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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. The secondary data on all pension contributions and retirement benefits were retrieved from a series of publications by Pen Com from 2004 to 2022. The primary data population consists of 1316 retirees. EasyFit 5.6 Professional Software, together with the Least Squares Model, accumulation, and annuity formulae, was employed to analyse the secondary data and the responses from the respondents during the survey. 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 investigated. The study recommends implementing a minimum pension, subject to specific modalities, based on a 20-year minimum qualifying length of service and a 10-year post-retirement subsidy.***

Keywords: ***Contributory-Pension-Scheme, Low-Income-Retirees, Guaranteed-Minimum-Pension, Retirement-Benefit.***

I. INTRODUCTION

For fairness, one who has contributed substantially to an organisation throughout their working life needs to be rewarded when there is no strength or capacity to continue working. One way to give such a reward is through pension payment (Abere & Abiola, 2019), [3]). According to Amadi (2020, [10]), 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 their retirement benefits through the accumulated and mandatory savings.

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Most countries that were convinced by the sustainability of the Chilean-introduced pension system adopted it. In this study, a contributory pension scheme is one in which both the federal government and low-income earners below level six contribute 18% of the earners' monthly emoluments into a retirement savings account towards the future payment of retirement benefits. The retirement benefits of low-income retirees who worked for a considerable number of years while in active service should be reasonably sufficient to satisfy the necessities of feeding, clothing and shelter to enjoy at least a minimum level of comfort during retirement. Age, retirement savings account balance, final salary (total emolument), gender, and pensioners' retirement payment choices are various factors influencing differences in the amount of pension payments received by different pensioners (Mojekwu & Adeyele, 2010). The standard of living of retirees after coming to the end of working life depends mainly 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 should to be addressed. Despite numerous amendments, adjustments, and reforms to the pension system, pension administration in Nigeria appears to face significant challenges. The contributory pension method, adopted to alleviate tedious issues and problems associated with pension benefit payment, appears not to have been generous to low-income retirees. Most retirees made contributions for more than half of their entire lifetime while in active service, but are often disappointed with the retirement packages they receive. 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 investigate the sufficiency of retirement benefits for low-income retirees in the federal public service. The specific objectives are to:

i. investigate the level of comfort enjoyed by low-income retirees.
ii. develop the expected average amount of the Guaranteed Minimum Pension (GMP)
iii. estimate the pension contributions sufficient to provide a GMP that can cater for necessities.

The required retirees for the study are those low-income retirees who joined the federal public service and retired no earlier than 2020, in order to have timely circumstances of the issues and solutions during the study. The major limitation envisaged was the tedious process of data gathering.

The study primarily examined the financial implications that constitute the requisite framework for the successful implementation of GMP by investigating whether the pool of savings contributed by low-income federal public service employees can suffice to provide the minimum needed for a livelihood at retirement. The outcome of the study is of great importance to pension stakeholders, including the Pension Fund Administrators (PFAs)/Pension Fund Custodians (PFCs), the Pension Regulatory Authority, financial institutions, insurance companies, and the Federal Government (FGN), for policy formulation, law amendment, capacity building, and institutional strengthening.

II. LITERATURE REVIEW

A. Theories

a. The Deferred Wage Theory

Capele, Malaski, and March (1980) viewed a pension plan established for employees as a method to shift some compensation that accrues to employees when they retire from active service with the employer. The theoretical model has numerous actuarial implications in terms of actuarial principles.

b. The Expectancy Theory

Victor Vroom (1964) believed that specific behaviour results from a particular choice made among other options whose purposes are to minimise pain or maximise gain. Applying the theory to this study, employees will put greater effort into achieving higher productivity if a strong relationship is established between active performance and positive rewards in the retirement benefits package.

c. Theory of Pension Funding and Policy.

Jon C. Exley worked on this theory in the year 1997, [19] to balance between the Expectancy Theory and the Deferred Wage Theory. Pension here serves as an insurance policy against the risk of reaching retirement age.

d. Theory of Life Cycle Hypothesis (LCH).

The Life Cycle Hypothesis (LCH), which was worked on by Franco Modigliani in the year 1985, [27] relates consumption 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.

B. Conceptual Review

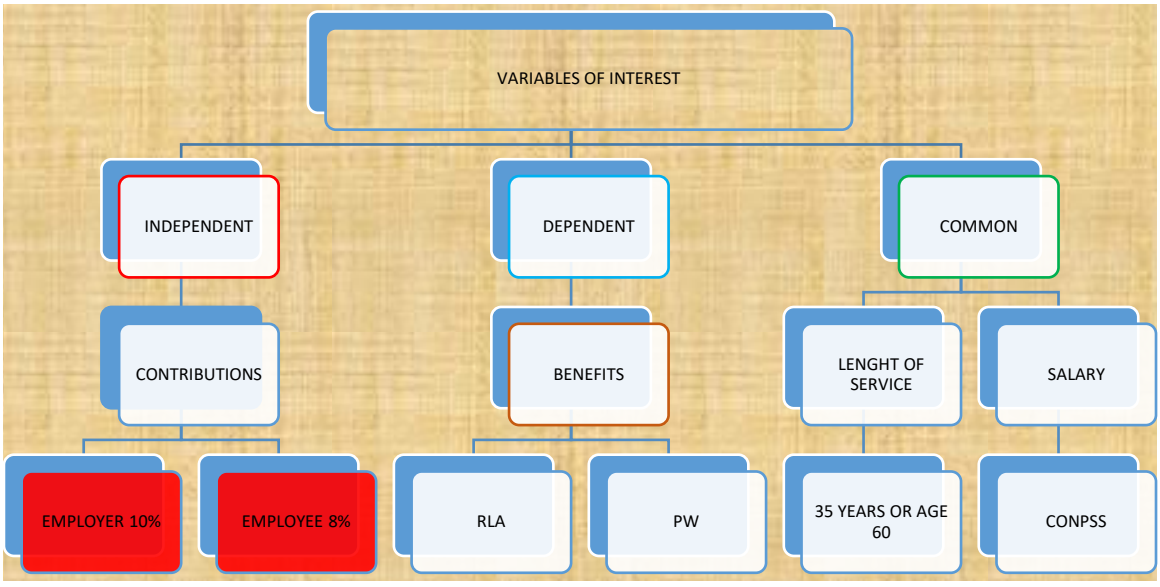

Figure 1: Research Framework

Generally, an employee in the public service retires at the age of sixty or after spending thirty-five years in service, whichever comes first. The series of (18%) contributions made represents the independent variable, while the pension benefit (RLA or PW) received represent the dependent variable.

