IS THE NATIONAL PENSION SYSTEM AS PROMISING AS THE OLD PENSION SYSTEM IN TERMS OF BENEFICIARIES' INTEREST IN INDIA: A COMPARATIVE ANALYSIS

Shruti Aggarwal,[1] Ashu Khanna,[2] Pratyush Kumar[3]
[1]Research Scholar, Department of Management Studies, Indian Institute of Technology Roorkee, Roorkee, India, Email_id: saggarwal@as.iitr.ac.in
(Corresponding author)
ORCID ID: https://orcid.org/0000-0003-0234-2920
[2]Associate Professor, Department of Management Studies, Indian Institute of Technology Roorkee, Roorkee, India, Email_id:ashu.khanna@ms.iitr.ac.in
[3]B.Tech student, Department of Chemical Engineering, Indian Institute of Technology Roorkee,Roorkee, India , Email id: pkumar3@ch.iitr.ac.in

Abstract
The major revolution came in India's social security and pension sector when the old pension system was replaced by the defined contribution, the new pension system, now called the National pension system. The new system created havoc and induced apprehension and dubiety in Government employees regarding their future benefits. This study attempts to determine whether the National pension system is a cause to worry for employees or is it just a fear of the unknown. A comparison is attempted between both old and new pension systems to gauge if there is a remarkable 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. The other two variables, Government contribution rate and job level, have less impact. A case is formed by changing the allocation rate in pension and lumpsum fund to 50:50, which is currently 60:40. A change in allocation rate also positively impacts the pension amount, which is one of the study's implications. The study's outcome benefits the government, the investors and fund managers as they can imply them to make the new system more attractive and make the benefits at par with the old system.
Keywords: Old pension system, National pension system, defined benefit, defined contribution, comparative analysis

1. Introduction

The past changes in demography, family system and social system have urged individuals to look into their future security and retirement planning. People who heavily relied upon their children for their old age needs in the past have now become more self-dependant and confident and want to live a more dignified life after retirement. This has strengthened the social security and retirement benefits sector in the last decade. Pension in India is mainly covered through employer and employee participation. The pension sector in India is limited to the organised sector, thus leaving the self-employed and people working in the unorganised sector without any security cover. Presently, only about 8% of the population is covered by any social security scheme in India, thus leaving 92% without any retirement planning.

The Pension system in India was introduced in 1857, and Indian Pension Act came into being in 1871. In independent India, the Civil Service Pension evolved to provide retired government employees an assured monthly pension based on their last drawn salary and years of service. The government's

pension bill increased exponentially from 1985 to 2000 at a CAGR (compound annual growth rate) of 23.2%. In the context of this tremendously rising liability, the Ministry of Social Justice and Empowerment set up OASIS (Old Age Social and Income Security) committee in 1998 and HLEG (High-level expert group) to examine old age income security in India. In 2000, the committee proposed to move from a Defined Benefit to a Defined Contribution Scheme, thereby introducing the National Pension System (NPS).

The National Pension System was implemented in India in 2004 for all Government employees (except armed forces). Although NPS started as a mandatory scheme for central government employees, it extended to autonomous bodies, state governments, and unorganised sectors. NPS has been adopted resoundingly by almost all state governments voluntarily. The New Pension system is based on a Defined-contribution system where the employee's contribution is fixed, not the benefit. In contrast, the Old pension system was based on a Defined- benefit system where employees are assured of the number of benefits they will get on retirement. Since its inception, employees and stakeholders have criticised the New Pension System on various fronts. Various employee unions even went on strike and demonstrated their protests to bring back the Old Pension System. The employees feel their future is insecure with such a pension system since there is no surety of returns. The main reasons for the criticism are its attributes such as taxation on maturity amount, no withdrawals till retirement, compulsory annuity after retirement, no assurance of returns, Lower returns on the annuity, and availability of better investment plans such as mutual funds, PPF, ELSS, etc. Poor liquidity and limited choice of fund managers are other reasons for criticising the NPS investment for retirement planning. There is no option for government and corporate employees except to invest in NPS (Murari, 2020). The government has been making specific changes in the scheme, such as flexibility of withdrawal of funds before retirement in certain circumstances, an increase of tax-free corpus amount, and an increase in government contribution to the employee fund from 10% to 14% to make the scheme more lucrative among employees and alleviating the grievances of them. On analysing the current situation of NPS, we conclude that if the employees get benefits from the National pension system that are at par with the old system, the scheme can become one of the favourite avenues of investment and principally an investment tool for Retirement Planning. Therefore, an attempt is made to undertake a comparative analysis between returns (here, returns consider both the accumulated fund as well as the pension amount) of both pension systems, the old as well as the new, to scrutinise whether the benefits in the new system are at par with the Old one or is there a higher difference between the two. A Scenario Analysis and Forecasting are done for the coming years making certain assumptions. Our study contributes to academic research in the field of Retirement Planning in the context of India. The researchers have done meagre work in this field, specifically in National Pension System (NPS). A comparative study between the old and new pension systems regarding financial benefits to the subscribers is a novice work left untouched and has not been undertaken by any researcher. Moreover, the study suggests suggestions to the government, pension fund managers, and intermediaries to make the scheme as worthwhile as the previous one.

The remainder of the paper is structured as follows. Section 2 presents the literature review, and the data and methodology in section 3. Section 4 discusses the results and output, and finally, section 5 comprises of conclusion, policy recommendations, limitations, and scope for future research.

2. Literature review

According to the United Nations Population Division, World's life expectancy is expected to reach 75 years by 2050 from the present level of 65 years. There should be a minimum basic pension for living in old age, regardless of job or occupation (Narayana, 2019). The increased life expectancy and

severity of the economic consequences of the defined benefit pension system have prompted the government to reconsider the pension structure. The reform agenda has focused on shifting from defined benefit pension plans to defined contribution pension plans, thus diversifying the risk onto

the employee (Barr, 2002). According to Keith Brainard (2005), Research Director at the National Association of State Retirement Administrators (NASRA), pension funds are a source of long-term capital. Also, they contribute significantly to the financial stability, financial development goals and liquidity of both the money and capital markets. Pension funds are essential institutional investors for the development of markets and economic activity by raising savings and contributing to the financial sector development. Therefore, the reforms and measures for pension systems can improve the financial sustainability of pension systems and positively affect economic performance through the development of the stock market and bond markets (Bayar and Kilik,2019). The demographic crisis, recessions in the economy and various research in the past about unsustainability and fiscal deficit caused by the defined benefit pension system have necessitated the implementation of long-term pension reforms, thus enforcing reduced benefits, higher contribution rates from employees, shifting the risk part upon the employees to borne by themselves and various other policy and administrative reforms (Holzmann et al., 2008).

DB schemes were closed in Australia on similar lines due to significant pension liabilities held by the states. In the1980s, warnings of a superannuation' time bomb' of unfunded public sector liabilities had led to much criticism of the states for the lack of financial responsibility shown in the management of state pension schemes. The more aggressive reforms of the 1990s saw the end of DB provisions, as new employees were enrolled in much more modest DC arrangements, with conservative governments viewing the shifting of financial risk onto employees as financially prudent (Mees,2020). One of the reasons to switch from the DB to the DC pension system is to improve the system's sustainability while assuring a fair pension for all simultaneously (Barr and Diamond, 2006). DC schemes perform better in terms of sustainability and fairness. Their good properties are less affected by the policy around retirement age, while they are susceptible to the assumptions made to calculate the annuity factor. When they do not account for longevity improvements, they reach similar (un)sustainability levels as the DB systems (Alonso Garcia et al., 2017).

