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# MACRO ECONOMIC FACTORS AND PENSION FUND SUSTAINABILITY IN NIGERIA: EVIDENCE FROM 2013-2020

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***Correspondence***: *fj.falope@unizik.edu.ng*
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**Samuel O. Ewuru[1] Femi J. Falope[2] Ugochukwu J. Nwoye[3]**

*[1]Research Scholar, [2&3]Lecturers*
*Department of Accountancy, Nnamdi Azikiwe University, Awka, Nigeria*
1. Email: os.ewuru_1@stu.unizik.edu.ng
2. Email: fj.falope@unizik.edu.ng
3. Email: uj.nwoye@unizik.edu.ng

**ABSTRACT:**

*Globally, the sustainability of pension funds is now a concern, from the fear of an inverted pyramid to soaring inflation and until recently, failures of Liability Driven Investments (LDI) an exotic financial instrument hitherto designed to withstand financial uncertainties. Nascent pension funds like the contributory pension scheme will need to rejig its strategies to avert a crisis. In this study, the ratio of Pension Liability to Pension Asset proxied as a measure of pension fund sustainability which is the dependent variable of the study, while Inflation rate was measured with Average rate of returns rate and ratio of Pension Assets to Gross Domestic Product. Using regression to test the data of ten years 2013 to 2022, the result indicates that the inflation rate and average returns rate had a strong and positive but non-significant effect on the sustainability of pension fund (p-values 0.303 and 0.081 > 0.05). This result is a pointer to the fact that the sustainability of the Pension Fund is tied to the performance of the economy and the growth of the pension assets. Managing fund performance by risk diversification is thus recommended for fund managers towards enhancing fund performance. Macroeconomic stabilization as the government should take steps to grow the economy because of the cascading effect on pension sustainability. Policymakers should endeavour to strengthen its supervisory and monitoring roles, prudential laws, and supportive legislation in other to ensure that ensure that pension funds are managed responsibly.*
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## 1. INTRODUCTION

Pension is the sum of money paid regularly to a person who no longer works because of age, or disablement or to his widow or dependent children by the state, by his former employer from funds to which he and his employees have both contributed (Olaniyi, 2001). There are different types of pension schemes, such as the Defined Benefit (DB) Pension Scheme and the Defined Contribution (DC) Pension Scheme. A Contributory Pension Scheme is a retirement savings plan where both

the employer and employee make contributions towards the employee's pension fund. This type of scheme is typically found in the public sector or large corporations. The contributions made by the employee are deducted from their salary regularly, usually monthly. The employer also makes contributions to the scheme on behalf of the employee, based on a certain percentage of the employee's salary. Such contributions are invested and accumulate over time, to provide a steady income for the employee after retirement. Another advantage is that these schemes often offer additional benefits, such as disability benefits or death benefits, which can provide additional financial protection for employees and their families.

A sizeable portion of the worldwide investment portfolio is made up of pension plans. The fact that they provide financial security after retirement, expand investment, banking, and insurance services, and foster the growth of capital markets all serve to highlight their significance and the development of global economies (Sharpe, Scott, & Watson, 2007; Yermo, 2008). Overall, Contributory Pension Schemes provide a way for employees to save for retirement and secure their financial future, with the added support and contributions from their employer. The United Nations 2015 embarked on 17 life-changing sustainable development goals aimed at ending extreme poverty among other targets by the year 2030. The first and second goals have to do with ending poverty and eliminating hunger. OECD has written a lot about old age poverty as a global trend that needs to be checked. Most countries that reforms embarked upon by nations towards changing their pension systems emphasized the accumulation phase while giving less attention to the decumulation phase. But James and Vittas (2000) have argued that for a successful new pension system, the decumulation phase must also be well organized and efficient. However, one of the principal tools needed to checkmate old age poverty among others is a sustainable retirement income from a robust Pension Fund. According to the World Bank (2019), a well-designed pension system should not only have the objective of reducing old-age poverty but also make for income smoothing throughout an individual's lifetime (World Bank, 2019). Pension fund sustainability refers to the ability of a pension fund to meet its financial obligations and provide retirement benefits to its members over the long term. It involves careful management of the fund's investments, contributions, and expenses to ensure that it remains financially viable and able to fulfil its commitments. According to the World Bank (2019) conceptual framework, a sustainable pension system refers to one that is financially sound and maintainable in a foreseeable period under reasonable assumptions.

