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The Contributory Pension Scheme (CPS) and Sufficiency of Retirement Benefit Of the Low Income Retirees of the Federal Public Service in Nigeria

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Abstract: *This study examined the level of sufficient retirement benefits under the contributory pension scheme emanating from the pool of savings contributed that can suffice to provide the minimum needed livelihood at retirement. The theories adopted for the study are the Pension Funding Policy and the Life Cycle Hypothesis. The secondary data of all pension contributions and retirement benefits were retrieved from series of publications of PenCom from the years 2004 to 2022. The primary data population consists of 1316 retirees. EasyFit 5.6 Professional Software together with the Least Square Model, accumulation and annuity formulae was employed to analyse the secondary data and the responses from the respondents during survey. EasyFit Software generated statistics using the Kolmogorov Smirnov, Anderson Darling and Chi-Square Models and ranked each model statistics generated to determine the best fit for both the data and the probability distribution used. Arising from the data collected and the analysis carried out using the Consolidated Public Service Salary Structure, the level of comfort of low income retirees who spent 20 to 35 years in active service is nothing to write home about due to insufficient pension benefits as a result of the challenges (such as investment and management of pension fund restrictions, political will and bureaucratic corruption) investigated. The study recommends the implementation of minimum pension derived with requisite modalities of 20 years as the minimum qualifying length of service and only 10-year post retirement subsidy.*

Keywords: Contributory-pension-scheme, low-income-retirees, guaranteed-minimum-pension, retirement- benefit.

1.0 INTRODUCTION

For fairness, one who has contributed substantially to an organisation throughout the working life needs to be rewarded when there is no strength or capacity to continue working. One way to give such reward is through pension payment (Abere & Abiola, 2019). According to Amadi (2020), pension can be defined as a series of payments made regularly to a person or beneficiary of a person who is no longer working due to old age, disablement or other reasons. The Chilean government operated a defined benefit pension system which was replaced in 1981 with a defined contribution pension system that allows employees to fund the retirement benefits through the accumulated and mandatory savings. Most countries who were convinced by the sustainability of the Chilean-introduced pension system switched over to it. In this study, a contributory pension scheme is when both the federal government and the low income earners below level six contribute 18% of the earners' monthly emoluments into the retirement savings account towards the future payment of the retirement benefits. The retirement benefits of low income retirees who worked for considerable number of years while in active service should be fairly sufficient to satisfy basic necessity of feeding, clothing and shelter in order to enjoy at least minimum level of comfort during retirement. Age, retirement savings account balance, final salary (total emolument), gender and pensioners' retirement payment choices are various ways or factors influencing differences in the amount of pension payments received by various pensioners (Mojekwu & Adeyele, 2010). The standard of living of retirees after coming to the end of working life depends largely on the pension arrangement that has been put in place for them while in active service.

Different literatures have been able to examine different factors, determinants, variables, genders and welfare provisions relating to the introduction of the contributory pension scheme but the void of generalising discussions on the entire retirees without in-depth study on how the contributory plan affects the vulnerable low income retirees whose take-homes while in active service could barely satisfy their basic needs needs to be addressed. Despite many amendments, adjustments and reforms in pension system, pension administration in Nigeria seems to face huge challenges. The pension contributory method adopted to remove tedious issues and problems of pension benefit payments appears not to have been generous to low income retirees. Most retirees made contributions for more than half of their entire lifetime when in active service but are disappointed with the retirement packages received. Section 84(1) of the Pension Reform Act 2014 states that retirees shall be entitled to a guaranteed minimum pension to be specified by the Commission from time to time. Up till now, for about two decades since it was first stated in Part VIII (Section 71(1)) of the Pension Reformed Act 2004, PenCom has not yet finalised financial implication and other modalities constituting requisite guidelines and framework for the successful implementation of the minimum pension that can guarantee fair standard of living during retirement. With the current state of economy where those who are actively working and earning salaries cannot comfortably enjoy good standard

of living, the fear of facing unknowns after retirement brings a lot of disturbances among low income employees on what becomes their fate if the accumulated savings cannot guarantee the minimum standard of living in the country. The study aims to examine the contributory pension scheme and investigates the retirement benefit sufficiency among low income retirees of the federal public service. The specific objectives are to:

i. find out the extent the contributory pension plan has ensured that the retirement benefits received by low income earners are enough for them to provide standard average living condition.
ii. develop the expected average amount of the Guaranteed Minimum Pension (GMP)
iii. derive the pension contributions sufficient to provide GMP that can cater for basic necessities.

The research questions are as follows.

i. To what extent have the contributory scheme benefits been able to cater for the basic needs of low income retirees of the federal public service in Nigeria?
ii. What should be the expected value of the GMP referred to in Section 84 (Part XI) of the PRA 2014?
iii. What contribution level can suffice to provide average living condition for low income retirees?

The required retirees for the study are those low income retirees who joined the federal public service and retired not earlier than the year 2020 in order to have timely circumstances of the issues and solutions in the course of the study. The major limitation envisaged was the tedious process issue of data gathering. The study examined the financial implications constituting requisite framework for the successful implementation of GMP by investigating whether the pool of savings contributed by low income employees of the federal public service can suffice to provide the minimum needed livelihood at retirement. The outcome of the study is of great importance to pension stakeholders, the PFA/PFC, the pension regulatory authority, the financial institutions, insurance companies and the FGN (Presidency) for policy formulation, law amendment, capacity building and institutional strengthening.

2.0 LITERATURE REVIEW

This study is based on the Theory of Pension Funding Policy and Theory of Life Cycle Hypothesis (LCH).

Jon C. Exley propounded the Theory of Pension Funding Policy in the year 1999 to balance between the Expectancy Theory and the Deferred Wage Theory. Pension here serves as an insurance policy against retirement age risk. The Life Cycle Hypothesis (LCH) which was worked on by Franco Modigliani in the year 1985 relates consumptions to lifetime wealth at disposal. The retirees have already accomplished a larger percentage of their achievable life goals and are aware that income is not directly coming from active service.

Figure 1 displays the concepts this study adopts as the research framework.