The expenditure on civil servants' pensions in India grew at a blistering rate. The pension debt liability of the government stood at 64% of GDP on account of civil servants alone (Bhardwaj and Dave, 2006). Primarily driven by fiscal pressures, the government initiated civil service pension reforms in 2004, moving all new civil service personnel recruited after January 2004 to a defined contribution (DC) programme called the National Pension System (NPS), administered by an independent regulatory authority- the PFRDA. The design of the NPS included portability of benefits, centralised recordkeeping, choice of investment in varied asset classes, and introduction of the annuity system in the pay-out phase (Bali, 2014).

The NPS offers a range of investment choices, such as equity, debt and government securities, including a default life cycle plan, which adjusts exposure to risk with age (Parekh, 2009). There are schemes in NPS for different sectors and people of all income groups, for organised and unorganised sectors, and for young and older adults. While the pension is still payable at 60, the NPS differs from the earlier scheme in its pay-out phase arrangements and restricts pre-retirement withdrawals (Murari,2020). At least 40 per cent of the accumulated balance should be used to purchase an annuity, while the rest can be withdrawn as a lump sum. Therefore, the NPS scheme requires a robust annuity market with appropriate financial products (such as long-term bonds) to match assets and liabilities

judiciously (Bali,2014).

The annuity market in India is still in an underdeveloped stage, characterizing features such as a lack of a strong bond market and a deficit of bonds of various types, such as stock-indexed bonds, long-dated bonds, interest rate derivatives, and instruments to provide cover against longevity risks. There are no standard mortality tables, and insurance companies must follow the current annuity products

(Sane and Price, 2018). Also, there is a shortage of intermediaries to educate the Indian population about the relevance of pension schemes. A study conducted by Sane and Thomas (2015) on informal sector participation in voluntary defined contribution pension schemes derives that voluntary participation in DC pension funds is feasible if the investors get adequate information and an intermediary channel.

Kali and Jana (2017) conducted a study entitled "Pension reform in India regarding New Pension Scheme." They conducted the survey to assess India's old and new pension schemes and collected secondary data from 12 accounting years comprising old and new pension periods. They used a t-test to compare the old pension and NPS and concluded that the employee benefited more from the NPS.

Kamnath and Patil (2017) have conducted a study entitled "Cost-Benefit Analysis of National Pension Scheme." They have considered investors with different age groups, investment periods, processing charges, and government taxation policies. They used the case study method and made a comparative study of NPS and other investment schemes. They considered the NPS Tier-1 with four age groups of investors 25 years, 35 years, 45 years, and 55 years. They concluded that NPS is a unique pension policy that provides multiple benefits and assures investors of market-linked returns.

Thaker et al. (2018), through their study "An Empirical Study of National Pension Scheme concerning Tier 1 - Corporate Bonds, Equities and Government Securities", have tried to conduct empirical research on the performance of NPS concerning Tier-I. They have used seven NPS schemes for their study period of five years. They used to mean standard deviation and ANOVA for the study. They also used Levene Statistics to test the homogeneity of variances among the different schemes of Tier-I. They concluded in their study that although NPS offers various benefits, due to a lack of awareness and low commission structure for advisory, many investors are keeping away from investing in NPS. They suggested NPS may offer a 12% to 15% return in the long run, which is good among the investment options for early-age investors.

Most subscribers of NPS are central and state government employees for whom the scheme is mandatory, thus questioning the purpose and objective of the scheme (Sanyal et al., 2011a). The welfare orientation is missing in the National Pension system since the plan does not guarantee a minimum pension after retirement (Sanyal et al., 2011b).

The current NPS has deviated from its goals in some critical regions. These include a multiplicity of schemes, lower penetration in the unorganized segment, low transparency of the system and a lack of focus on keeping asset management fees low and, above all, the trust of the people (Sane and Thomas, 2014). The schemes explicitly designed for unorganized workers, such as NPS lite and Atal Pension Yojana, have been unable to attract a huge base of subscribers (Rajasekhar et al., 2017). If the government actively participates in the pension fund's investment performance in the stock market, there would be less risk (Imam, 2011).

3. Data and methodology

Secondary data is used in our study. The data used is related to the salary structure of Indian Government employees. The information is compiled from the pay commissions, which the government announces every ten years. The data is extracted from the government websites of the pay commission. We took data starting from the year 2004 up to the year 2021. From 2021 to 2039, i.e., 19 years, the data is based on forecasting analysis. The data for employees' basic pay and salary structure has been taken from the 5th,6th and 7th pay commissions. The year 2004 has been taken as

the starting year for the calculation since NPS was launched that year. As the person joining in the year 2004 at the age of 25 will continue his service up to the year 2039, i.e. the year in which he attains the retirement age, the salary increments are made on similar lines. The 8th pay commission and 9th pay commission are assumed for the upcoming years making the increments and hikes in salary structure on a past basis. Dearness allowance is increased, too, based on past rates.

To compare monetary benefits between Old Pension System and the National Pension system, we need to have variables that constitute the pension and the lump sum funds in both systems. The factors that contribute to pension under the National pension system are:
1) Basic pay
2) No. of years of service
3) Contribution of Government
4) Interest rate earned on investments
We took three different cases in which variation is done in the abovementioned factors to find out the optimum amount in NPS that matches the Old Pension system. Pension is calculated at five levels of the job according to the existing pay commission (Levels 1,4,6, 8, and 10).

The variables for the study are:
1. **Level of job** – In the present pay structure, the levels of the job include level 1 upto12 Level 12 constitute high-rank jobs such as administrative and managerial positions. Entry to this level is mostly through promotions; in rare cases, there is a direct entry. For our study, we took levels 1,4,6,8 and 10.
2. **Contribution by Government**- 14% (current), 16% (assumed). We assume that if, instead of 14%, the government contributes 16% of the basic pay towards the employee pension account, it will make a greater difference in future benefits.
3. **Age of employee at the time of joining service**-25,30 and 35 years (assumed)
4. **The interest rate on Investment**- The current interest rate earned by fund managers on NPS investments is around 9-!0%. There is a slight variation in the interest rate of seven PFMs. We assume that if the interest rate earned is 10% in one case and 12% in another, how much impact will it have on overall pension income. Therefore, the interest rate assumed are- 9%, !0% and 12%.
Two factors will be the same in all the cases, i.e., level of job and age of the employee at the time of joining service. In contrast, variation is done in the other two factors to determine the best combination of factors that give the maximum return.
In the Old pension system, the pension is calculated by the following formula: **50%*Basic pay-40%*Basic pay towards commutation +100% dearness allowance.** The lumpsum value in the OPS consists of:
1. General Provident fund (GPF)- The employee contributes 10% of his monthly salary. The government credits interest on this amount.
2. Gratuity- Retirement gratuity is calculated by the following formula- 1/4th of a month's Basic Pay plus Dearness Allowance drawn on the retirement date for each completed six months of qualifying service. The maximum gratuity payable is Rs.20 lakhs
3. Commutation of pension- A Central Government servant can commute a portion of pension, not exceeding 40% of it, into a lump sum payment**.** The calculation formula is:
CVP = 40 % (X) Commutation factor* (X)12. Here CVP stands for the commuted value of pension, X= Basic pension, commutation factor – the Central government releases it. At present, the value of this factor is 8.19.