Macroeconomic factors are significant financial, natural, or geopolitical events that have a broad impact on the regional or national economy, and a sizable population and are outside the direct

influence and control of the organisation. The GDP, unemployment rate, interest and inflation rates, the money supply, natural disasters like earthquakes, and the threat of domestic or international conflict are among the variables that are related to the status of the economy and governmental policies. Investors closely monitor the signs. The key macroeconomic variables that influence pension funds are interest and inflation rates, GDP, exchange rates, etc. By presently constructing on rights that will provide a guaranteed income to the employee or his dependents at retirement or death, pension systems are intended to offer employees security (Ngu, 2014). Accordingly, the main objective of the pension plan is to guarantee that pensioners' post-service lives are not compromised by a lack of funds (Yusuf, 2014). However, given the shortcomings and restrictions of the earlier pension changes, the government was forced to start over with new reforms, which resulted in the creation of Nigeria's Contributory Pensions Scheme in 2004. Several studies have been undertaken to evaluate the impact of macroeconomic factors on pension funds resulting in mixed and sometimes inconclusive findings (Akwimbi, 2020). Prior studies were mainly conducted before the reform (Nwagwu, 2014; Eme, Uche, & Uche, 2014; Omah, Anifowose, & Ogundina, 2013). The researcher plans to investigate how the macroeconomic factors affect the contributory pension scheme sustainability in the Nigerian economy. This study sought to assess the effect of average returns and inflation on pension fund sustainability in Nigeria using annual data spanning the period from 2013 to 2022.

### 1.1 Objectives of the Study

The main objective of the study is to evaluate the effect of macroeconomic factors on pension fund sustainability. The specific objectives of the study are as follows:

1. To ascertain the effect of the inflation rate on pension fund sustainability in Nigeria.
2. To investigate the effect of the average rate of return on pension fund sustainability in Nigeria.

### 1.2 Research Hypotheses

The following hypotheses were stated in null forms;

$Ho_1$: Inflation has no significant effect on the sustainability of pension funds in Nigeria.

$Ho_2$: The average rate of return has no significant effect on the sustainability of pension funds in Nigeria.

## 2. LITERATURE REVIEW

### 2.1 Conceptual review

#### 2.1.1 Pension Scheme

A pension scheme, also known as a retirement plan or pension plan, is a financial arrangement that provides income to individuals during their retirement years. It is designed to help people save money over their working lives so that they can have a secure and comfortable retirement. Pension schemes can be provided by employers to their employees as workplace pensions or can be set up individually as private pensions. They may offer tax advantages or employer contributions to encourage saving for retirement.

The main goals of pension and retirement policies are to: (i) provide adequate income in old age while ensuring (ii) financial sustainability and (iii) maximise employment (i.e. through incentives in support of stable formal work careers and longer working lives for women and men). The World Bank Pension primer has designed a combination of primary and secondary yardstick to access a good pension system that is well reformed to absolve current realities which favour the funded pension system over Pay As You Go. These criteria include: Adequacy, Predictability, Equitability, Affordability, Robustness and Sustainability (APEARS)

1. Adequacy: Here an adequate pension system is expected to provide enough benefits that are capable of averting old-age poverty to an acceptable level be it country-specific or absolute. This will entail capturing a great percentage of the aged population as well as providing them with a reliable source of income to support lifetime consumption needs. From the lens of this criteria one can state that the current system falls short of this standard considering the fact with a working population of about 60 million only 8.5million are registered under the scheme as of March 2020. This confirms the assessment of Abdulazeez (2015) that a large proportion of the population remains inadequately covered by the contributory system despite the seemingly laudable benefits of the contributory pension scheme Furthermore, the term enough benefit seems a mirage to even the few retirees covered by the contributory pension scheme because only a few of them has been privileged to witness monthly pension enhancement which was subject to the returns from their pension investment, but with inflation cruising at double-digit the increment of 5% average still cannot level the purchasing power erosion.
2. Predictability: A predictable pension scheme is meant to 1) provide retirement income that is specified in the law and is not subject to frequent policy and administration changes 2) protect the retiree from inflation, wage and interest adjustment before and after retirement and 3) defend the retiree from the longevity risk characterizing the defined contributory