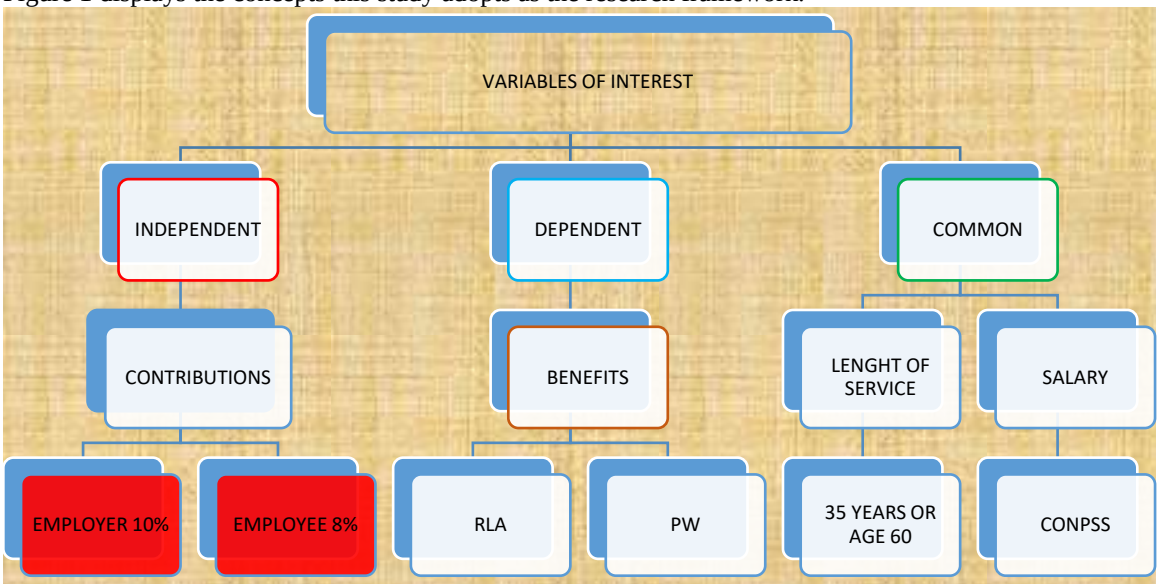

Figure 1: Research framework

Generally, an employee in the public service retires at the age of sixty years or having spent thirty-five years in service, whichever one comes earlier. The series of contributions (18%) made represent the independent variable while the pension benefits (RLA or PW) received represent the dependent variable.

Empirical studies of the contributory pension scheme have generated large literature in the last two decades in Nigeria upon the enactment of PRA in the year 2004. According to Onukwu (2020), pension system began to gain attention after 1960 as Nigeria gained independence. Casey (2009) stated that the government bonds were purchased for those who had more than three years to retire when the new scheme was introduced. The value of the bond was equivalent to the tune of accrued benefits under the old scheme and shall be redeemable upon retirement. Pension issue is very worrisome to active workers in Nigeria because most pension

beneficiaries are not the actual contributors. Most workers die before or shortly after their retirement from active service since the normal and general retirement age in Nigeria is sixty years and the life expectancy in Nigeria moved from 55.44 years to 55.75 years in the year 2022 (Rewane, 2023). According to Rewane (2023), most people who live longer than the expected life expectancy die between ages sixty and seventy. As the life expectancy improves, the size of the retiree population also increases and the number of years spent in retirement increases in like manner. A study on the sufficiency of retirement benefits is of utmost important due to rapid increase in ageing population in the developing countries especially Nigeria.

A study that deals with pension sufficiency is utmost important due to high old age poverty in developing countries of which Nigeria is not exempted. According to Izuaka (2022), there has been an increase in the number of elderly people living in poverty as the World Bank estimated the number of impoverished old persons in Nigeria in the year 2022. Poverty level and dependency on working population by the retirees would be at the barest minimum if pension benefits allow the elderly enjoy fair standard of living. Retirement in Nigeria poses a serious financial challenges because larger percentage of retirees are still the breadwinners of the family due to shorter normal retirement age of sixty years compared to many nations across the globe. According to Beedie (2015), pension income in Nigeria is insufficient for female retirees to cater for the basic needs due to shorter service years as a result of gender-based responsibility demands. The pension income inadequacy relates to the extent the pension income cannot help individual retirees fulfil the three basic needs of feeding, shelter and clothing.

According to Agbata, Ekwueme and Jeroh (2017), the issue of corruption being a militating factor against pension administration did not just start in Nigeria as it contributed to delay in pension payment in the old pension scheme. Bahago, Ogunlela and faruk (2010) studied the extent some pension problems witnessed in the past have been improved. Untimely payments of retirement benefits, the problem of heterogeneity and continuity in the administration of pension assets or funds were the major problems observed. Using multiple instruments for data collection and subjecting the data collected to a non-parametric analytical test, the study revealed that there was absence of retiree discrimination but maintained that delay still occurred in pension payment. However, the study failed to explain further on the stages of retirement cycle that delay problem was decreasing, constant or improving. Musibau (2012) in his study on the impact of the contributory pension on retiree savings using Oyo State public service employees as a case study, suggested that retirement benefits should be like a reward for retirees by the government without the need for employees' contributions. The study pointed out that there existed no significant relationship between savings and contributory pension scheme. It clearly appears that Musibau's study turned a blind eye to many problems faced when retirement benefit payment was wholly on government shoulder.

Gunu and Tsado (2012) studied the economic implication of the contributory pension scheme in Nigeria. Descriptive statistics, simple percentages and chi-square were employed to analyse the questionnaires administered to pension managers, current contributors and retirees. The authors concluded that the contributory pension scheme has boosted economic growth in Nigeria through significant and positive implication on the lives of the participants and the impact on capital market. Strict monitoring of pension managers and increased awareness to achieve success of the programme more than what is being achieved at the moment were further recommended. Ojiya, Ajie and Isiwu (2017) re-examined this belief and carried out an empirical analysis using the Granger Casuality Test and econometric tool of SPSS to assess the impact of contributory pension system on the Nigerian economic growth. Using data from the World Bank database and various issues of PenCom annual reports, the study concluded that pension funds or savings have positive but insignificant impact on economic growth. The conclusion of the study indicates that pension funds have not been judiciously used to boost economic growth in Nigeria.

Although the PRA 2014 grants an employee access to the saved fund if such employee loses job and cannot find another one within four months, what about if an employer refuses to pay salary for several months due to circumstances beyond the control of the employer. For instance, during the corona pandemic time that shook the whole world in the year 2020, Abere and Ojikutu (2021) affirmed that the pandemic impacted severely and worsened the living condition of the poor and vulnerable workers in Nigeria. Various palliative measures offered by the government and other concerned citizens could not cushion the adverse impact of the pandemic. Abere and Ojikutu (2021) recommended that the government should leverage on the pension funds to tackle poverty among workers during the pandemic era or any other disaster.

Determinants of any financial decision in an organisation are risk and return which are directly related. The optimal investment of pension funds contain different complexities while trying to secure returns that must be paid back to retirees (Abere & Abiola, 2019). According to Abere and Abiola (2019), the investment of pension funds must be done carefully in order not to lose the invested capital. Kurfi (2003) explained that investment of pension funds faces two major risks: financial market and background risks. The first one is the risk associated with exchange rate and asset price while background risks involve external financial risks such as inflation and the risk associated with the income streams. Longevity risk occurs when the retirees outlive their asset value. One of the main problems affecting the contributory pension scheme in Nigeria is the compositions of investment outlets/windows to ensure safety of pension funds (Banwo & Ighodalo, 2015). Due to safety or security of the pension fund investment, there is inadequacy in the accumulated pool of pension assets/funds (Abere & Abiola, 2019).