The total payments after retirement are divided as pension and the lump sum fund. 40% of the total amount is compulsorily converted into an annuity that will give the employee a monthly pension, and

the balance is paid as a lump sum. In our study, we have also done calculations assuming that in NPS, 50% of the amount will be converted into an annuity and 50% will be paid as a lump sum, which is currently in the ratio of 60:40. This is done to gauge whether an increment in amount devoted towards annuitisation will have an impact on pension amount.

The main reason for the dissatisfaction of current employees with the National pension system is the less pension compared to the old pension. If a change in this ratio of lump sum and pension amount

brings a positive difference in the pension, then this can be one of the measures the government can implement. Calculating salary, pension, and future estimation of pension and the lump sum amount is carried out in MS Excel. Special functions and formulas are used in the Excel program.

4. Results and discussion

Total payments under National Pension System and the old pension system are calculated at various levels of jobs and in different age groups. Government contribution and interest rates are varied and different cases are formed. By varying the factors, the author wants to obtain a combination of factors that maximize the pension and put it equal to the amount of the old pension. In the current scenario, i.e..., fund allocation ratio of 60:40, we took different cases. The first case is formed by taking the current ROI of 9% and the government the contribution rate of 14%.

4.1 Iˢᵗ CASE: Present scenario: fund allocation in the ratio of 60:40 (I,e 60% lumpsum and 40% pension)

Table 1 depicts that in the ongoing scenario, the pension amount in NPS is much less than in OPS, with the difference increasing by age.

A) ROI- 9%. Govt. Contribution- 14%

TABLE 1: Pension amount at ROI=9%, Govt. contribution=14%

GRADE PAY	LEVEL	PENSION					
		25YRS		30 YRS		35 YRS	
		NPS	OPS	NPS	NPS	NPS	OPS
1800	1	₹ 46,396	₹ 56,409	₹ 25,582	₹ 42,275	₹ 13,380	₹ 25,071
2400	4	₹ 65,728	₹ 79,913	₹ 36,242	₹ 59,889	₹ 18,954	₹ 35,517
4200	6	₹ 91,245	₹ 1,10,938	₹ 50,312	₹ 83,140	₹ 26,313	₹ 49,306
4800	8	₹ 1,22,692	₹ 1,49,171	₹ 67,651	₹ 1,11,793	₹ 35,382	₹ 66,298
5400	10	₹ 1,44,601	₹ 1,75,808	₹ 79,732	₹ 1,31,756	₹ 41,700	₹ 78,137

Source: Author

Table 2 clearly states that lumpsum fund value is greater in NPS than OPS in the age group of 25 and 30 years, whereas, at the age of 35, the lump sum amount is also less in NPS. Joining service at an early age is thus an indicator of a handsome amount at retirement. This analysis is also presented in a figure with a bird's eye view.

TABLE 2: Lumpsum amount at ROI=9%, Govt. contribution=14%

GRADE PAY	LEVEL	LUMPSUM					
		25YRS		30YRS		35YRS	
		NPS	OPS	NPS	OPS	NPS	OPS
1800	1	₹ 9,341,478	₹ 8,973,194	₹ 5,150,816	₹ 5,007,257	₹ 2,693,880	₹ 3,101,018
2400	4	₹ 13,233,760	₹ 12,712,025	₹ 7,296,989	₹ 7,093,615	₹ 3,816,330	₹ 4,393,109
4200	6	₹ 18,371,572	₹ 17,647,282	₹ 10,129,938	₹ 9,847,606	₹ 5,297,964	₹ 6,098,669
4800	8	₹ 24,703,018	₹ 23,729,114	₹ 13,621,047	₹ 13,241,414	₹ 7,123,815	₹ 8,200,470

| 5400 | 10 | ₹ 29,114,272 | ₹ 27,966,456 | ₹ 16,053,376 | ₹ 15,605,952 | ₹ 8,395,925 | ₹ 9,664,839 |

Source: Author

Fig.1 clearly states that pension in OPS is more than NPS at all levels and age groups.
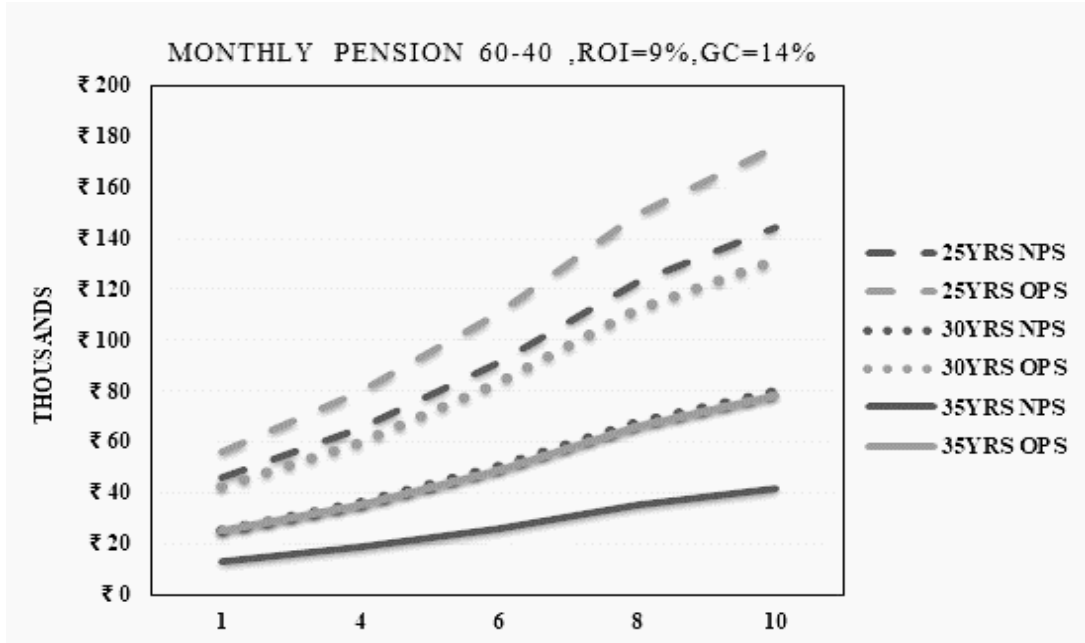

Figure 1: Monthly pension when ROI=9% and Govt. contribution=14% (allocation ratio 60:40)

The lumpsum fund value is higher in NPS than OPS at 25 and 30 years of age while it is lower in 35 years age.
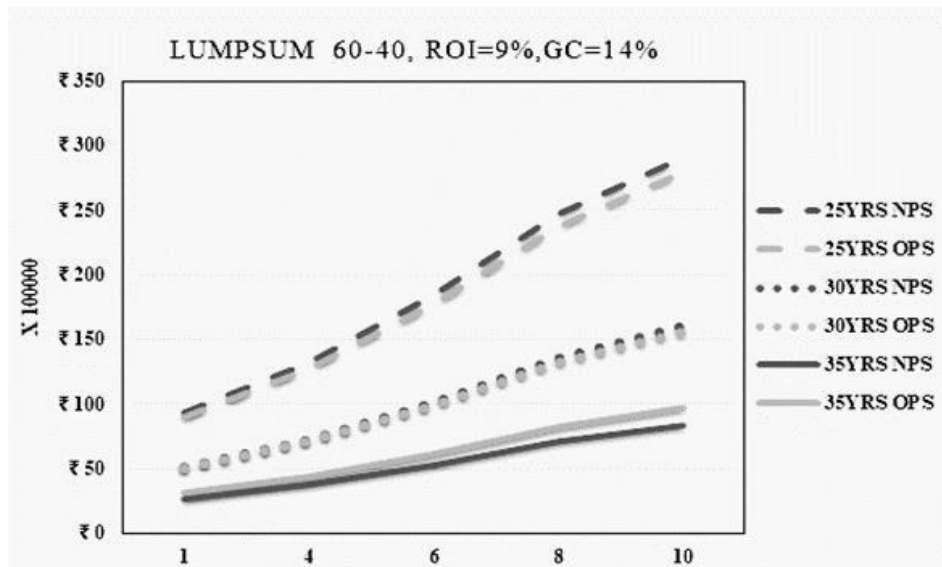

Figure 2: Lumpsum value at ROI=9% and Govt. Contribution: 14% (allocation ratio 60:40)

Another case is formed by taking ROI as 12% and other variables unchanged.
B) ROI- 12%, Govt. contribution 14%
Table 3 states that pension amount in NPS increases when a person starts a job at the age of 25,

whereas in other age groups pension amount is still less than that in old pension system.