Table 1: Difference Between Programmed Withdrawal and Retiree Life Annuity Pension Payment Options

Programmed Withdrawal	Retiree Life Annuity
Product offered by PFAs and regulated by PenCom.	Product offered by a life insurance company and jointly regulated by NAICOM and PenCom
The expected life span of a retiree is determined by the new A (55) Table of Annuitant Ultimate Rates published by the Institute and Faculty of Actuaries, United Kingdom.	The expected lifetime of a retiree is determined by the new A (90) Table of Annuitant Ultimate Rates published by the Institute and Faculty of Actuaries, United Kingdom.
Both PFA and the retiree share the risks	Longevity risks are transferred to the life office
The contribution balance stays in the RSA.	The contribution balance is used as a premium to purchase RLA.
Payments of pension are limited to the retiree's expected lifespan	Payments of pension are for life till the death of the retiree
After the guaranteed pension payment period, the balance in the RSA is paid to the legal beneficiary upon the untimely death of the retiree.	After the guaranteed pension payment period, nothing is paid to the beneficiary upon the untimely death of the retiree.

Source: NAICOM (2020)

C. Empirical Review

Empirical studies of the contributory pension scheme have generated an extensive literature in Nigeria over the last two decades, following the enactment of the PRA in 2004. According to Onukwu (2020, [38]), pension system began to gain attention after 1960 as Nigeria gained independence. As studied by Onukwu (2020), the problem of defined benefit schemes became more serious due to upward salary reviews, as an increase in employees' salaries ultimately led to an increase in employees' accrued retirement benefits.

When the contributory pension scheme was introduced in 2004, some employees (with a maximum of three years remaining until retirement) were allowed to remain in the old pension system. Casey (2009, [16]) 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. The pension issue is very worrisome to active workers in Nigeria because most pension beneficiaries are not the actual contributors to the pension funds. Most workers die before or shortly after they retire 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), [44]). According to Rewane (2023), most people who live longer than expected die between the ages of sixty and seventy. As life expectancy improves, the size of the retiree population also increases, and the number of years spent in retirement increases in a like manner. A study on the sufficiency of retirement benefits is of utmost importance due to the rapid increase in the ageing population in developing countries, especially Nigeria.

The cases of embezzlement or misappropriation of pension funds have become a source of worry and demoralised prospective pensioners in terms of their welfare in retirement (Ojiabor & Onogu, 2012). The uncertainty of what to expect during retirement can lead to bureaucratic fraud or crime, low morale and commitment, and falsification of age among some low-income retirees as they attempt to accumulate sufficient wealth while still in active service (Agba, 2008). The fear has raised some questions that challenge the capacity of the contributory pension plan to achieve its objective of ensuring that individuals save to cater for their livelihood in old age (African Examiner, 2012). The Pension Reform Act, enacted to some extent, has helped to solve the problems of inefficient/weak administration of the pension system and unsustainable increase in the cost of paying pension benefits (Odia & Okoye, 2012), [34]). Most employees in active service find it very difficult to save for their future due to some circumstances such as the responsibilities of the extended family members, lack of social welfare provision for the elderly, amplified propensity for consumption, inflation in the general price level, poor salaries/wages and so on (Aibieyi & Oyemwinmina, 2016), [7]). The changes in pension reform have made the pension system in Nigeria simple, financially sustainable, less cumbersome to operate, transparent, cost-effective and serve as a vehicle for achieving a saving culture among the low-income earners (Iwelumo, 2016), [24]). Pension managers must be prepared for the unknown and unpredictable forces emanating from regulatory changes and be able to direct pension resources quickly to operate in a goal-directed manner (Baker, Logue, & Rader, 2005). Elekwa, Okoh and Ugu (2011, [18]) studied the implication of pension reform on social security planning and concluded that the current pension scheme has significantly improved social security planning for retirees and their families. Pension income received has brought economic security and replaced the income loss due to retirement. Notably, the study did not assess the adequacy of retirement benefits provided to low-income retirees.

One would expect that more than 50% of Nigerian workers would be enrolled in the CPS, as the pension scheme was made compulsory for both public and private sector workers upon its enactment. The National Bureau of Statistics, in the Fourth Quarter Report of the year 2016, affirmed that seven million three hundred and forty-eight thousand and twenty-eight employees out of the total working population of sixty-nine million four hundred and seventy thousand and ninety-one employees were enrolled in the scheme according to the number of number of RSAs opened (NBS, 2017). Many workers in Nigeria are engaged in the informal sector, including trading, transportation, small-scale farming, and other forms of microbusinesses. The majority of Nigerian workers are not covered by a pension scheme and are exposed to social insecurity in their old age. Musibau (2012, [28]) recommended that the coverage and the scope of the scheme should be reviewed to mandatorily include informal sector and micro businesses as a result of low number of contributors. The provision and existence of micro pensions in Nigeria have addressed the recommendation of Musibau (2012).

The wide gap in workers not covered by the scheme cannot be attributed solely to the increased distribution of workers in the informal sector, but also to the role of the pension regulatory authorities in ensuring compliance, as outlined in the Act. According to Odo, Orga, and Ozoemenam (2019), most private organisations do not enrol employees in any pension plan because they remit their part of the pension contributions to the employees' RSAs. The Commission appears to feign ignorance of the allegation by waiting for employees' complaints against employers regarding non-compliance, rather than PenCom performing its role as a watchdog to address compliance gaps among all parties involved.