Aja (2015) carried out a study on contributory pension plan to see if the scheme introduction has resolved the delay witnessed by retirees on the monthly pension payments. Survey research design was used and the opinions of retirees in seven federal establishments in Nigeria between years 2008 to 2014 were randomly sampled using questionnaire and interview methods of data collection. As noted from the opinions of the study, the delay witnessed still exists due to the manual approval process required in

accessing retirement benefits. Aja (2015) recommended that PenCom should use appropriate software system to automate the approval process to greatly speed up the process and eliminate the administrative bottleneck emanating from multiple hardware or paper work which passes from one desk to another before final approval.

In the year 2020, Adegboyega (2021) observed that sixty-three percent of registered employees in the CPS were male while thirty-seven percent were female which shows there are more male workers than female workers. Although the female gender have higher life expectancy as observed by Rewane (2023) but are also disadvantaged due to their shorter working life experienced as a result of family and childbirth responsibilities. The family responsibilities ascribed to female interrupt incomes and work tenure which cause vulnerability in term of comparable occupations with the male gender (Beedie, 2015). According to Mojekwu and Adeyele (2010), female mortality is higher than male mortality after retiring from active service. On the contrary, Onifade (2021) stated that women are only more disadvantaged when purchasing retiree life annuity product because more premium is expected than the male counterparts in procuring RLA due to the female higher life expectancy. The 2004 PRA was discovered, after a few years of implementation, to be insufficient in terms of some experiences and occurrences arising from some aspects of the provision of the Act (Ubhenin, 2012). The insufficiencies and inadequacies gave rise to the subsequent amendment and review in 2014. In other words, the incapability of the year 2004 PRA to meet the needs of pensioners led to the amendment in the year 2014. The 2014 PRA (Amendment) now serves as the principal and current law on pension and pension related matters in Nigeria.

GMP is an income support from the government and a social security policy variant which entails resource redistribution to the retirees (Apere, 2017). The funding of GMP is not only borne by the government. The Pension Protection Fund (PPF) is jointly funded by the Federal Government, the National Pension Commission and pension administrators/operators. Aside from the government contribution of one percent of the employee wage bill, the pension operators also contribute three percent Annual Pension Protection Levy (APPL) from the management fees earned. According to Popoola (2021), FGN failed to pay its own share of the contributions into the PPF after the PFAs have been contributing their own quota of the contributions. One can deduce that the failure of the government to play its part in PPF funding has stalled the implementation of the GMP. The outstanding government pension liabilities with the appetite to take additional loan could continue to prevent ability to implement GMP. As disclosed in the year 2017 by the Chairman of Pension Fund Operators Association of Nigeria, pension managers proposed a minimum monthly pension of fourteen thousand and four hundred naira to each retiree who collects less than that amount in the CPS (Longe, 2017). Judging by the economic role of inflation and the situation of things in Nigeria now, such amount is ridiculous to be paid as pension for a retiree who has put in considerable number of years into quality service.

Ibiwoye and Adesona (2011) expressed concern that the issue of GMP is only expressed in paper as government has not really shown appropriate commitment. The government made provision for the funding of GMP and other pension benefit shortfall upon enactment of PRA as against the claim of Ibiwoye and Adesona (2011) in their study. The only issue militating the provision made by the government is the commitment to the provision (Popoola, 2021). Nwoji (2023) noted that the delay in GMP has led PenCom to make provision for enhanced pension for retirees under programmed withdrawal (PW) option. The provision excludes retirees who are using annuity as the pension retirement option. The enhanced pension for PW retirees cushions the effect of GMP non-implementation. According to Pension Nigeria (2023), PenCom paid out pension enhancement for retirees in December 2020, February 2022 and February 2023. In the draft regulation, a pensioner that is eligible for GMP shall not benefit from enbloc withdrawal (Pension Nigeria, 2023). As stated by Pension Nigeria (2023), enbloc withdrawal is paid to those pensioners (on PW benefit payment option) whose balance in the RSA cannot provide at least monthly pension of one-third of the minimum wage. Enhancing pension benefits for only retirees on PW option while neglecting retirees on annuity option has considerably raised concerns by affected retirees and stakeholders despite the good intentions and aspiration of the initiative regulation (Apere, 2023). According to PenCom (2020), if a pensioner has a balance of not more than five hundred and fifty thousand naira in the RSA upon retirement, such retiree will be allowed to withdraw the entire amount as a lump sum but if the RSA balance is more than this amount, the retiree will be placed on monthly pension. A lump sum withdrawal of maximum of twenty-five percent by retirees upon retirement will only be allowed and possible provided that the remaining balance is sufficient to procure programmed withdrawal or annuity payment of an amount of not less than fifty percent of the pensioners' monthly emolument prior to the time or month of their retirement (PenCom, 2020).

In a defined contribution system of pension, individual retiree receives what the accumulated savings can purchase at retirement. The side effect of the system is that the benefit purchased by low income retirees may be too low to sustain the retirees due to time value of money and the volume of their remuneration while in active service. The government is expected to subsidise pension benefit by setting a minimum guaranteed amount of pension when the available balance in the retirement savings account of a prospective low income earner cannot guarantee minimum standard of living (Ford & Browning, 2016). The funding of the Guaranteed Minimum Pension is provided for in Section 82 of the year 2014 PRA. A pension reform faces a lot of political oppositions in Nigeria which result to delay and higher adjustment cost (Agba, 2008). Sometimes, the pension benefits may not suit the major party (retirees) involved as a result of insufficiency or inability of retirees to meet the financial obligations due to inadequate capital or contributions made while in active service (Sogunro, Ayorinde & Adeleke, 2019).

Sogunro, Ayorinde and Adeleke (2019) estimated that low income earners would have to contribute more than twenty-eight percent of their emolument for forty years in order to maintain or enjoy at least fair standard of living. The study respectively used CONUASS (Consolidated University Academic Salary Structure) and CONTISS II (Consolidated Tertiary Institution Salary Structure) for

academic and non-academic staff of the federal university in Nigeria. Nyong and Duze (2011) has defined retirement as the period people stop working while continuing to receive income but this does not seem applicable to most low income retirees. Nyong and Duze (2011) worked on the retirement planning in Nigeria and examined the ability of the current retirement scheme in providing sufficient old age financial security for retired teachers in Nigeria. The retirees were not comfortable with the provision of PRA 2004 in catering for the basic needs during retirement due to inadequacy of the benefits received. A large number of low income retirees return to informal sector to continue working in order to support the family basic needs. According to Wolf and López Del Río (2021), retirees look for financial supplement to help their financial needs due to benefit insufficiency. The two common supplements open to retirees are agriculture (fishery, poultry, pig or crop farming) and trading.