TABLE 3: Pension amount at ROI=12%, Govt. contribution=14%

GRADE PAY	LEVEL	PENSION					
		25YRS		30YRS		35YRS	
		NPS	OPS	NPS	NPS	NPS	OPS
1800	1	₹ 70,904	₹ 56,409	₹ 35,265	₹ 42,275	₹ 16,658	₹ 25,071
2400	4	₹ 1,00,447	₹ 79,913	₹ 49,959	₹ 59,889	₹ 23,599	₹ 35,517
4200	6	₹ 1,39,444	₹ 1,10,938	₹ 69,355	₹ 83,140	₹ 32,761	₹ 49,306
4800	3	₹ 1,87,501	₹ 1,49,171	₹ 93,257	₹ 1,11,793	₹ 44,051	₹ 66,298
5400	10	₹ 2,20,984	₹ 1,75,808	₹ 1,09,910	₹ 1,31,756	₹ 51,918	₹ 78,137

Source: Author

Table 4, depicting the lumpsum amount, states that lumpsum fund value is more significant in NPS than OPS at all levels and in all age groups. This is evidently because of the high portion of funds devoted to lumpsum.

TABLE 4: Lumpsum amount at ROI=12%, Govt. contribution=14%

GRADE PAY	LEVEL	LUMPSUM					
		25YRS		30YRS		35YRS	
		NPS	OPS	NPS	NPS	NPS	OPS
1800	1	₹ 1,42,75,953	₹ 89,73,194	₹ 71,00,360	₹ 50,07,257	₹ 33,53,964	₹ 31,01,018
2400	4	₹ 2,02,24,267	₹ 1,27,12,025	₹ 1,00,58,843	₹ 70,93,615	₹ 47,51,449	₹ 43,93,109
4200	6	₹ 2,80,76,041	₹ 1,76,47,282	₹ 1,39,64,041	₹ 98,47,606	₹ 65,96,130	₹ 60,98,669
4800	8	₹ 3,77,51,964	₹ 2,37,29,114	₹ 1,87,76,508	₹ 1,32,41,414	₹ 88,69,372	₹ 82,00,470
5400	10	₹ 4,44,93,387	₹ 2,79,66,456	₹ 2,21,29,455	₹ 1,56,05,952	₹ 1,04,53,188	₹ 96,64,839

Source: Author

Monthly pension increases in NPS when the ROI is 12% and at age group of 25 years. At other age groups the pension is still less than what it is in OPS.
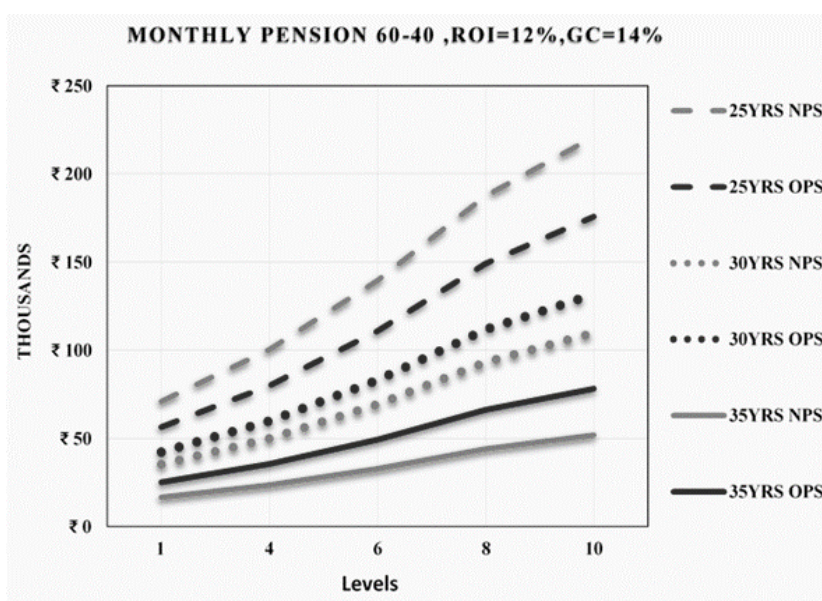

Figure 3: Monthly pension at ROI=12% and Govt. contribution=14% (allocation ratio 60:40

There is a much positive change in the lumpsum amount in NPS as depicted by fig.4. The amount is
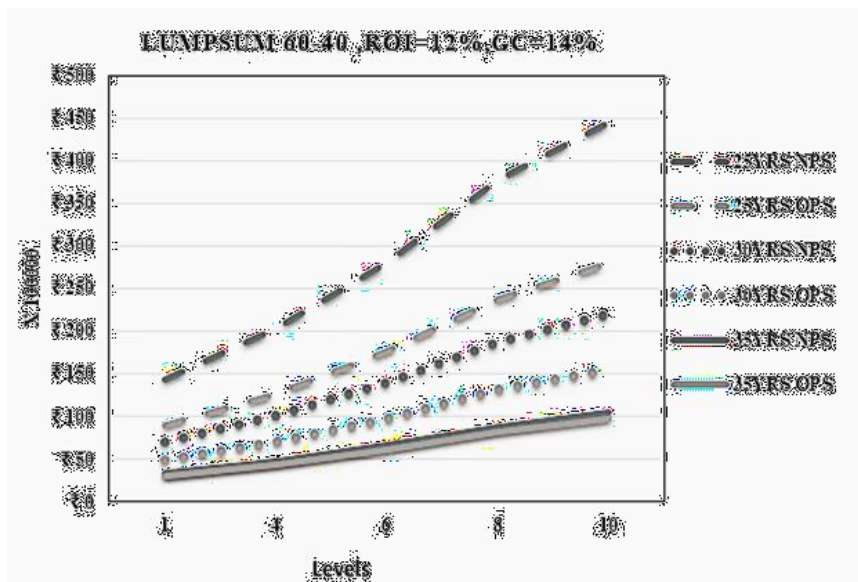
higher in NPS at all levels and in all age groups.

Figure 4: Lumpsum value at ROI=12%, Govt. contribution=14% (allocation ratio- 60:40)

Another scenario is considered where we assume the fund allocation ratio as 50:50, i,e 50% into an annuity and 50% in a lump sum. The retiree's foremost concern is monthly pension; therefore, an attempt is made to increase the pension amount in NPS by changing the allocation ratio. Interest rate is taken at 9% and government contribution 14%.