Although there has been remarkable success upon the introduction of the CPS in the year 2004 as perceived by some researchers but various myriads of problems and competing forces that plague the old scheme in the public sector and other varying types of existed private pension schemes seem to have been sighted by making the Act redundant in living up to the objective of universal and uniform pension coverage for all employees because of the exclusion of some public office holders from the scheme (Abdulazeez, 2015), [1][2]). The exclusion or preferential treatment of some workers is navigating the future of the pension industry to an unknown destination (Abayomi, 2022). In case an employer (whether government or not) covered under the Act fails to remit the employees' pension contributions, PenCom should mandate such employer to make the due remittance along with the penalty addition of two per cent of unpaid contributions into the RSA of the affected employees (Unini, 2022). The question to ask is how the regulatory authority, PenCom, can mandate the Nigerian government to comply with the law in a country that operates like the Old Roman Empire where the Emperor was not only considered as the only most powerful ruler but also considered as the Head of the Empire Supreme Legal Authority making, enforcing and interpreting the law at the same time. The way forward, as recommended in Unini (2022), is to strengthen labour and trade unions to hold the government accountable for fulfilling its responsibilities to employees through practical, specific, timely, attainable, and realistic means that will yield results. The best time to demonstrate these means is during an election period, when the government appears to be responsive to people's needs by listening to their requests and implementing changes promptly.

A study on pension sufficiency is of utmost importance due to the high incidence of old age poverty in developing countries, of which Nigeria is not exempt. According to Izuaka (2022, [25]), 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. The poverty level and dependency on the working population by retirees would be at the barest minimum if pension benefits allow the elderly to enjoy a fair standard of living. Retirement in Nigeria poses a significant financial challenge because a larger percentage of retirees are still the primary breadwinners of their families, due to the shorter normal retirement age of sixty years compared to many nations worldwide. According to Beedie (2015), pension income in Nigeria is insufficient for female retirees to meet their basic needs due to shorter service years resulting from gender-based responsibilities. In this study, pension income inadequacy relates to the extent to which pension income cannot help individual retirees fulfil the three basic needs of feeding, shelter, and clothing.

According to Agbata, Ekwueme and Jeroh (2017, [6]), 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, [13]) studied the extent to which 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 collected data to a non-parametric analytical test, the study revealed the absence of retiree discrimination; however, it also maintained that delays still occurred in pension payments. However, the study failed to explain further the stages of the retirement cycle at which the delay problem decreased, remained constant, or improved. Musibau (2012) in his study on the impact of contributory pension on retiree savings, using Oyo State public service employees as a case study, suggested that retirement benefits should be provided by the government as a reward for retirees, without requiring employee contributions. The study found no significant relationship between savings and the contributory pension scheme. It appears that Musibau's study turned a blind eye to many problems faced when retirement benefit payment was wholly on the government's shoulders.

Gunu and Tsado (2012, [21]) studied the economic implications 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 implications for the lives of participants and its impact on the capital market. Strict monitoring of pension managers and increased awareness were further recommended to achieve the programme's success beyond what is currently being achieved. Ojiya, Ajie and Isiwu (2017, [35]) re-examined the belief and carried out an empirical analysis using the Granger Causality Test and the econometric tool of SPSS to assess the impact of the 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 a positive but insignificant impact on economic growth. The study's conclusion indicates that pension funds have not been utilised judiciously to boost economic growth in Nigeria due to safety and investment restrictions imposed by regulatory authorities.

Chizueze, Nwosu, and Agba (2011, [17]) investigated the commitment of civil service workers and their attitudes towards a contributory pension scheme. As concluded in the study, the contributory pension scheme has a significantly positive effect on employees' attitude towards retirement, as workers are more confident and relaxed with the scheme

than with the old defined benefit plan.

As observed in the study, relying solely on the opinions of active workers currently engaged to conclude the sustainability and capital adequacy of pension plans is misleading. The regular salaries, combined with other financial resources available to current employees, may mislead or misinform them about the pension plan's operations during retirement. In addition to assessing the confidence level of employees in active service, the confidence level of actual retirees in the scheme also needs to be investigated. Olanrewaju (2011) examined the welfare of retirees and the Pension Reform Act (PRA) using Marxist theory to analyse the collected descriptive data from structured questionnaires administered to selected retirees in Nigeria. Olanrewaju (2011, [36]) concluded that organised private sector retirees enjoy retirement benefits than their counterparts in the public sector because the government delays releasing or remitting contributions on behalf of the employees. The delay deprives many retirees of being able to assess their retirement benefits as soon as they are due upon retirement from active service.

Although the PRA 2014 grants an employee access to the saved fund if such an employee loses their 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, [4]) affirmed that the pandemic had a severe impact and worsened the living conditions 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 pension funds to tackle poverty among workers during the pandemic era or in the event of any other disaster. The determinants of any financial decision in an organisation are risk and return, which are directly related. The optimal investment of pension funds involves various complexities in securing returns that must be paid back to retirees (Abere & Abiola, 2019). According to Abere and Abiola (2019), the investment of pension funds must be made carefully to avoid losing the invested capital. Kurfi (2003) explained that investments in pension funds face two significant risks: financial market and systemic risks. The first one is the risk associated with exchange rates and asset prices, while background risks involve external financial risks, such as inflation, and the risk associated with 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 composition of investment outlets/windows to ensure the safety of pension funds (Banwo & Ighodalo, 2015), [14]). Due to the safety or security of the pension fund investment, there is an inadequacy in the accumulated pool of pension assets/funds (Abere & Abiola, 2019).