According to Apere (2017), assessing the adequate sustainability of pension system requires proper actuarial analyses which estimate the future cash flows in accordance with the detailed profiles of the contributors and the existing retirees taking into account the national demographic and economic variables. Unfortunately, such detailed actuarial analyses are not being employed in relevant pension cases by Nigerian pension managers (Ibiwoye & Adesona, 2010). In cases where the actuarial analyses are employed, the assumptions made in the analyses in respect of future growth rates, future lifetime of retirees, interest rate and the investment returns make the analyses unrealistic and difficult to apply. After many years of reform in pension system of Nigeria, there are some issues limiting the success of the scheme. Ajijola and Ibiwoye (2012) observed that a lot of people prefer programmed withdrawal to life annuity option because many retirees do not know more about longevity risk and the importance of using annuity as a retirement benefit option. The large number of people using PW pension benefit option can cause the current pension scheme in Nigeria to suffer the same fate as the old defined benefit system of pension if the expected survival lifetime is exceeded. Professional advice and series of actuarial publications on pension or pension related matters can help retirees on the best option to choose but unfortunately many actuarial reviews in Nigeria on matters relating to pension are not adequately utilised, published or used judiciously by the regulatory authorities (Apere, 2017).

Despite many studies on the subject matter, there still exists gaps to fill in the empirical literature as regards a study that pays special attentions to the plights and fear of low income retirees of the contributory pension scheme of the federal public sector in respect of sufficiency of the retirement benefits. This study does not only look into the welfare and post-retirement standard of living of retirees in the public sectors but pays more attention to those retirees whose take-homes while in active service could barely satisfy the needs of their family members. From the reviewed literature, there has not been any serious attempt to see if the benefits received by the retired low income employees of the public service of the federation enable them to live comfortably in retirement with the volume contributed by giving them minimum guaranteed amount of pension in respect of that. From the study of Sogunro, Ayorinde and Adeleke (2019), the savings accumulated through contributions could not provide fair standard of living upon retirement. There is need for subsidy by the government to augment the retirement benefit for minimum standard of living. Developing a GMP amount is one of the objectives of this study.

This study also builds on the study of Nyong and Duze (2011) and limits the investigation to low income retirees of the federal public service in Nigeria. Unlike the study of Nyong and Duze (2011) which made use of only quantitative approach, this study makes use of both quantitative and qualitative approaches to investigate the level of comfort or financial security enjoyed by low income retirees. In the course of this study, appropriate software is used to analyse the issue of GMP quantitatively and qualitatively. It calls for concerns for low income earners if teachers, with the levels of their job qualification requirements and high probability of not retiring as low income earners, could be unsatisfied with the benefit packages received under the current pension system.

In the research work of Ibiwoye and Adesona (2011), various costs to be incurred by the Federal Government of Nigeria in providing GMP were computed based on a mere assumption of eighteen thousand naira as GMP. The result arrived at would not stand the test of time due to arbitrary choice of any amount as the GMP. Besides, the costs computed in the study would distort conclusion because computation of funding or cost of GMP depends greatly on the quantitative and quality analyses of the appropriate amount of GMP rather than using a mere assumed or illustrated figure used in a research of another country with different economic situation from Nigeria. The study calculated the subsidy to be provided by the government to supplement the pension shortfall without specifying the exact qualifying years of contributions for GMP eligibility. In the course of this study, qualifying years for GMP will be specifically stated with the appropriate contributions expected for funding purpose. The modalities of GMP (with some problems and challenges limiting its implementation) and the average/expected minimum amount of pension a retiree is entitled are missing in the related pension literature in Nigeria.

3.0 METHODOLOGY

A cross-sectional descriptive sample survey method is the major research design for the study. One retiree was selected from each federal establishment to form the target population of the study. The population of the study comprises 1316 federal establishment low income group retirees who are presently beneficiaries of the defined contribution pension plan. As a result of homogeneity and uniformity in the federal public service in terms of operations, grade levels, salary structure or systems, a simple random sampling technique was adopted. In order to determine the sample size of the study, Taro Yamane formula was used with 90% confidence level as follows:

$$s = \frac{P}{1+ Pe^2} \cong 93$$

In addition to the 93 retirees, seven more respondents comprising 4 pension managers, consultant, salary unit and pension union representatives were selected. The total sample size comprises 100 respondents.

The primary data consist of raw facts from the interview conducted while the secondary data were got from the readily compiled, accessible and downloadable data to complement or confirm the data gathered through primary source. The study drew greater knowledge from the PRA and series of publications from NSIWC and PenCom such as annual reports, pension updates, quarterly reports, pension frequently asked questions (FAQ) and so on. Other secondary data used comprise series of publications relevant to pension management and administration in different textbooks, articles, journals, newspapers, forums, conferences, seminars and so on. The qualitative data which provide an in-depth investigation were generated by the interviews carried out through face-to-face, zoom application, WhatsApp video calls and telephone calls. The various means of interviews adopted enabled the respondents to be reached irrespective of the locations and have also given opportunity to eliminate confusion, misinformation and ambiguity during analysis.

Descriptive statistics used contain tables, diagrams, charts and simple percentages to show how a variable among a particular set of data is fairly distributed in the whole set. Inferential statistics used in analysing the data are pension annuity formula, fund accumulation formula and Ordinary Least Square (OLS) Model.

In actuarial work, the choice of appropriate probability density distribution function to be employed to analyse a particular set of data is a very serious task. In order to perform the task of choosing the appropriate PDF that best suits the data used, EasyFit 5.6 Professional Software was employed. EasyFit Software generates statistics using three models (Kolmogorov Smirnov, Anderson Darling and Chi-Square) to select the best fit for the data. The statistics generated by the software in each model were ranked to determine the best fitness for the probability distribution used.