4.2 IInd Case: Forecasted scenario (fund allocation in the ratio of 50:50 i, e 50% in lumpsum and 50% pension

a) ROI- 9%, Govt. contribution 14%

Table 5 shows that the pension amount increases in NPS more than OPS at the age of 25, whereas in other age groups pension amount is still less.

TABLE 5: Monthly pension at ROI=9%, govt. contribution=14% (fund allocation ratio 50:50)

		MONTHLY PENSION					
		25YRS		30YRS		35YRS	
GRADE PAY	LEVEL	NPS	OPS	NPS	OPS	NPS	OPS
1800	1	₹ 57,995	₹ 56,409	₹ 31,978	₹ 42,275	₹ 16,725	₹ 25,071
2400	4	₹ 82,160	₹ 79,913	₹ 45,302	₹ 59,889	₹ 23,693	₹ 35,517
4200	6	₹ 1,14,057	₹ 1,10,938	₹ 62,890	₹ 83,140	₹ 32,892	₹ 49,306
4800	8	₹ 1,53,365	₹ 1,49,171	₹ 84,564	₹ 1,11,793	₹ 44,227	₹ 66,298
5400	10	₹ 1,80,751	₹ 1,75,808	₹ 99,665	₹ 1,31,756	₹ 52,125	₹ 78,137

Source: Author

The lumpsum fund value decreases at all levels and age groups simply because of less funds devoted to the lumpsum amount.

TABLE 6: Lumpsum amount at ROI=9%, Govt. contribution=14%(fund allocation ratio 50:50)

GRADE PAY	LEVEL	LUMPSUM					
		25YRS		30YRS		35YRS	
		NPS	OPS	NPS	OPS	NPS	OPS
1800	1	₹ 77,84,565	₹ 89,73,194	₹ 42,92,347	₹ 50,07,257	₹ 22,44,900	₹ 31,01,018
2400	4	₹ 1,10,28,133	₹ 1,27,12,025	₹ 60,80,824	₹ 70,93,615	₹ 31,80,275	₹ 43,93,109
4200	6	₹ 1,53,09,644	₹ 1,76,47,282	₹ 84,41,615	₹ 98,47,606	₹ 44,14,970	₹ 60,98,669
4800	8	₹ 2,05,85,849	₹ 2,37,29,114	₹ 1,13,50,872	₹ 1,32,41,414	₹ 59,36,513	₹ 82,00,470
5400	10	₹ 2,42,61,893	₹2,79,66,456	₹ 1,33,77,814	₹1,56,05,952	₹ 69,96,604	₹ 96,64,839

Source: Author

Fig.5 depicts that at ROI of 9% pension amount is higher only in 25 years age whereas it is low in other age groups.
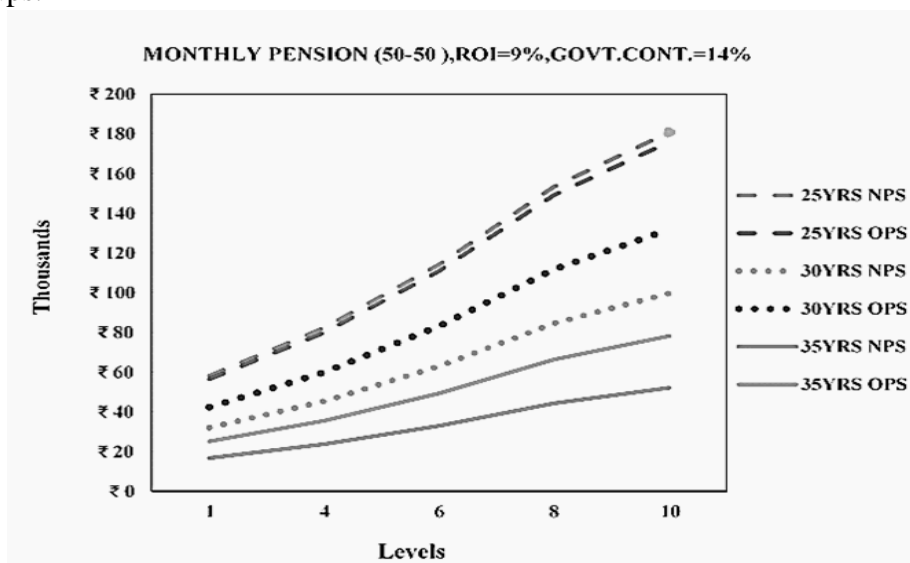

Figure 5: Monthly pension at ROI=9%, Govt. contribution=14% (allocation ratio 50:50)

The lump sum amount of NPS decreases at all age groups and in all levels because of less funds devoted towards lumpsum.
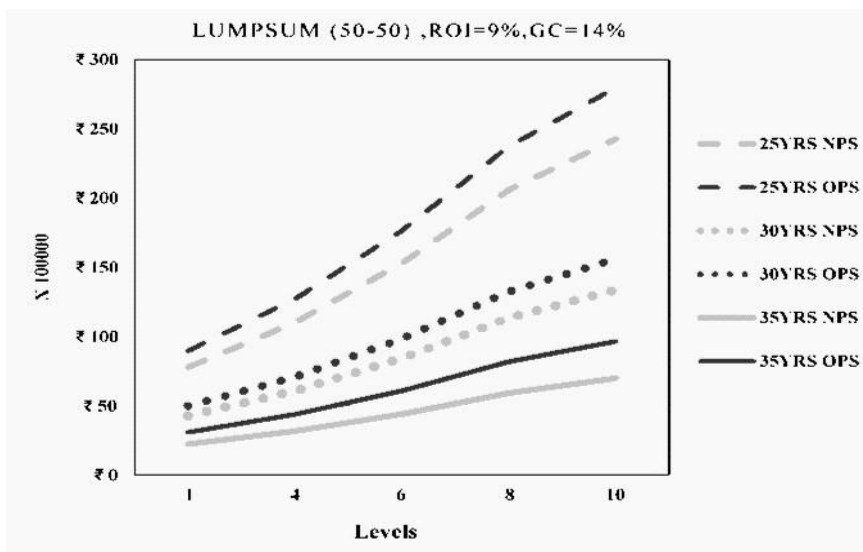

Figure 6: Lumpsum value at ROI=9% and Govt. contribution=14% (allocation ratio 50:50)

In another case, we take ROI as 12% and Govt. contribution of 14% with an allocation ratio of 50:50.
b) ROI- 12%, Govt. contribution 14%

It is seen from table 7 that pension amount increase drastically in NPS at the age of 25. At the age of 30, it is still more in NPS than OPS. However, the amount is less in NPS at the age of 35. Age is the most significant factor impacting the retirement benefit amount. The early a person starts the job, the more will be his fund amount, which is the core principle of NPS.

TABLE 7: Monthly pension at ROI=12%, Govt. contribution=14%(fund allocation ratio 50:50)

		MONTHLY PENSION					
		25YRS		30YRS		35YRS	
GRADE PAY	LEVEL	NPS	OPS	NPS	OPS	NPS	OPS
1800	1	₹ 88,630	₹ 56,409	₹ 44,081	₹ 42,275	₹ 20,823	₹ 25,071
2400	4	₹ 1,25,559	₹ 79,913	₹ 62,449	₹ 59,889	₹ 29,499	₹ 35,517
4200	6	₹ 1,74,305	₹ 1,10,938	₹ 86,693	₹ 83,140	₹ 40,951	₹ 49,306
4800	8	₹ 2,34,377	₹ 1,49,171	₹ 1,16,571	₹ 1,11,793	₹ 55,064	₹ 66,298
5400	10	₹ 2,76,230	₹ 1,75,808	₹ 1,37,387	₹ 1,31,756	₹ 64,897	₹ 78,137

Source: Author

The lumpsum fund value also increases in the age group of 25 and 30 and at all levels which is depicted in table 8.