Aja (2015, [8]) carried out a study on the contributory pension plan to see if the scheme introduction has resolved the delay witnessed by retirees in the monthly pension payments. Survey research design was employed, and the opinions of retirees in seven federal establishments in Nigeria between 2008 and 2014 were randomly sampled using questionnaire and interview methods for data collection. As noted in the study's findings, the delay persists due to the manual approval process required for accessing retirement benefits. Aja (2015) recommended that PenCom should use an appropriate software system to automate the approval process, vastly speeding it up and eliminating the administrative bottleneck caused by multiple hardware or paperwork that passes from one desk to another before final approval.

In the year 2020, Adegboyega (2021, [5]) observed that sixty-three per cent of registered employees in the CPS were male, while thirty-seven per cent were female, which shows there are more male workers than female workers. Although the female gender has a higher life expectancy, as observed by Rewane (2023), they are also disadvantaged due to their shorter working life experienced as a result of family and childbirth responsibilities. The family responsibilities ascribed to female income interrupters and work tenure, which cause vulnerability in terms of comparable occupations with the male gender (Beedie, 2015), [15]). According to Mojekwu and Adeyele (2010, [29]), female mortality is higher than male mortality after retiring from active service. On the contrary, Onifade (2021, [37]) stated that women are only more disadvantaged when purchasing a retiree life annuity product because a higher premium is expected than their male counterparts in procuring RLA due to the female's higher life expectancy. The 2004 PRA [42] 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), [46]). The insufficiencies and inadequacies gave rise to the subsequent amendment and review in 2014. In other words, the incapability of the 2004 PRA to meet the needs of pensioners led to the amendment in 2014. The 2014 PRA (Amendment) now serves as the principal and current law governing pensions and pension-related matters in Nigeria.

GMP is an income support from the government and a social security policy variant that entails redistributing resources to retirees (Apere, 2017, [11]). The funding of GMP is not only borne by the government. The Federal Government, the National Pension Commission and pension administrators/operators jointly fund the Pension Protection Fund (PPF). Aside from the government's contribution of one per cent of the employee wage bill, pension operators also contribute three per cent of the Annual Pension Protection Levy (APPL) from the management fees earned. According to Popoola (2021, [41]), the FGN failed to pay its share of the contributions into the PPF after the PFAs had contributed their quota. One can deduce that the government's failure to fulfil its part in PPF funding has stalled the implementation of the GMP. The outstanding government pension liabilities, along with the appetite for taking additional loans, could continue to hinder the 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 four hundred naira to each retiree who collects less than that amount in the CPS (Longe, 2017, [26]).

Considering the economic impact of inflation and the current situation in Nigeria, such a sum is excessive to be paid as a pension to a retiree who has dedicated a considerable number of years to quality service.

Ibiwoye and Adesona (2011, [23]) expressed concern that the issue of GMP is only expressed in paper, as the government has not shown appropriate commitment. The government made provision for funding GMP and other pension benefit shortfalls upon the enactment of the PRA, as opposed to the claim made by Ibiwoye and Adesona (2011) in their study. The only issue that militates against the provision made by the government is the commitment to it. Nwoji (2023, [32]) noted that the delay in GMP has led PenCom to make provision for enhanced pension for retirees under the programmed withdrawal (PW) option. The provision excludes retirees who use an annuity as their 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. According to the draft regulation, a pensioner who is eligible for GMP will not be entitled to an en bloc withdrawal (Pension Nigeria, 2023). As stated by Pension Nigeria (2023, [40]), 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 the PW option while neglecting retirees on the annuity option has considerably raised concerns by affected retirees and stakeholders despite the good intentions and aspiration of the initiative regulation (Apere, 2023), [12]). 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 a retiree will be allowed to withdraw the entire amount as a lump sum. However, if the RSA balance exceeds this amount, the retiree will be placed on a 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), [39]).

In a defined-contribution pension system, the individual retiree receives what the accumulated savings can purchase at retirement. The side effect of the system is that the benefits purchased by low-income retirees may be too low to sustain them due to the time value of money and the volume of their remuneration while in active service. The government is expected to subsidise pension benefits by setting a minimum guaranteed amount of pension when the available balance in the retirement savings account of a prospective low-income retiree cannot guarantee a minimum standard of living (Ford & Browning, 2016), [20]). The funding of the Guaranteed Minimum Pension is provided for in Section 82 of the 2014 PRA. A pension reform in Nigeria faces significant political opposition, resulting in delays and higher adjustment costs (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), [45]).

Sogunro, Ayorinde, and Adeleke (2019) estimated that low-income earners would have to contribute more than 28% of their earnings for forty years in order to maintain or enjoy at least a fair standard of living. The study used the 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, respectively. Nyong and Duze (2011, [33]) 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) examined retirement planning in Nigeria, focusing on the current retirement scheme's ability to provide sufficient financial security for retired teachers. The retirees were not comfortable with the provision of PRA 2004 in catering to their basic needs during retirement due to the inadequacy of the benefits received. A large number of low-income retirees return to the informal sector to continue working in order to support their family's basic needs. According to Wolf and López Del Río (2021, [47 Retirees look for a financial supplement to help with their financial needs due to insufficient benefits. The two common supplements available to retirees are agriculture (including fishery, poultry, pig, or crop farming) and trading.

According to Apere (2017), assessing the adequate sustainability of a pension system requires proper actuarial analyses that estimate future cash flows by detailed profiles of contributors and existing retirees, taking into account 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, [22]). In cases where actuarial analyses are employed, the assumptions made in the analyses regarding future growth rates, the lifetime of retirees, interest rates, and investment returns make the analyses unrealistic and difficult to apply. After many years of reform in Nigeria's pension system, some issues are limiting the success of the scheme. Ajijola and Ibiwoye (2012, [9]) observed that many people prefer programmed withdrawal to the life annuity option because they are often unaware of longevity risk and the importance of using annuities as a retirement benefit option. The large number of people using the 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 a series of actuarial publications on pension or pension-related matters can help retirees make informed choices. However, 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).