Formula/Model Specification

Salary growth rate (g)

$$F_n = S[(I+g) + g(1+g) + g(1+g)^2 + \ldots + g(1+g)^{n-1}]$$
$$= S(1+g)^n \quad (1.0)$$

Accumulated Value of Contributions ( )

The total contribution made into the retirement savings account is eighteen percent (18%) of the series of salaries. The accumulated value of the series of salaries received by a retiree for n years of service is represented by $= (1+g)^{n-1} + (1+g)^{n-2} + (1+g)^{n-3} + \ldots + 1$

Summing up the series;

$$S_{\overline{n}|} = S\,\frac{(1+g)^n - 1}{g} \quad (2.0)$$

The present value of the series of pension annuity payments consisting of n payments of P at the beginning of each period is represented by P

$$\ddot{a}_{\overline{n}|} = 1 + v + v^2 + \ldots v^{n-1}$$

$$P\,\ddot{a}_{\overline{n}|} = \frac{p(1 - v^n)}{1-v} \quad \text{where } v = \frac{1}{1+g} \quad (3.0)$$

Least Square

The contributions serve as the independent variable(X) while the retirement benefit is the dependent variable (Y). Hence, the equation is defined as:

$$\hat{Y} = a + bX \quad (4.0)$$

$$b = \frac{n\sum XY - \sum X \sum Y}{n\sum X^2 - (\sum X)^2} \quad (5.0)$$

$$a = \frac{\sum X^2 \sum Y - \sum X \sum XY}{n\sum X^2 - (\sum X)^2} \quad (6.0)$$

Test of reliability of the model

Standard Error of the Estimate (S_e)

$$S_e = \sqrt{\frac{\sum(Y - \hat{Y})^2}{n-2}} \quad (7.0)$$

4.0 DATA PRESENTATION AND ANALYSIS

The secondary data contain various salary ranges received by pensioners and the series of all contributions made while in active service with the total retirement benefits paid by various pension managers/operators. The primary data were obtained from the field survey using various means of interview instruments to obtain information from the ninety-three retirees who retired not earlier than the year 2020 in order to have timely and relevant information. The salary structure used is the Consolidated Public Service Salary Structure (CONPSS) obtained from the National Salaries, Incomes and Wages Commission (NSIWC). CONPSS contains seventeen grade levels with different steps. Grade levels 1 - 10 have fifteen steps each, levels 11 – 14 have eleven steps each while grade levels 15 – 17 have nine steps each. The contribution and retirement benefit data between the years 2004 - 2022 were retrieved from the

series of annual reports/publications of PenCom. Contributions into pension funds started in the year 2004 while the payment of retirement benefits started in the year 2008 consisting of the retirement benefits of those that retired as from the 25th June 2007.

Retirees' Interview

From the responses of the ninety-three retirees, the years spent in service were computed using the years/dates of employment and retirement. Table 1 shows the result.

Table 1: Length of Service

length of service	No of retirees	Percentage (%)
20 - 25	48	51.6
26 - 30	31	33.3
31 - 35	14	15.1
	93	**100.0**

Source: Researcher's Field Survey

Table 2: Descriptive statistics of years of Service

Statistic	Value	Percentile	Value
Sample Size	93	Min	20
Range	15	5%	20
Mean	24.237	10%	20
Variance	22.596	25% (Q1)	20
Std. Deviation	4.7535	50% (Median)	20
Coef. of Variation	0.19613	75% (Q3)	28
Std. Error	0.49291	90%	31
Skewness	0.52037	95%	33
Excess Kurtosis	-1.1932	Max	35

Table 3: Grade level and last salary range (r) prior to retirement

Level	No	r (₦'000)	No
1	0	$31 < r < 34$	06
2	0	$34 \leq r < 37$	11
3	0	$37 \leq r < 40$	29
4	41	$40 \leq r < 43$	22
5	52	$43 \leq r < 45$	25

Source: Researcher's Field Survey

The level of comfort enjoyed by low income retirees in fulfilling major and basic needs of feeding, clothing and shelter was estimated through various pension amounts received. From Table 4, a larger percentage of the retirees receive an amount between ten thousand naira and fifteen thousand naira as monthly pension.

Table 4: Respondents' monthly pension amount

Monthly pension (x) ₦'000	Frequency (f)	Percentage (%)
$10 < x < 15$	44	47.3
$15 \leq x < 20$	36	38.7
$20 \leq x < 25$	13	14.0

Source: Researcher's Field Survey

Source: EasyFit software analysis

Among sixty-one probability functions tested using the Kolmogorov-Smirnov, Anderson Darling and Chi-Squared Models, the Johnson SB Distribution was selected as the best pdf for the data judging by the model statistics shown in Table 5. Fitting in the parameters in the Johnson System Bounded PDF, an average pensioner interviewed receives ₦15 087.00 as monthly pension.
Only three retirees were able to make additional voluntary contribution while in active service and about 96.8% of the retirees have other means of survival. From the responses of the retirees, various challenges under the contributory pension which seem to defeat the objectives of the scheme are: the insufficiency of the benefit received; no impact of investment returns felt; non-review of pension benefits for a long time; inflation or purchase power of the pension amount; reluctance or non-implementation of regulation that increases the pension benefit of low income retirees; leadership or competence problems which result to corruption or embezzlement of funds; undemocratic state of the pension industry which practically ties the hands of the fund contributors on matter relating to management, administration and investment of pension funds.

Table 5: Goodness of Fit of Johnson SB Probability Density Function on Interviewees' Pension Amount

Johnson SB parameters: γ=0.27789 δ=0.7013 λ=14374.0 ξ=8925.0					
Kolmogorov-Smirnov					
Sample Size Statistic P-Value Rank	93 0.07907 0.57848 1				
α	0.2	0.1	0.05	0.02	0.01
Critical Value	0.10947	0.12506	0.13891	0.15533	0.16666
Reject?	No	No	No	No	No
Anderson-Darling					
Sample Size Statistic Rank	93 0.7586 2				
α	0.2	0.1	0.05	0.02	0.01
Critical Value	1.3749	1.9286	2.5018	3.2892	3.9074
Reject?	No	No	No	No	No
Chi-Squared					
Deg. of freedom Statistic P-Value Rank	6 5.892 0.43539 3				
α	0.2	0.1	0.05	0.02	0.01
Critical Value	8.5581	10.645	12.592	15.033	16.812
Reject?	No	No	No	No	No

Source: EasyFit Software Analysis

Pension Manager/Consultant Interview
The investment instruments do not give higher yield but safety of fund is guaranteed. There is an investment limit on each allowable instrument in order to diversify all investment instruments available to the PFA. The pension contributions are always safeguarded to ensure transparency, accountability and safety. The key safeguards of the CPS contributions include: ring fencing of pension contributions; separating the assets of the pension managers from the pension funds; regulating and monitoring of pension

contributions by the regulator and the concerned parties; prohibiting the usage of pension contributions as loan collateral or loanable funds; strict licensing requirements imposed on the custodian of pension contributions. On the compliance issue, the erring operator is punished by the appropriate authority for any case of non-compliance specified by the Act. The valuation reports submitted by PFAs at the end of each trading day help to verify compliance with the regulations by scanning for possible infractions. Few other challenges faced in the CPS as observed by different respondents include: technical competence; more capacity building and institutional strengthening; national cohesion threats and choice of management leadership which are based on regional or loyalty rewards instead of competence and qualification.

Analysis of Secondary Data

Programmed Withdrawal Option

Using EasyFit Software to analyse CONPSS salary structure, the average monthly pension amount was derived. In order to find best distribution fit, Table 6 displays sixty-one PFDs run by EasyFit Software using the Kolmogorov Smirnov, Anderson Darling and Chi-Square.