TABLE 8: Lumpsum amount at ROI=12%, Govt. contribution rate= 14% (fund allocation ratio 50:50)

		LUMPSUM					
GRADE PAY	LEVEL	25YRS		30YRS		35YRS	
		NPS	OPS	NPS	OPS	NPS	OPS
1800	1	₹1,18,96,627	₹ 89,73,194	₹ 59,16,967	₹ 50,07,257	₹ 27,94,970	₹ 31,01,018
2400	4	₹1,68,53,556	₹ 1,27,12,025	₹ 83,82,369	₹ 70,93,615	₹ 39,59,541	₹ 43,93,109
4200	6	₹2,33,96,701	₹ 1,76,47,282	₹ 1,16,36,701	₹ 98,47,606	₹ 54,96,775	₹ 60,98,669
4800	8	₹3,14,59,970	₹ 2,37,29,114	₹ 1,56,47,090	₹1,32,41,414	₹ 73,91,143	₹ 82,00,470
5400	10	₹3,70,77,822	₹ 2,79,66,456	₹ 1,84,41,213	₹1,56,05,952	₹ 87,10,990	₹ 96,64,839

Source: Author

It is evident from fig.7 that monthly pension increases at 25 and 30 years of age in comparison to OPS. The allocation ratio is 50:50 and ROI is 12%.
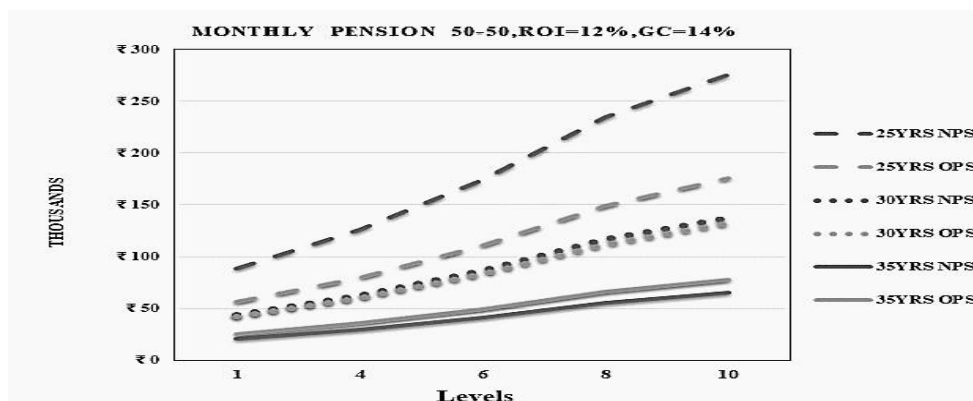
Figure 7: Monthly pension at ROI=12% and Govt. contribution=14% (allocation ratio 50:50)

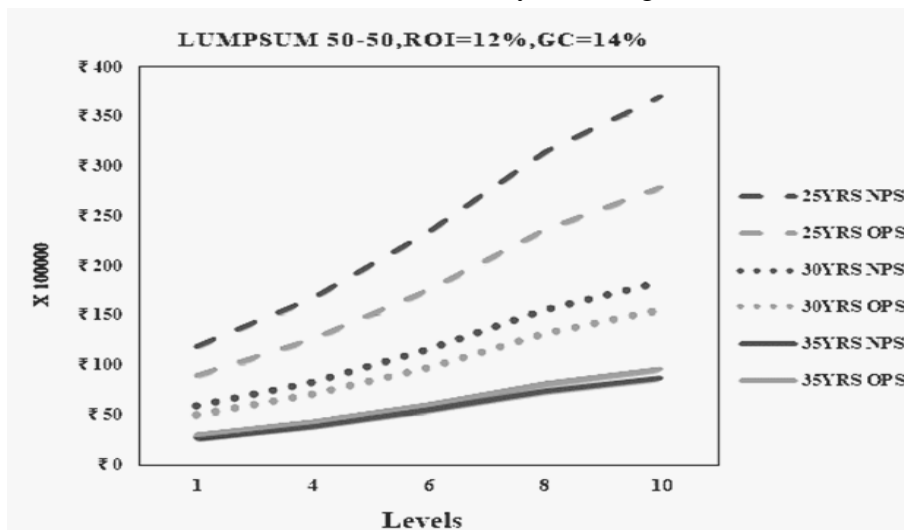The lumpsum value also increase in NPS at 25 and 30 years of age.

Figure 8: Lumpsum value at ROI=12% and Govt. contribution=14% (allocation ratio 50:50)

Thus, from the overall analysis, it can be concluded that the minimum ROI required to achieve the benefits in NPS which are at par with OPS is 12%. The funds have a positive value when a person starts a job at 25. The benefits decrease with increasing age. After 30, the fund's value is much less than in OPS. The foremost reason underlying this is the theory of compounding. The value compounds over time. The more the period, the more will be the fund's amount. The best combination thus comes out to be an ROI of 12%, a job starting age of either 25 or a maximum up to 30, and an allocation ratio between pension and lumpsum fund of 50:50. If these measures are implied, the benefits under the National Pension System will rise in the future. Employees will feel more contented and satisfied with the new system, which they are currently scared of.

5. Conclusion and policy recommendations

In this study, we saw that in the prevailing scenario, i.e., at 9% ROI and 14 % contribution rate by the government, the pension amount is less in NPS than OPS at all age groups and levels of job. In contrast, the lumpsum fund value is more remarkable in NPS than in OPS at all levels. When the ROI

is changed from 9% to 12%, the pension amount increases in NPS at 25 i.e., when the employee starts the job at 25, but in other age groups, the pension amount is less. However, the lump sum fund value is higher at all levels in NPS than in OPS. Another study has changed the government contribution rate from 14% to 16%. A meagre change is noticed in the number of returns. Therefore, we have included it in the appendix for reference.

Another analysis has been done by changing the ratio between pension and lumpsum from 60:40 to 50:50. At 9% ROI, the pension amount is greater in NPS than OPS at the age of 25, and in other age groups of 30 and 35, the pension amount is better than before. The lump sum amount decrease since the contribution is less. At a 12% interest rate, the pension amount increases for 25 and 30. also, the lump sum amount increases at all age group and all job levels. This comparative analysis of returns under both the national pension system and the old pension system reveals that the rate of return of investments is the most potent factor that impacts the pension and lumpsum amount. The age of the employee is another crucial factor. The age at which an employee starts the job determines his future benefits since the money is invested in stocks and debts; therefore, the money multiplies exponentially

over time. This difference is absolute because of how the new system calculates the pension. The risk that the government previously bore is now shifted upon the beneficiaries.

The pension amount depends on the prevailing annuity system in India. The annuity market in India is still in a very underdeveloped stage. There is a need to strengthen the annuity market, which requires the development of the capital market. - Long-term financial instruments, including long-term government bonds (possibly price-indexed), must be further developed to enable insurance companies to match the long-term liabilities implied by annuities. Investment regulation and regulatory authority should be modernized, and new products must be developed to attract customers from diverse backgrounds.