III. LITERATURE GAP

Despite numerous studies on the subject matter, gaps still exist in the empirical literature regarding a study that pays special attention to the plights and fears of low-income retirees in the contributory pension scheme of the federal public sector, specifically the sufficiency of retirement benefits. This study not only examines the welfare and post-retirement standard of living of retirees in the public sector but also pays particular attention to those retirees whose take-home pay while in active service was barely sufficient to meet 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 by working out the minimum guaranteed amount of pension in respect of that. According to the study by Sogunro, Ayorinde, and Adeleke (2019), the savings accumulated by low-income retirees through contributions may not provide a fair standard of living upon retirement. There is a need for government subsidies to supplement retirement benefits and ensure a minimum standard of living. Developing such a minimum pension amount is one of the objectives of this study.

This study also builds on the work of Nyong and Duze (2011) and focuses on low-income retirees from the federal public service in Nigeria. Unlike the study by Nyong and Duze (2011), which employed only a quantitative approach, this study combines 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 data quantitatively and qualitatively. It raises concerns for low-income earners that teachers, with job qualification requirements at higher levels and a high probability of not retiring as low-income retirees, may 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 the arbitrary choice of any amount as the GMP. Besides, the costs computed in the study would distort the conclusion because the computation of funding or cost of GMP depends significantly on the quantitative and qualitative analyses of the appropriate amount of GMP, rather than using a mere assumed or illustrated value used in a research study from another country with a 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, the qualifying years for GMP will be specifically stated, along with the appropriate contributions expected for funding purposes. The modalities of GMP (with some problems and challenges limiting its implementation) and the average or expected minimum pension amount to which a retiree is entitled are lacking in the related pension literature in Nigeria.

In summary, based on the theoretical literature and framework reviewed and adopted in this study, along with the corresponding empirical evidence, the existing gaps in the literature necessitate this study. Several studies have been conducted by various researchers on the contributory pension scheme before and after the enactment of the Pension Reform Act (PRA) in Nigeria in 2004. However, few studies have directly examined the pension issues and challenges affecting only low-income retirees of federal public service establishments (below GL 06) in Nigeria, particularly in the following areas of study.

i. The level of comfort enjoyed by low-income retirees in the federal establishment of Nigeria.
ii. The expected average amount of the minimum pension using the CONPSS salary structure.
iii. Pension contributions can cater to the necessities of life, including food, clothing, and shelter.

The missing areas in the existing literature are gaps that this study fills and bridges to contribute to knowledge.

IV. METHODOLOGY

A. Research Design

A cross-sectional descriptive sample survey method is the major research design for the study.

B. Population of the Study

One retiree was selected from each federal establishment to form the target population for the study. The study population comprises 1,316 federal establishment low-income retirees who are currently beneficiaries of the defined contribution pension plan.

C. Sample Size and Sampling Technique

Due to the homogeneity and uniformity in the federal public service in terms of grade levels and salary structures, a simple random sampling technique was employed. In order to determine the sample size of the study, the Taro Yamane formula was used with a 90% confidence level as follows:

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

In addition to the 93 retirees, seven more respondents, comprising four pension managers, a consultant, a salary commission representative, and a pension union representative, were selected. The total sample size comprises 100 respondents.

D. Methods of Data Collection

The primary data consists of raw facts from the interview conducted. In contrast, the secondary data were obtained from readily compiled, accessible, and downloadable data to complement or confirm the data gathered through the primary source. The study drew on greater knowledge from the PRA and a series of publications from NSIWC [30][31] and PenCom, including annual reports, pension updates, quarterly reports, pension frequently asked questions (FAQs), and more. Other secondary sources used comprise a series of publications relevant to pension management and administration, including various textbooks, articles, journals, newspapers, forums, conferences, and seminars.

The qualitative data, which provides an in-depth investigation, was generated through interviews carried out via face-to-face meetings, Zoom applications, WhatsApp video calls, and telephone calls. The various means of interviews adopted enabled the respondents to be reached irrespective of their locations and also allowed for the elimination of confusion, misinformation, and ambiguity during analysis.

E. Methods of Data Analysis

The descriptive statistics used include tables, diagrams, charts, and simple percentages to illustrate how a variable is distributed within a particular subset of data within the entire set. Inferential statistics used in analysing the data include the pension annuity formula, fund accumulation formula, and Ordinary Least Squares (OLS) Model.

In actuarial work, the choice of an appropriate probability density function to be employed to analyse a particular set of data is a solemn task. To select the most suitable PDF for the data, EasyFit 5.6 Professional Software was utilised. 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.

a. Formula/Model Specification

Salary Growth Rate (g)

$$F_2 = S(I+g) + Sg(1+g)$$
$$= S(1+g)[1+g]$$
$$= S(1+g)^2$$

Following the above pattern, $F_3 = S(1+g)^3$.

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

$$= S(1+g)^n \quad (3.0)$$

Accumulated Value of Contributions (S_m)

The total contribution made into the retirement savings account is eighteen per cent (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 in Figure 2

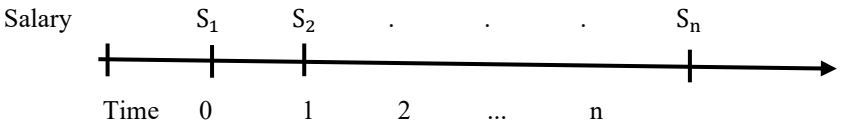

Figure 2: Salary Accumulation Series

$$s_{\overline{n}|} = (1+g)^{n-1} + (1+g)^{n-2} + (1+g)^{n-3} + \ldots + 1$$

Summing up the series;

$$= \frac{(1+g)^{n-1}[1-v^n]}{1-v}, \text{ where } v = \frac{1}{1+g}$$
$$= \frac{v(1+g)^n[1-v^n]}{1-v}, \text{ where } 1 - v = gv$$
$$= \frac{v(1+g)^n[1-v^n]}{gv}$$
$$s_{\overline{n}|} = S\,\frac{(1+g)^n - 1}{g} \quad (3.1)$$

