Loading	% of Variance	Cumulative % of Variance
Freedom of Selection	Choice of the Pension Funds	0.675	**18.345**	**18.345**
	Choice of the Pension Schemes	0.668		
	Choice of Investment mix	0.627		
	Choice of Investment (Active choice/Auto Choice)	0.618		
	Choice of asset classes	0.577		
	Choice of selecting Annuity service provider	0.534		
Financial Charges	Initial Contribution Processing Charges	0.722	**17.05**	**35.395**
	Subsequent Contribution Processing Charges	0.718		
	Non-financial charges	0.699		
	Exit/ Withdrawal charges	0.682		
Timeliness	Time period to open the NPS account	0.731	**16.63**	**52.02**
	Time period to process the monthly contribution amount	0.516		
Other Aspects Enhancing the retirement Benefit	Option of Changing the Investment Mix	0.772	**7.20**	**59.23**
	Option of changing the Pension Fund	0.645		
	Option of changing the asset class	0.631		
	Crediting the Units in employees account	0.629		
	Rate of return	0.594		

Data analysis on various aspects NPS on the basis of Varimax rotation with Kaiser Normalization revealed the emergence of 4 factors. Retaining only those variables with eigen values greater than 1, it can be inferred that 18.35 percent of variance is explained by factor 1, while 17.05 percent of variance is explained by factor 2, 16.63 percent of variance is explained by factor 3, 7.20 percent of variance is explained by factor 4. Cumulative percentage of all the 4 factors is 59.23.

Each factor is constituted of all those variables that have factor loading greater than 0.5. First factor constituted with 6 variables namely Choice of Pension Funds, Choice of the Pension Schemes, Choice of Investment mix, Choice of Investment (Active choice/Auto Choice), Choice of asset classes, Choice of annuity service provider. It is conceptualized as "**Freedom of Selection**" given to the employees.

Second factor constituted with various kinds of charges like Initial Contribution Processing Charges, Subsequent Contribution Processing Charges, Non-financial charges, and Exit/ Withdrawal charges and it is conceptualized as "**Financial Charges**".

Third factor consists of time related variables such as Time period to open the NPS account and Time period to process the monthly contribution amount and it is conceptualized as "**Timeliness**".

The fourth factor comprises of 5 variables like Option of Changing the Investment Mix, Option of changing the Pension Fund, Option of changing the asset class, timely updating the units in employees' account and rate of return which will help in enhancing the retirement benefit of the employees. The factor is conceptualized as "**Other Aspects Enhancing the Retirement Benefit**".

VIII. Findings, Suggestions and Conclusion

1. Government employees consisting of Central and State Government employees has a major share of 49.07% in total number of employees and accounts for 81.1% share in total value of AUM .
2. CG Pension Scheme got higher returns of 9.42% from LIC pension fund followed by UTI and SBI. However, UTI posted consistent returns for the scheme. For SG Pension Scheme, LIC Pension Fund has higher yield of 9.75% and the returns are consistent as disclosed by CV.
3. HDFC Pension Fund has reported a higher yield of 14.05% and 13.46% on Equity tier-I and tier–II schemes along with the consistency in returns as shown by the CV of around 1.8.
4. SBI earned better returns of 10.10% on Corporate Bond Tier-I scheme, but returns are consistent with Birla Pension Fund on both Corporate Bond tier-I and tier-II schemes.
5. Government Bond tier-I and tier II schemes reported a higher yield of 10.62% and 10.63%, respectively from LIC Pension Fund. However, Birla Pension Fund had a lower CV of 0.4 for both the schemes.
6. SBI earned maximum return of 10.16% on Alternative Investments Scheme. Conversely, HDFC Pension Fund is optimal choice for the employees as it has lowest CV of 0.18.
7. Maximum and consistent returns on NPS Lite and Corporate-CG Schemes were generated by LIC pension fund compared to other Pension Fund.
8. CG, SG, GB-I & II, NPS-Lite, and Corp-CG pension schemes had better rewards per unit total risk from LIC pension fund. The best reward on Equity tier-I & tier-II scheme made by HDFC pension fund. Corporate Bond tier –I scheme, Alt. Investments, and APY schemes got better rewards from SBI.

9. Similar to Sharper ratio, Treynor ratio was favourable with CG, SG, GB-I & II, NPS Lite, and Corp-CG schemes. The maximum rewards on Equity tier-I & tier-II and Corporate bond tier-II scheme obtained from HDFC pension Fund.
10. CG, SG, GB-I & II, NPS-Lite, and Corporate-CG Scheme earned best rewards from LIC Pension Fund. HDFC Pension Fund is a best choice for Equity tier-I scheme. SBI Pension Fund recorded maximum returns on Corporate Bond tier-I Scheme.
11. Freedom to select the pension fund is most important factor for the Government employees. However, they are more dissatisfied for not having better returns on their investments.

Suggestions

1. Return and risk analysis reveals that LIC can be an optimal choice for CG and SG schemes, if they get a choice to invest their maximum contributions.
2. Investors willing to take market risk can chose Equity and Alternative Investments Funds for which, HDFC can be the optimal choice. HDFC made better returns on Equity and consistent returns on both Equity and AIFs as well.
3. LIC is a leading pension fund for the risk averse employees as it got better rewards per unit of risk on GB-I & GB-II and also for NPS lite and Corp-CG as revealed by Sharpe, Treynor and Jensen ratios
4. HDFC is a best Pension Fund for risk taking investors based on all the three performance evaluation models.
5. Central Government employees can chose HDFC apart from LIC to manage their funds in anticipation of more returns, as HDFC earned more returns even on risky investments.
6. It is suggested to the Government to take the initiatives in NPS, so that the government employees also get better returns and a minimum guaranteed Pension as the returns are subjected to market risk.

Conclusion

The Government Employees accounts for major share in total AUM under NPS. But the returns on CG and SG schemes intended for them are giving a mean returns of less than 10% over the last 12 years. LIC is making better returns for them comparing to UTI and SBI. HDFC is a best choice for risk taking investors. As the Central Government employees were given the choice of selecting the Pension fund, they can opt for HDFC as it generating better returns comparing to other funds. The Government can fix a minimum guaranteed Pension for the Government employees even in the worst market conditions as the returns are subjected to market risk.

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