Pension amounts in the National pension system can be brought to par with the pension amount in the old pension system if certain modifications are made in the new system. The pension amount, as well as lump sum amount in the new system, will be less under the prevailing conditions. The employee's age at the time of starting a job is the factor that most impacts the amount of pension, but this is an uncontrollable variable. Another factor is the rate of return on investments. This is a controllable factor. It depends significantly on investment bankers and fund managers how prudently they are managing the funds. The funds well managed will yield a high rate of return. Therefore, numerous studies have been done in the past related to the comparative analysis of risk-return of various fund managers. Their results are very helpful to investors and employees in selecting fund managers. One such study was done by Murari (2020), who stated that LIC has the best portfolio with minimum risk among all fund managers.

The results of our study are important to investors, fund managers, pensioners, and largely to the Government of India so that it can take essential steps to make the National Pension Scheme as lucrative as the old pension system. The key findings of our study state that firstly, the employee's age at the time of entering the job and return on investment are the primary factors that affect the amount of pension and the lump sum fund in the National pension system. Employees starting a job early will get a handsome pension since their fund's value will multiply over time as it will be invested in the stock market. The more time, the vaster the corpus amount. Another factor that exerts an enormous impact is the rate of return on investments i.e., ROI. Principally, fund managers are responsible for this. The management of funds can either earn profits or incur a loss. Professional and expertise management is required to achieve this. Fund managers and investment bankers should be trained and have the requisite knowledge and experience. The percentage of contribution by the government is another factor, but it does not essentially impact the pension amount.

Presently, the allocation rate of investment in pension and lumpsum is 60:40. We also assumed this allocation rate to be 50:50 and thus see its impact on pension. We found that the pension amount increases even more than the old pension of the employees joining at age 25 and 30. The lumpsum value decreases slightly. Therefore, this suggestion can be experimented with to bring employees' pensions to par with a pension in the old system.

This study on the comparison of benefits between the National Pension system and the old pension system is of immense utility in the Indian economic scenario. The Government employees are still unable to ingest the new system and are full of apprehensions about the benefits they will get. The unorganized sector also has significantly less information and knowledge about this pension system, thus leading to a very low enrolment rate. This study has tried to open the pages of the untouched book and will inform the public about the National pension system and the benefits for which they are eligible. Employees can draw an idea about the pension that they will receive in the future. There are limitations too, and firstly, we have assumed future salary structure and increments, which is vulnerable to many external factors and political changes. In India, the ruling government influences social and economic policies, and the shift in governance also changes these ongoing policies. Another limitation is that the calculation has been done based on the current pay commission, which can

change in the future.

5. Theoretical implications and future research.

The study has several suggestions for policymakers, especially the government and fund managers. Firstly, the governing body, the PFRDA (Pension fund regulatory and development authority), should look on to change the allocation rate. Secondly, the government should try to make the scheme more popular among the masses, including rural people and workers in the unorganized sector. This will involve advertising and educating, and spreading awareness among people. Financial literacy plays a vital role in this. Financial education should be provided at workplaces. A Case study conducted in 2013 with employees of the US Federal Reserve System showed that completing a financial literacy learning module led to significant changes in retirement planning behaviour and better-performing investment portfolios (Clark et al., 2017).

Still, a decade after the launch of this scheme, the enrolment rate is too low. Therefore, keen efforts should be made to popularise the scheme and take it to the masses. A hybrid PAYG pension scheme can be modelled. A pension architecture based on a mix between DB and DC can be experimented with to achieve social adequacy and sustainability in pensions. 'Musgrave rule' propended by Devolder and de Valeriola(2019) is one such step in bringing the two extremes of DB and DC closer. A 'Separation principle has been propounded by (Angrisani et al., 2017), which is based on a PAYG financing scheme with a structurally funded component and on a DC formula that recognizes the same rate of return on contributions and benefits while also taking into account the financial rate of return on invested assets. In the future, researchers will have abundant opportunities to further build upon this work. Models can be developed to compare the two systems, and analysis can be undertaken for the various plans of the National pension system.

References

1) Alonso-García,J., , Boado-Penas,M.D.C. & Devolder,P.(2017), 'Adequacy, fairness and sustainability of pay-as-you-go-pension-systems: defined benefit versus defined contribution', The European Journal of Finance. 24 (13), 1100-1122.

2) Angrisani, M., Di Nella, G. & Di Palo, C. (2017), 'The shift to the defined contribution pension scheme: an Italian case'. International Journal of Sustainable Economy, 9 (1), 72–86.

3) Bali, A.S. (2014). 'The political economy of pension reforms in India'. Public administration and development, 3 (4), 294–304.

4) Barr, N. (2002). 'The Pension Puzzle - Prerequisites and Policy Choices in Pension Design'. International Monetary Fund, Washington D.C.

5) Barr, N., & P. Diamond. (2006). 'The Economics of Pensions.'. Oxford Review of Economic Policy, 22, 15–39.

6) Bayar, Y. & Kilic, M. (2019). 'Pension funds and stock market development: evidence from OECD countries'. International Journal of Sustainable Economy, 11(3), 273–285.

7) Bhardwaj, G. & Dave, S. (2006). 'Towards estimating India's implicit pension debt', technical report, Paper presented at The Second International Workshop on The Balance Sheet of Social Security Pensions, Tokyo, 15 December 2005. https://www.ier.hit-u.ac.jp/pie/stage1/Japanese/proceeding/pro7/3.pdf.

8) Brainard, K. (2005). 'Myths and Misperceptions of Defined Benefit and Defined Contribution Plans', White paper, National Association of State retirement administrators.

9) Clark, R., Lusardi, A., & Mitchell, O. S. (2017). 'Employee financial literacy and retirement plan behavior: a case study'. Economic Inquiry, 59 (1), 248–259.

10) Devolder, P.& de Valeriola, S. (2019). 'Between DB and DC: optimal hybrid PAYG pension

schemes'. European Actuarial Journal, No.2.

11) Holzman, R., Hinz, P. R. & Dorfman, M. (2008). 'Pension system and reform conceptual framework'. Social Protection Discussion Papers and Notes 46175, The World Bank.

12) Imam, A. (2011). 'Pension Fund Management in India: Government Role and Regulatory Issues'. ZENITH: International Journal of Research in Management and Technology, 1(7), 38–44.

13) Kali, S & Jana, S. (2017). 'Pension Reform in India with Reference of New Pension Scheme'. IJRDO-Journal of Business Management, 3 (17), 38-51.

14) Kamath, V. & Patil, R. (2017). 'Cost Benefit Analysis of National Pension Scheme'. International Journal of Management, 8 (3), 156–158.

15) Mees, B. (2020). 'Risk shifting and the decline of defined benefit pension schemes in Australia'. Accounting History Review, 30 (1), 69-87.

16) Murari, K. (2020). 'Risk-adjusted performance evaluation of pension fund managers under social security schemes (National Pension System) of India'. Journal of Sustainable Finance & Investment, 1-16.

17) Narayana, M. R. (2019). 'Organizing old age Pensions for India's Unorganized Workers: A Case Study of a Sector-Driven Approach'. The Journal of the Economics of Ageing, 13 (5), 56–69.

18) Parekh, D. (2009). 'Report of the Expert Group on Investment regulation for the New Pension System for the informal sector'. Committee Report, PFRDA.

19) Rajasekhar, D., Kesavan,S. & Manjula, R. (2017). 'Are our Contributory Pension Schemes Failing the Poor?'. Economic and Political Weekly,52 (47), 77–85.