Pension Annuity Payment

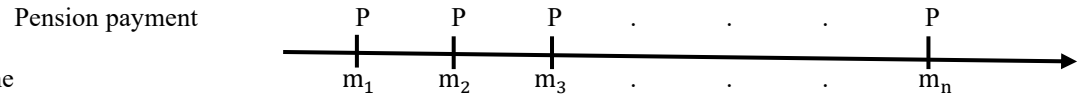

Figure 3: Pension Annuity Payments

The present value of the series of pension annuity payments consisting of n payments of P at the beginning of each of the following m^{th} periods is represented by P

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

Summing up;

$$P\ \ddot{a}_{\overline{n}|} = \frac{p(1-v^n)}{1-v} \quad (3.2)$$

Ordinary Least Squares (OLS)

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

$$\hat{Y} = a + ь X \quad (3.3)$$

$$ь = \frac{n\sum XY - \sum X \sum Y}{n\sum X^2 - (\sum X)^2} \quad (3.4)$$

$$a = \frac{\sum X^2 \sum Y - \sum X \sum XY}{n\sum X^2 - (\sum X)^2} \quad (3.5)$$

Test of the reliability of the model

Standard Error of the Estimate (**SE**)

$$\ddot{a}_{\overline{n}|}$$

$$S_e = \sqrt{\frac{\sum(Y-\hat{Y})^2}{n-2}} \quad (3.6)$$

a. Assumptions

i. Returns on investment on the pension contributions of retirees when in active service are ignored. This is due to the role of inflation and other adverse return effects on the future value of the invested contributions. It is assumed that the accumulated interest on invested contributions throughout the entire service years of the retirees will lose its value in the long run as a result of the effect of inflation and the time value of money over the years of contributions.

It is logical to assume that the interest on investment and other positive impacts offset the effects of inflation and other adverse investment effects, allowing the accumulated contributions to retain their exact monetary value, as contributed by the retirees.

ii. Retirees did not exceed Grade Level Five (GL 05) before retirement

iii. The retiree's final salary prior to retirement was not more than fifty thousand naira using a unified and consolidated public service salary structure.

iv. Retirees did not spend more than thirty-five (35) years in service, and sixty (60) years is the maximum age for retirement. No voluntary or early retirement is allowed before 20 years of service.

v. Annuity due is assumed for the pension payment, while annuity immediate applies to the accumulated value of the contribution. By annuity due, payment of pension commences immediately in the month of retirement. Applying the annuity immediate concept to the accumulation value of contributions shows consistency, indicating that the contribution was made at the end of the month, when employees received their monthly salary.

The interpretation of the results presented in the study is based on the analysis of the data collected, considering the relevant assumptions of the study.

V. DATA ANALYSIS AND INTERPRETATION

A. Presentation of Data

The secondary data contains various salary ranges received by pensioners, as well as a series of all contributions made while in active service, along with the total retirement benefits paid by various pension managers/operators. The primary data were collected through a field survey using various interview instruments to gather information from ninety-three retirees who retired in or after 2020, ensuring the collection of 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 to pension funds began in 2004, while the payment of retirement benefits started in 2008, encompassing the retirement benefits of those who retired as of June 25, 2007.

B. Analysis of Primary Data

a. 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 2 shows the result.

Table 2: 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**

Source: Researcher's Field Survey

Table 3: 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

Source: Easy Fit software analysis

Table 4: Grade level and last salary range (r) prior to retirement

Level	No	r (₦'000)	No
1	0	$31 < r < 34$	6
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 their primary and basic needs, such as food, clothing, and shelter, was estimated based on the various pension amounts received. According to Table 5, a larger percentage of retirees receive a monthly pension of between ten thousand naira and fifteen thousand naira.

Table 5: 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

Table 6: 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	93				
Statistic	0.07907				
P-Value	0.57848				
Rank	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	93				
Statistic	0.7586				
Rank	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					
Degrees of freedom	6				
Statistic	5.892				
P-Value	0.43539				
Rank	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: Easy Fit 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 6. Fitting in the parameters in the Johnson System Bounded PDF, an average pensioner interviewed receives ₦ 15,087.00 as a monthly pension. Only three retirees were able to make additional voluntary contributions while still in active service, and approximately 96.8% of the retirees have other means of support. 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.

b. Pension Manager/Consultant Interview

The investment instruments do not offer higher yields, but the safety of the fund is guaranteed. There is an investment limit on each allowable instrument in order to diversify all investment instruments available to the PFA. 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 verify compliance with regulations by scanning for potential infractions. Few other challenges faced in the CPS, as observed by different respondents, include technical competence, a need for more capacity building and institutional strengthening, threats to national cohesion, and the choice of management leadership based on regional or loyalty rewards rather than competence and qualification.

C. Analysis of Secondary Data

In considering the two options for pension benefit payments—life annuity and programmed withdrawal—an analysis was conducted on the historical retirement benefits, pension contributions, and the CONPSS salary structure of various federal establishments.

a. Programmed Withdrawal Option

Using EasyFit Software to analyse the CONPSS salary structure, the average monthly pension amount was derived. In order to find the best distribution fit, Table 7 displays sixty-one PDFs run by EasyFit Software using the Kolmogorov-Smirnov, Anderson-Darling, and Chi-Square.

Table 7A: 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	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	59	1538.6	59	2.42E+11	56
57	Triangular	0.04441	9	2.1661	33	1.6267	11
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 7 presents the different test statistics generated by each model under its respective probability density function (PDF), allowing for the selection of the best PDF for the analysis. Looking at the Weibull Distribution (3P) with the generated statistics from the models, the Kolmogorov-Smirnov test ranks 1st, the Anderson-Darling test ranks 2nd, and the Chi-Square test ranks fourth.