Table 6A: Summary of PDF and Model Goodness of Fit

#	Distribution	Kolmogorov Smirnov		Anderson Darling		Chi-Squared	
		Statistic	Rank	Statistic	Rank	Statistic	Rank
1	Beta	0.06021	17	2.0819	32	1.6267	12
2	Burr	0.17499	44	3.9223	36	11.341	40
3	Burr (4P)	0.42228	48	22.675	49	34.606	45
4	Cauchy	0.13962	38	1.8068	30	2.4196	25
5	Chi-Squared	0.49456	52	531.12	57	158.8	50
6	Chi-Squared (2P)	0.49781	53	593.43	58	87.12	48
7	Dagum	0.55576	54	27.909	51	785.25	55
8	Dagum (4P)	0.48567	50	42.09	55	90.733	49
9	Erlang	0.07269	25	0.64516	21	2.0426	17
10	Erlang (3P)	0.16535	42	3.9875	37	9.6801	36
11	Error	0.08188	29	0.92055	26	2.23	24
12	Error Function	1	60	N/A		N/A	
13	Exponential	0.57335	55	28.267	52	409.32	52
14	Exponential (2P)	0.15309	41	4.8208	41	10.063	37
15	Fatigue Life	0.07108	24	0.59777	20	2.8981	30
16	Fatigue Life (3P)	0.04363	7	0.16938	6	0.94702	5
17	Frechet	0.05622	16	0.27644	13	1.6723	13
18	Frechet (3P)	0.04611	12	0.20652	11	2.0646	18
19	Gamma	0.07033	22	0.65824	22	2.1445	22
20	Gamma (3P)	0.04355	6	0.15785	5	0.34888	2
21	Gen. Extreme Value	0.03558	3	0.14768	4	0.63201	3
22	Gen. Gamma	0.0744	27	0.69546	23	2.1701	23
23	Gen. Gamma (4P)	0.0394	4	0.11928	3	1.273	8

24	Gen. Pareto	0.04667	13	11.5	46	N/A	
25	Gumbel Max	0.04713	14	0.2514	12	1.3779	9
26	Gumbel Min	0.15114	40	4.6336	39	10.113	38
27	Hypersecant	0.11404	36	1.3774	29	5.8342	32
28	Inv. Gaussian	0.08353	30	0.78524	25	2.0152	16
29	Inv. Gaussian (3P)	0.04391	8	0.17037	7	1.1291	7
30	Johnson SB	0.03318	2	0.05454	1	0.32112	1
31	Kumaraswamy	0.24158	46	7.6744	44	15.953	43
32	Laplace	0.14153	39	2.009	31	10.136	39
33	Levy	0.62379	57	35.319	54	657.03	54
34	Levy (2P)	0.3348	47	9.6273	45	47.009	46
35	Log-Gamma	0.06899	21	0.5627	17	2.8795	28
36	Log-Logistic	0.06759	20	0.56803	18	2.0953	19
37	Log-Logistic (3P)	0.04803	15	0.28771	14	1.9136	15
38	Log-Pearson 3	0.04315	5	0.19723	10	1.0795	6
39	Logistic	0.09939	33	1.1086	28	4.7577	31
40	Lognormal	0.07093	23	0.59604	19	2.8964	29
41	Lognormal (3P)	0.04465	10	0.17992	8	1.5757	10
42	Nakagami	0.07398	26	0.75464	24	2.7549	27
43	Normal	0.08156	28	0.92538	27	2.63	26
44	Pareto	0.17425	43	5.8229	42	11.802	41
45	Pareto 2	0.61007	56	31.642	53	436.79	53
46	Pearson 5	0.06719	18	0.50821	15	2.1301	21
47	Pearson 5 (3P)	0.04551	11	0.19254	9	1.8759	14
48	Pearson 6	0.0672	19	0.51204	16	2.1264	20
49	Pearson 6 (4P)	0.49367	51	26.251	50	58.627	47
50	Pert	0.09582	32	4.6716	40	7.9733	35
51	Power Function	0.13806	37	3.0381	35	16.0	44
52	Rayleigh	0.43438	49	19.131	47	175.66	51
53	Rayleigh (2P)	0.09252	31	4.4509	38	7.6758	34
54	Reciprocal	0.22324	45	6.1607	43	13.527	42
55	Rice	0.66345	58	529.16	56	N/A	
56	Student's t	1.0	59	1538.6	59	2.4153E+11	56
57	Triangular	0.04441	9	2.1661	33	1.6267	11

Source: EasyFit Software Analysis

Table 6: Summary of PDF and Model Goodness of Fit

58	Uniform	0.1035	34	20.107	48	N/A	
59	Weibull	0.11319	35	2.541	34	6.7257	33
60	Weibull (3P)	0.03185	1	0.08981	2	0.63749	4
61	Johnson SU	No fit					

Source: EasyFit Software Analysis

Table 6 shows different test statistic generated by each model under respective PDF in order to choose the best PDF for the analysis. Looking at Weibull Distribution (3P) with the generated statistics by the models, Kolmogorov Smirnov ranks 1st, Anderson Darling ranks 2nd while Chi-Square ranks 4th.

From Table 7, Weibull Probability Distribution (with 3 parameters) is the best fit for the analysis of average pension amount of low income retirees based on the current salary structure of CONPSS. Fitting the parameters (α=1.5632 β=5981.4 γ=29834.0) into the mean ($\bar{X}$) and the standard deviation (δ) of Weibull Distribution, the expected value and the deviation are ₦35 220 and ₦3 471.30 respectively. Examining the stability or normality of the results, the standardized measure of variability (coefficient of variation) was employed. A lower CV value of 9.86% suggests the distribution used is better in terms of normality, standard and stability.

Table 7: Weibull Distribution Goodness of Fit

Weibull (3P): α=1.5632 β=5981.4 γ=29834.0					
Kolmogorov-Smirnov					
Sample Size Statistic P-Value Rank	75 0.03185 1.0 1				
α	0.2	0.1	0.05	0.02	0.01
Critical Value	0.12167	0.13901	0.15442	0.17268	0.18528
Reject?	No	No	No	No	No
Anderson-Darling					
Sample Size Statistic Rank	75 0.08981 2				
α	0.2	0.1	0.05	0.02	0.01
Critical Value	1.3749	1.9286	2.5018	3.2892	3.9074
Reject?	No	No	No	No	No
Chi-Squared					
Deg. of freedom Statistic P-Value Rank	6 0.63749 0.99574 4				
α	0.2	0.1	0.05	0.02	0.01
Critical Value	8.5581	10.645	12.592	15.033	16.812
Reject?	No	No	No	No	No

Source: EasyFit Software Analysis
Life Annuity Pension Option.

Using Equation (1.0) stated earlier, different salary growth rates based on the lengths of service are computed and displayed in Table 8.