pension scheme. The Pension Reform Act 2014 section 4 (1) provided for predictability of the amount of pension payable which is 8% of the workers' Basic salary, Housing and Transport allowance (BHT) while the employer brings counterpart funding of 10% of the same BHT. However, in an inflationary environment like ours, pension funds need to be effectively managed for good returns for pensioners in the future (Ajibade, Jayeoba & Aghahowa, 2018) Also, subsequent regulations from the national pension commission provided that the target of the scheme pays a retiree 50% of his BHT as monthly pension upon retirement while between 20 to 49 per cent of the RSA balance with be paid as a lump sum. However, contributors with an RSA balance below N550,000 will be paid en bloc with no further monthly pension. On the second point apart from section 116 which insulated pension from garnishee proceedings there are not provisions to protect the contributor from inflation at all but the provisions of section 83. All income earned from the investment of pension funds under this Act shall be credited to the individual Retirement Savings Accounts of beneficiaries and section 10 which excludes pension earnings from taxes seems to address this to a great extent. Finally, sections 81 and 82 of PRA 2014 that provided for the Statutory Reserves Fund and Pension Protection Fund addressed longevity risk satisfactorily. While statutory reserve funds by PFAs take care of contributions whose funds could not last as agreed because of wrong computations or the outcome of a bad investment decision, Pension Protection will be used to implement the Minimum Guarantee Pension.

3. Equitability: An equitable pension scheme is expected to redistribute income from the rich to the poor and should not tax pension income. The contributory pension scheme is an individualized account system that specifies what you contribute and what you earn the only aspect that project equitability is the fact that all contributions received are unitized making it impossible for a contributor with a higher RSA balance to obtain a higher rate of return more than a lower contributor. Also, individual pension fund administrators exclude contributors with monthly pension remittances below N1,000 from the PenCom-approved monthly admin fee of N100 per monthly remittance thereby shifting the admin fee burden off them. Furthermore, the use of proceeds from the statutory reserve fund to take care of contributors with issues on the fund balance is still another form of income redistribution because the owners of well-funded RSAs will not take part in this arrangement. The 8/10 per cent structure that places a higher burden on the contribution is equal redistribution of income from the employer to the employee.
4. Affordability. The ease with which provision is made for pensions is referred to as affordable. The current system that takes only 8 per cent of the worker's basic salary,

housing and transport allowances to a great extent is affordable compared with the 10 per cent remitted by the employer. Before now the rate was 7.5/7.5 Employer/Employee. The overall effect of the increase in the contribution rate and the widening of the base of emoluments in the 2014 Pension Act as it relates to affordability has not been tested within the framework of the economic reality in Nigeria (Sogunro, Ayorinde, & Adeleke, 2019). Making pension deductions a tax-allowable expense further makes the affordability apparent in section 10 notwithstanding the provisions of any other law, contributions to the Scheme under this Act shall form part of tax-deductible expenses in the computation of tax payable by an employer or employee under the relevant income Tax Law.

5. Robustness: The robustness of a pension scheme is a function of its ability to incorporate a shock-absorbing mechanism in the framework. These shock-absorbing measures should be able to address volatility arising from changes in the Political, Economic and Demographic scenes. The current pension style in Nigeria did not incorporate into her pension architecture mechanism to address these issues directly. Oduwole (2015) investigated the returns rate of 10 pension fund administrators between 2007 and 2014 his findings show that despite growing in nominal terms the pension fund value declined in real terms because the earnings percentage was below the inflation rate. However, a discerning contributor who knows the inflation growth rate can determine the number of additional contributions he can make and commence so via voluntary contributions since there are no treasury-adjusted income products available to insulate them from the vagaries of inflation that are not in any way abating. The periodic monthly pension enhancement is equally an element of robustness even though the application is not general. The available Statutory Reserves by PFAs from where contributors that suffer losses attributable to PFA error are paid while the payment of compensation to eligible pensioners for shortfall or financial losses arising from investment activities is from the Pension Protection fund held by the commission.
6. Sustainability: Given a reasonable number of assumptions a pension system be able to maintain sound financial key-satisfying indicators that will project the ability to meet pension payment obligations over a specific period. When this is achievable then the system could be called a sustainable one. Note that the unsustainability of the previous Pay As You Go system practised in Nigeria which according to Nwanna and Ogbonna (2019) amounted to N1.787 trillion unpaid pension liabilities as of 1999 was what prompted the adoption of the Defined Benefit Scheme the Chilean model Sogunro et al (2019) posits that while various developed countries designed indicators used to measure the sustainability