From Table 8, the Weibull Probability Distribution (with three parameters) is the best fit for analysing the 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 8: Weibull Distribution Goodness of Fit

Weibull (3P): α=1.5632 β=5981.4 γ=29834.0					
Kolmogorov-Smirnov					
Sample Size	75				
Statistic	0.03185				
P-Value	1				
Rank	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	75				
Statistic	0.08981				
Rank	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					
Degrees of freedom	6				
Statistic	0.63749				
P-Value	0.99574				
Rank	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: Easy Fit Software Analysis

b. Life Annuity Pension Option.

Using Equation (3.0) stated earlier, different salary growth rates based on the lengths of service are computed and displayed in Table 9.

Table 9: 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
Source: Researcher's Computation		**0.015**

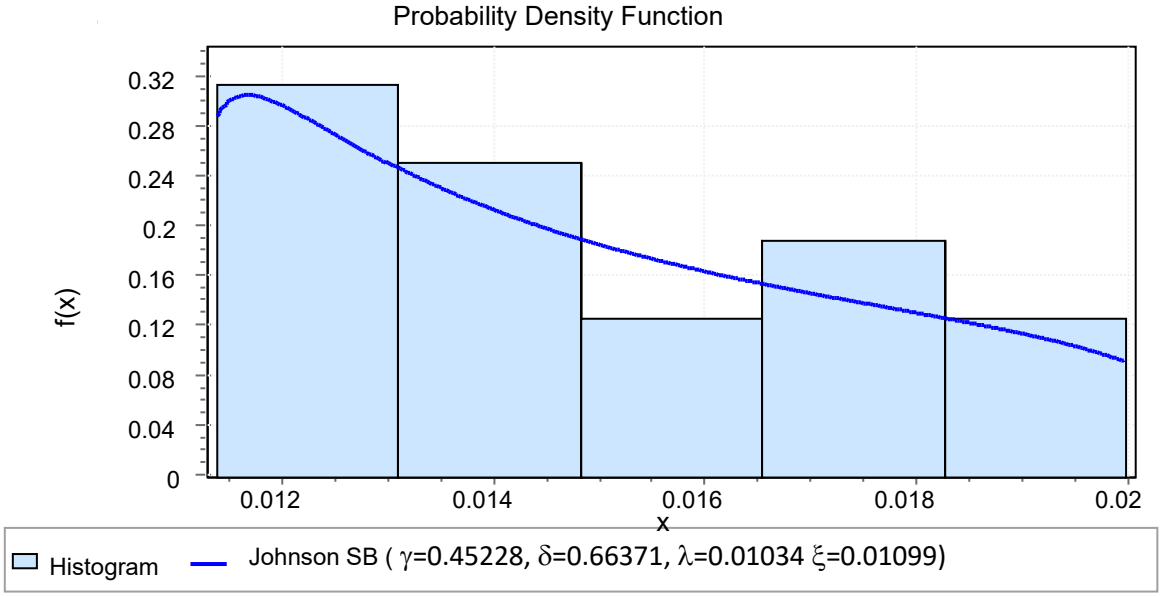

Figure 4: Probability Distribution of Salary Growth Rate

Source: Easy Fit Software Analysis

Figure 4 displays how the Johnson SB Probability Density Function distributes the salary growth rates in Table 9—the salary growth rates for different lengths of service range between 1.1% and 2%. Applying the parameters of the PDF to the mean value, the pooled salary growth rate is 0.015. Using the pooled salary growth rate, the accumulated value of eighteen per cent (18%) pension contributions can be derived using Equation (3.1).

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)

$$= 18\% \text{ of AAVS } = ₦\ 3\ 468\ 427.205$$

Using Equation (3.2) to compute average annual pension (P) when the average contributions of a retiree amounted to ₦ 3,468,427.205 p.a;

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

₦ 3 468 427.205 = 9.361P

P = $\frac{₦\,3\,468\,427.205}{9.361}$

= ₦ 370 537.9827

Monthly Pension = $\frac{₦\,370\,537.9827}{12}$

= ₦ 30,878.17

c. Guaranteed Minimum Pension (GMP)

The values in both pension benefit options (programmed withdrawal and annuity) differ. A larger pension value of ₦35,220.00 in programmed withdrawal than in annuity (₦30,878.17) explains why many retirees opt for programmed withdrawal instead of annuity. At the end, all values will be equal because the annuity fund is inexhaustible, while programmed withdrawal can be exhausted. For fairness, the minimum guaranteed pension should be a uniform amount irrespective of the benefit option adopted in order to maintain a balance between the two values to produce the GMP at no extra cost.

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

= $\frac{₦\,66\,098.17}{2}$

= **₦ 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 (LCH) (in Section 2.1.4 of the study) 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 channelled chiefly to the necessities of life, such as food, clothing, and shelter. For one thousand, three hundred and sixteen (1316) MDAs in Nigeria with at least one low-income retiree in each of the federal establishments, the total retirement benefit per annum is 12* ₦ 33,049.01 * 1316 = ₦ 521,909,965.90. For ten years, the value of the benefit is 10* ₦ 521 909 965.90 = ₦ 5 219 099 659

D. Funding

As indicated in Section 2.1.3 (Theory of Pension Funding and Policy), it is important to consider the funding or cost implications of GMP in order to continue to sustain the policy of GMP implementation. The Pension Funding Policy Theory combines the attributes of Deferred Wage (in Section 2.1.1) and the Expectancy Theories (in Section 2.1.2). Table 10 shows the analysis of total pension contributions and retirement benefits from the years 2004 to 2022 using equations (3.3) to (3.6).

Table 10: 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

From the table,

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

= $\frac{-1\,337\,766\,248}{28\,606\,849.55}$

= -46.76384393

= -46.76

$$b = \frac{19(1996837.476) - 8474.17(2948.58)}{19(5285179.302) - 8474.17^2} = \frac{12\,953\,143.87}{28\,606\,849.55} = 0.452798685 = 0.45$$

$\hat{Y} = -46.76 + 0.45X$ (First regression equation)

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

Applying the regression equation to compute the expected contributions.