Table 8: Computation of Pooled Salary Growth Rate

Length of Service	Salary Ratio	Salary Growth Rate (g)
20	1.0199	0.019989792
21	1.019	0.019028899
22	1.018	0.018156145
23	1.017	0.017359936
24	1.016	0.016630624
25	1.0159	0.015960119
26	1.015	0.015341584
27	1.0147	0.014769202
28	1.014	0.014237994
29	1.0137	0.01374367
30	1.013	0.013282519
31	1.0128	0.012851309
32	1.0124	0.012447217
33	1.012	0.012067762
34	1.0117	0.011710757
35	1.0113	0.011374269
		0.015

Source: Researcher's computation

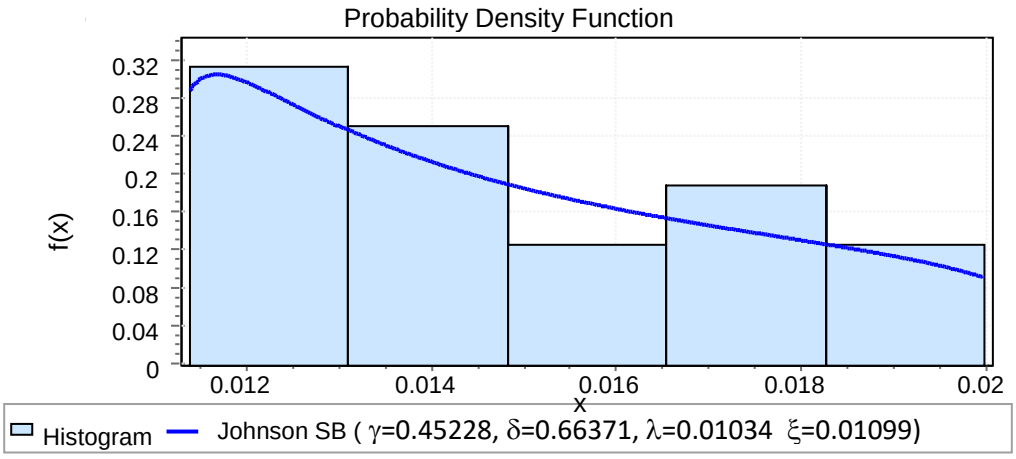

Figure 2: Probability Distribution of Salary Growth Rate
Source: EasyFit Software Analysis

Figure 2 displays how the salary growth rates in Table 8 are distributed by Johnson SB Probability Density Function. The salary growth rates for different lengths of service range between 1.1% and 2%. Applying the parameters of the PDF in the mean value, the pooled salary growth rate is 0.015. Using the pooled salary growth rate, accumulated value of 18% pension contributions can be derived using Equation (2.0).

Average Accumulated Value of Salaries (AAVS)= 12 * ₦35 220 $\frac{(1+0.015)^{35} - 1}{0.015}$ =₦ 19 269 040.03

Average Accumulated Value of Contributions (AAVC) = 18% of AAVS =₦ 3 468 427.205

Using Equation (3.0) to compute average annual pension (P) when the average contributions of a retiree amounted to ₦ 3 468 427.205 per annum;

₦ 3 468 427.205 = $\frac{P\,(1 - 0.985^{10})}{1-0.985}$

Monthly Pension (P) = ₦ 30 878.17

Guaranteed Minimum Pension (GMP)

A larger pension value got in programmed withdrawal than annuity option explains the reason many retirees go for programmed withdrawal instead of annuity. At For fairness, minimum guaranteed pension should be a uniform amount irrespective of the benefit option adopted in order to maintain balance between the two values to produce the GMP at no extra cost.

$$\text{GMP} = \frac{₦35\,220.00 + ₦30\,878.17}{2} = ₦33\,049.01$$

Although, an average pension amount of ₦ 33 049.01 is still not enough coupled with the current state of the Nigerian economy but one of the theories which this study is based is the Theory of Life Cycle Hypothesis which believes that consumptions reduce towards the later years in the life cycle of mankind because most of the achievable goals set by individuals must have been accomplished before retirement. Consumption during retirement is mostly channelled to the necessity of life such as feeding, clothing and shelter. For 1316 MDAs in Nigeria with at least one low income retirees in each of the federal establishments, the total retirement benefit per annum is 12* ₦ 33 049.01 * 1316 = ₦ 521 909 965.90. For a period of ten years, the value of the benefit is 10* ₦ 521 909 965.90 = ₦ 5 219 099 659

Funding

It is important to consider the funding or cost implication of GMP in order to continue to sustain the policy of GMP implementation. The Pension Funding Policy Theory combines the attributes of Deferred Wage and the Expectancy Theories. Table 9 shows the analysis of total pension contributions and retirement benefits from the years 2004 to 2022 using equations (4.0) to (7.0).

Table 9: Analysis of Pension Contributions and Retirement Benefits (2004-2022)

Year	X	Y	XY	X^2	$\hat{Y}$	$(Y-\hat{Y})$	$(Y-\hat{Y})^2$
2004	15.6	0	0	243.36	-39.74	39.74	1579.268
2005	34.68	0	0	1202.702	-31.154	31.154	970.5717
2006	60.41	0	0	3649.368	-19.5755	19.5755	383.2002
2007	148.97	0	0	22192.06	20.2765	-20.2765	411.1365
2008	180.09	13.85	2494.247	32432.41	34.2805	-20.4305	417.4053
2009	228.31	35.85	8184.914	52125.46	55.9795	-20.1295	405.1968
2010	265.49	43.27	11487.75	70484.94	72.7105	-29.4405	866.743
2011	348.48	72.12	25132.38	121438.3	110.056	-37.936	1439.14
2012	461.76	94.84	43793.32	213222.3	161.032	-66.192	4381.381
2013	503.92	142.17	71642.31	253935.4	180.004	-37.834	1431.412
2014	581.73	182.8	106340.2	338409.8	215.0185	-32.2185	1038.032
2015	558.96	206.47	115408.5	312436.3	204.772	1.69799999999998	2.883204
2016	488.2	208.01	101550.5	238339.2	172.93	35.08	1230.606
2017	610.84	292.81	178860.1	373125.5	228.118	64.692	4185.055
2018	607.55	283.86	172459.1	369117	226.6375	57.2225	3274.415
2019	700.69	342.28	239832.2	490966.5	268.5505	73.7294999999999	5436.039
2020	908.09	320.08	290661.4	824627.4	361.8805	-41.8005000000001	1747.282
2021	879.15	326.32	286884.2	772904.7	348.8575	-22.5375	507.9389
2022	891.25	383.85	342106.3	794326.6	354.3025	29.5475	873.0548
	8474.17	**2948.58**	**1996837**	**5285179**			**30580.76**