20) Sane, R & Thomas, S. (2014). 'The way forward for India's National Pension System'. Indira Gandhi Institute of Development Research, http://www.igidr.ac.in/pdf/publication/WP-2014-022.pd.

21) Sane, R. & Thomas, S. (2015). 'In Search of Inclusion: Informal Sector Participation in a Voluntary, Defined Contribution Pension System'. The Journal of Development Studies, 51 (10), 1409-1424.

22) Sane, R. & Price, W.J. (2018). Simulating Pension Income Scenarios with penCalc: An Illustration for India's National Pension System. Policy Research Working Paper No. 8304, World Bank.

23) Sanyal, A., Gayathri, K & Erappa, S (2011a). 'National Pension Scheme: For Whose Benefit'? Economic and Political Weekly, 46 (8), 17–19.

24) Sanyal, A., Gayithri, K & Erappa, S (2011b). 'Indian Civil Servants Pension Liability Projections: An Alternative Framework'. The IUP Journal of Public Finance, 9 (2), 7–29.

25) Thaker, A. A., Maisuria, M. H. & Jariwala, P. T. (2018). 'An Empirical Study of National Pension Scheme with respect to Tier 1 (Corporate Bonds, Equities and Government Securities)'.Emerging Trends and Innovations in Modern Management . https: //www. inspirajournals.com/uploads/Album/1048960428.pdf

APPENDIX

1) Calculation at ROI- 9%, Govt. contribution -16%

GOVT CONTRIBUTION		16%		ROI	9.00%		
		MONTHLY PENSION					
		25YRS		30YRS		35YRS	
GRADE PAY	LEVEL	NPS	OPS	NPS	OPS	NPS	OPS
1800	1	₹ 48,605	₹ 56,409	₹ 26,656	₹ 42,275	₹ 13,818	₹ 25,071
2400	4	₹ 68,857	₹ 79,913	₹ 37,762	₹ 59,889	₹ 19,576	₹ 35,517
4200	6	₹ 95,590	₹ 1,10,938	₹ 52,423	₹ 83,140	₹ 27,176	₹ 49,306
4800	8	₹ 1,28,533	₹ 1,49,171	₹ 70,489	₹ 1,11,793	₹ 36,542	₹ 66,298
5400	10	₹ 1,51,485	₹ 1,75,808	₹ 83,077	₹ 1,31,756	₹ 43,067	₹ 78,137

GRADE PAY	LEVEL	LUMP SUM					
		25YRS		30YRS		35YRS	
		NPS	OPS	NPS	OPS	NPS	OPS
1800	1	₹ 97,86,220	₹ 89,73,194	₹ 53,66,908	₹ 50,07,257	₹ 27,82,236	₹ 31,01,018
2400	4	₹ 1,38,63,812	₹ 1,27,12,025	₹ 76,03,119	₹ 70,93,615	₹ 39,41,500	₹ 43,93,109
4200	6	₹ 1,92,46,233	₹ 1,76,47,282	₹ 1,05,54,919	₹ 98,47,606	₹ 54,71,730	₹ 60,98,669
4800	8	₹ 2,58,79,116	₹ 2,37,29,114	₹ 1,41,92,489	₹ 1,32,41,414	₹ 73,57,467	₹ 82,00,470
5400	10	₹ 3,05,00,387	₹ 2,79,66,456	₹ 1,67,26,863	₹ 1,56,05,952	₹ 86,71,301	₹ 96,64,839

2.) ROI- 10%, Govt. contribution- 14%

GOVT CONTRIBUTION		14%		ROI	10.00%		
GRADE PAY	LEVEL	MONTHLY PENSION					
		25YRS		30 YRS		35 YRS	
		NPS	OPS	NPS	OPS	NPS	OPS
1800	1	₹ 53,262	₹ 56,409	₹ 28,420	₹ 42,275	₹ 14,385	₹ 25,071
2400	4	₹ 75,455	₹ 79,913	₹ 40,262	₹ 59,889	₹ 20,378	₹ 35,517
4200	6	₹ 1,04,749	₹ 1,10,938	₹ 55,893	₹ 83,140	₹ 28,290	₹ 49,306
4800	8	₹ 1,40,848	₹ 1,49,171	₹ 75,156	₹ 1,11,793	₹ 38,039	₹ 66,298
5400	10	₹ 1,66,000	₹ 1,75,808	₹ 88,576	₹ 1,31,756	₹ 44,832	₹ 78,137

GRADE PAY	LEVEL	LUMPSUM					
		25YRS		30YRS		35YRS	
		NPS	OPS	NPS	OPS	NPS	OPS
1800	1	₹ 1,07,23,897	₹ 89,73,194	₹ 57,22,181	₹ 50,07,257	₹ 28,96,236	₹ 31,01,018
2400	4	₹ 1,51,92,187	₹ 1,27,12,025	₹ 81,06,423	₹ 70,93,615	₹ 41,03,001	₹ 43,93,109
4200	6	₹ 2,10,90,331	₹ 1,76,47,282	₹ 1,12,53,622	₹ 98,47,606	₹ 56,95,931	₹ 60,98,669
4800	8	₹ 2,83,58,750	₹ 2,37,29,114	₹ 1,51,31,989	₹ 1,32,41,414	₹ 76,58,935	₹ 82,00,470
5400	10	₹ 3,34,22,812	₹ 2,79,66,456	₹ 1,78,34,130	₹ 1,56,05,952	₹ 90,26,603	₹ 96,64,839

2.1 ROI- 10% Govt. contribution -16%

Govt. contribution		16%		ROI	10.00%		
		MONTHLY PENSION					
		25YRS		30YRS		35YRS	
GRADE PAY	LEVEL	NPS	OPS	NPS	OPS	NPS	OPS
1800	1	₹ 55,699	₹ 56,409	₹ 29,572	₹ 42,275	₹ 14,844	₹ 25,071
2400	4	₹ 78,907	₹ 79,913	₹ 41,894	₹ 59,889	₹ 21,029	₹ 35,517

4200	6	₹ 1,09,542	₹ 1,10,938	₹ 58,159	₹ 83,140	₹ 29,193	₹ 49,306
4800	8	₹ 1,47,294	₹ 1,49,171	₹ 78,202	₹ 1,11,793	₹ 39,254	₹ 66,298
5400	10	₹ 1,73,596	₹ 1,75,808	₹ 92,167	₹ 1,31,756	₹ 46,264	₹ 78,137

| | | LUMP SUM | | | | | |
| | | 25YRS | | 30YRS | | 35YRS | |
GRADE PAY	LEVEL	NPS	OPS	NPS	OPS	NPS	OPS
1800	1	₹ 1,12,14,614	₹ 89,73,194	₹ 59,54,126	₹ 50,07,257	₹29,88,740	₹ 31,01,018
2400	4	₹ 1,58,87,369	₹ 1,27,12,025	₹ 84,35,012	₹ 70,93,615	₹42,34,048	₹ 43,93,109
4200	6	₹ 2,20,55,407	₹ 1,76,47,282	₹1,17,09,781	₹ 98,47,606	₹58,77,855	₹ 60,98,669
4800	8	₹ 2,96,56,423	₹ 2,37,29,114	₹1,57,45,355	₹ 1,32,41,414	₹79,03,556	₹ 82,00,470
5400	10	₹ 3,49,52,213	₹ 2,79,66,456	₹1,85,57,026	₹ 1,56,05,952	₹93,14,906	₹ 96,64,839