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

$\hat{Y} = ₦5\,219\,099\,659$

$5.219099659 = -46.76 + 0.45X$

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

VI. DISCUSSION

The low-income retirees examined in this study retired at grade levels four and five, having served for 20 to 35 years (as shown in Tables 2, 3, and 4). The series of processes and multiple forms filled out by intending retirees during documentation have reduced the problems encountered by retirees in accessing their pension benefits. Additionally, the early notification of retirement by employers to pension operators and the regulatory authority has helped combat the issues of non-payment of benefits witnessed in the old system. Prospective retirees solve documentation problems before retirement due to the early start of the processing. The volume of contribution made to the RSA by low-income employees is determined by the amount of salary earned.

From Table 5, the low-income retirees' pension benefits cannot satisfy the necessities of life in terms of food, shelter, and clothing, as a result of the insufficient salaries (shown in Table 4) on which the pension contributions were based while they were 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 inadequacy of pension benefits has led many retirees to seek employment after retirement to maintain their financial stability. Life is difficult for this set of retirees, as their bodies are weak and they struggle with new job engagement. Compliance issues were once a greater problem among pension operators because the Pension Reform Act, enacted in 2004, was silent on the penalties to be imposed on erring operators. The PRA 2014, [43] has tried to amend some areas whose punishments were silent in the previous Act. Furthermore, any operator who misappropriates any pension fund will be dealt with accordingly.

The pension benefits received by low-income retirees of the federal public service in Nigeria are insufficient, despite the considerable years of service they have spent. It is therefore compulsory to implement a guaranteed minimum pension, which will help low-income retirees meet their basic needs for food, shelter, and clothing. This study has computed a GMP of ₦33,049.01 as the monthly pension for ten years, which will require pension funding or contributions of ₦115.5 billion. The funding only covers 1316 low-income retirees in the federal public service in Nigeria. The value can now be adjusted based on the number of retirees envisaged. The FGN is expected to make up for any shortfall in pension funds as a pension subsidy if pension contributors do not contribute up to that amount. One of the significant challenges of the pension system in Nigeria is corruption. Bureaucratic corruption is responsible for the government's inability to implement a welfare package for retired low-income workers, due to nepotism or favouritism in the choice of leadership, which is based on loyalty or party reward instead of competence. In Table 3, most retirees spent 20 years in active service, and Rewane (2023) found that most retirees die within 10 years after their normal retirement age of 60 years. In line with Rewane (2023) and the analysis shown in Table 3, the qualifying year of service for GMP is 20 years, and payment ceases after 10 years of subsidy payment. After this period, the retirees then revert to their original pension amount without subsidy. At this period, the appetite of retirees for some necessities of life (such as food, clothing, and housing) has reduced to the barest minimum. Retirees can now survive with less than the GMP.

A. Summary of Findings

Based on the analysis of data carried out in this study, Table 11 summarises the research findings.

Table 11: Summary of Findings

Contents	Findings
Pension or life market	Competitive. The competition channels the operators to behave rationally in managing and investing the pension funds.
The level of welfare or comfort of low-income retirees	The welfare package is insufficient and fails to meet the minimum standard of living for retirees.
Investment and safety of pension funds	Restriction mitigates efficient investment returns but ensure the safety of funds.
Actuarial principles.	Not fully applied by the pension operators in order to benefit all parties accordingly. The operators place their profit maximisation goal above the contributors' welfare.
Average amount of GMP	₦ 33,049.01 per month
Expected contribution/funding	₦ 115.5176524 billion for ten years
CPS challenges	Limited investible assets, benefit insufficiency, stringent regulation and its compliance, unreliable statistical data, undemocratic state of pension industry, incessant inflation, leadership/governance challenges, capacity building and institutional strengthening.

VII. CONCLUSION AND RECOMMENDATION

A. Conclusion

This study examined the sufficiency of pension benefits received by low-income retirees in the Nigerian federal public service. As observed in this study, the pension benefits received by retirees under the programmed withdrawal option are more than those of the life annuity option. The logical explanation for this is that a life annuity pension payment is for the entire lifetime of the retiree, while the programmed withdrawal option has an expiry time.

Aside from the lifetime pension provision of the annuity option, it is necessary to introduce another player not just to participate in the pension system but to serve as a watchdog for pension managers and administrators in the way pension funds are managed or accumulated, in order to curb the problem of benefit insufficiency. As Nigeria advances towards a dependable and comprehensive system of pension administration, this study contributes to the drive, providing a simulated evaluation of the efficient and effective sufficiency of current pension system benefits. The study analysis serves as a guide to identify areas of the current pension plan that can be improved to enhance the adequacy and sufficiency of retirement benefits. In order to adequately fund the minimum guarantee pension for low-income retirees and reduce the fiscal cost of the pension system, the government should review the excessively generous tax treatment of pension payments above a certain amount. The Pension Commission should also review commissions and curb the unnecessary hidden fees charged by the pension operators/managers in order to increase the accumulated contributions of retirees.

B. Recommendation

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

- In order to secure the future of the retirees, only life annuity option perfectively suits the purpose of providing pension payments for retirees
- In order to adequately address the plights, issues and challenges of pensioners in Nigeria, the government should create a separate ministry for pensions 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 a minimum of 20 years in active service for qualification, and the pension subsidy will last for 10 years after the normal retirement age of 60 years old or 35 years in service. The guaranteed minimum pension will not run more than one hundred and twenty months, which can also be deferred at the discretion of the retirees. The retirees revert to the actual pension benefit amount without subsidy after a ten-year post-retirement or deferred period.
- 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 to cater for not only the basic needs but also accumulate more pension funds for their retirement.

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