Source: Researcher's Computation from MS Excel

$$a = \frac{(5285179.302)(2948.58)-(8474.17)(1996837.476)}{19(5285179.302)-8474.17^2} = -46.76$$

$$b = \frac{19(1996837.476)-8474.17(2948.58)}{19(5285179.302)-8474.17^2} = 0.45$$

$$\hat{Y} = -46.76 + 0.45X$$

$$S_e = \sqrt{\frac{30\,580.75897}{17}} = 42.413$$

Applying the regression equation to compute the expected contributions;

$$\hat{Y} = -46.76 + 0.45X, \text{ where } \hat{Y} = ₦5\,219\,099\,659$$

$$X = \frac{51.98294359}{0.45} = ₦115.5176524$$

Discussion

The retirees examined in this study retired at the grade levels four and five having served for 20 to 35 years (as shown in Tables 1, 2 & 3). The series of processes and multiple forms filled by intending retirees during documentations have reduced the problems encountered by retirees in accessing their pension benefits. The volume of contribution made into RSA by low income employees is

determined by the amount earned as salaries. From Table 4, what the low income retirees get as pension benefits cannot satisfy basic necessities of life in terms of feeding, shelter and clothing as a result of the insufficient salaries (shown in Table 3) which the pension contributions were based while in active service. The meagre salaries received while in active service did not allow them to make additional voluntary contributions to augment the pension fund. The insufficiency of pension benefits has led old retirees to search for another job after retirement to sustain body and soul. The pension benefit received by the low income retirees of the federal public service in Nigeria is insufficient despite considerable years spent in active service. It is therefore compulsory to implement guaranteed minimum pension which will help the low income retirees to meet the basic needs of feeding, shelter and clothing. This study has computed a GMP of ₦ 33 049.01 as monthly pension for ten years which will require pension funding or contributions of ₦115.5b. In Table 2, most retirees spent 20 years in active service and Rewane (2023) found out that most retirees die within 10 years after normal retirement of 60 years. In line with Rewane (2023) and analysis shown in Table 2, GMP qualifying year of service is 20 years and the payment ceases after 10 years of subsidy payment.

5.0 CONCLUSION AND RECOMMENDATION

As observed in this study, pension benefit received by retirees under programmed withdrawal option is more than that of life annuity option. The logical explanation for this is that life annuity pension payment is for the entire lifetime of the retirees while the programmed withdrawal option has expiry time. As Nigeria advances towards a dependable and comprehensive system of pension administration, this study adds to the drive which provides simulating evaluation of sufficiency of the current pension system benefits. The study analysis serves as direction to know which areas of current pension plan can be improved upon for adequacy and sufficiency of retirement benefits. The Pension Commission should also review commissions and curb the unnecessary hidden fees charged by the pension operators in order to increase the accumulated contributions of retirees.

Arising from the findings of this study, the followings are recommended.

- In order to secure the future of the retirees, only life annuity option perfectively suits the purpose of providing pension payment for retirees
- In order to adequately address the plights, issues and challenges of pensioners in Nigeria, the government should create a separate ministry for pension that will be distinctly and solely responsible for all matters relating to pension issues.
- A GMP of ₦ 33 049.01 should be implemented for low income retirees of the federal public service with the modalities of minimum of 20 years in active service for qualification and the pension subsidy will last for 10 years after normal retirement age of 60 years old or 35 years in service.
- Finally, the government should consider raising the normal retirement age from 60 years or 35 years of service to 65 years or 40 years in service to enable low income earners accumulate more funds.

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Appendix I – Interview Questions

For retirees

i. When were you employed and retired?
ii. At what grade level did you retire from the federal establishment and how much was your last salary prior to retirement?
iii. Did you experience delay in pension payment due to documentation before or after retirement?
iv. What is the monthly pension amount you receive now?
v. Did you make additional voluntary contributions into your RSA when in active service?
vi. Do you have any other means of survival apart from retirement benefits you receive now?
vii. Does your pension take care of your basic needs?
viii. What can you say the challenges and problems of the contributory pension plan are?

For pension managers/consultants/union member

i. When are you mostly notified on the retirement of employees?
ii. How safe is the investment of pension funds?
iii. How safe are the contributions managed by the pension managers under CPS?
iv. Are the operators adequately complying with the guidelines laid down by the commission?
v. What are the challenges faced with the current pension system?

Appendix II- Secondary Data

Table 10: Pension contributions received and retirement benefits paid (2004 – 2022)

year	Contribution (₦'b)		Total Retirement Benefit (₦'b)	Programmed Withdrawal				Annuity				
	Public Sector	Total		No of Retirees		Lump Sum (₦'b)	Monthly Pension (₦'b)	No of Retirees		Lump Sum (₦'b)	Monthly Pension (₦'b)	yearly Premium (₦'b)
				FG	Total			FG	Total			
2022	476.8	891.25	383.85	6621	22847	98.58078	1.41561	6472	12259	44.46196	1.01312	91.22836
2021	491.75	879.15	326.32	4093	27843	96.38	1.34	2608	9220	29.35	0.601	60.02
2020	536.97	908.09	320.08	14721	35650	105.91	1.47	3673	8763	25.92	0.54	57.22
2019	331.56	700.69	342.28	17477	32746	87.08796	1.33094	6302	13153	24.92321	0.81762	78.43812
2018	266.84	607.55	283.86	10527	26561	71.35004	2.73204	7676	13118	16.48297	0.73252	87.25342
2017	257.11	610.84	292.81	14451	31444	81.71435	1.07095	9071	13663	13.20188	0.77874	71.05145
2016	225.86	488.20	208.01	6267	15967	50.2574	0.63268	5322	8544	9.20287	0.38995	40.96901
2015	200.05	558.96	206.47	9148	23694	66.98162	0.97872	7674	12270	13.53644	0.66656	60.14447
2014	237.76	581.73	182.80	12293	23457	47.47278	0.7568	3668	6563	8.02363	0.32439	32.62381
2013	278.50	503.92	142.17	13565	20520	47.02967	0.63424	4132	5065	8.34319	0.24944	24.74525
2012	302.24	461.76	94.84	11834	16397	37.26642	0.45537	1263	1728	5.51662	0.08997	9.06174
2011	228.92	348.45	72.12	11733	14773	38.02654	0.4283	516	632	2.1973	0.02555	2.78333
2010	162.46	265.49	43.27	9722	11402	32.21028	0.3102	71	74	0.27077	0.00254	0.27841
2009	137.10	228.31	35.85	10386	11469	34.30578	0.43209	N/A	N/A	N/A	N/A	N/A
2008	99.28	180.09	13.85	4933	5124	13.46224	0.18776	N/A	N/A	N/A	N/A	N/A
2007	80.63	148,97			47							
2006	37.38	60.41										
2005	34.68	34.68										
2004	15.6	15.6										

Source: PenCom Annual Reports (2004 -2022)