of pension, no single Nigeria took no clear measure to assess the adequacy of retirement benefit.

Nigeria's pension system was based on the British pension system and was established in 1951. This is mostly because Britain, Nigeria's colonial overlord, established the Pension Ordinance, which gave rise to the country's pension system. However, the project was primarily meant to assist British nationals who were stationed in Nigeria. The 2014 Pension Reforms Act (PRA) eliminated the 2004 pension legislation that had been designed to prevent a sharp decline in workers' financial capacity and standard of living upon the cessation of retirees' monthly income and benefits. PRA seeks to give retirees, both public and private, a decent income, which should increase their savings, investments, and consumption. The idea was to use financial investments to promote economic growth (FGN, 2014).

### 2.1.2 Sustainability of Pension Fund

Sustainability could be viewed from the perspective namely the ability to pay the retiree who agreed on a monthly pension for the rest of his life which is what the Insurance companies offer as an annuity which guarantees payment of a fixed amount over the retiree's lifetime. Although the Programmed withdrawal model offered by Pension Fund administrators is meant to pay over an estimated life the interest element that goes back into the retiree account allows for extra income that increases the income replacement rate making it possible to pay beyond the estimated life span coupled with the availability Pension Protection fund as specified in section 82 of the pension reforms act. This allows the retiree whose fund experiences a shortfall to be compensated from the reserve. But the real sustainability will be the ability of the pension fund to pay the retiree monthly pension that is inflation adjusted so that the purchasing power of the income provided will be able to prevent old age poverty which is one major global aim of the modern pension fund. At the commencement of the contributory pension scheme in Nigeria only one pension fund existed, however in 2009 Retiree fund was carved out of the fund to handle the decumulation stage of the pension scheme given the peculiarity of the need for liquidity and lower risk investment options. The real test of sustainability can only be confirmed at the decumulation stage when retirees begin to draw from their contributions.

#### 2.1.2.1 Twenty-Five per cent

The pension reforms acts allow a contributor who temporarily lost his/her job to access 25 per cent of his Retirement Savings Account balance four months after losing his job so long as he is not up to 50 years of age. This window no doubt decreases the amount that will be available for this contributor upon formal retirement. Although contributions to this account are allowed once he gets another job this window can only accessed once in a lifetime.

Table 1: 25 Percent Pension Decumulation 2011 to 2020

| 25% DECUMULATION | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** |
|---|---|---|---|---|---|---|---|---|---|---|
| 25% Amount Billion | 1.82 | 3.46 | 5.47 | 8.07 | 14.61 | 15.66 | 20.68 | 20.86 | 19.06 | 20.3 |
| 25% Number | 11,883 | 18,772 | 24,135 | 24,145 | 52,172 | 44,025 | 57,416 | 52,414 | 37,674 | **38,254** |

Source; National Pension Commission

#### 2.1.2.2 Death Benefit Payout

Contributors who died before or after retirement will have their RSA balance paid to their named beneficiary in a valid will confirmed by the Probate Court or an executor named in a letter of administration issued by the Probate court.

Table 2: Death Benefit Payout Decumulation 2011 to 2020

| **DEATH BENEFIT PAYOUT** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** |
|---|---|---|---|---|---|---|---|---|---|---|
| Death Benefit AMT Billion | 7.93 | 24.16 | 25 | 8 | 7 | 16.94 | 27.67 | 28.68 | 27.22 | 31.09 |
| Death Benefit NO | 3,805 | 9,115 | 8,916 | 23,446 | 21,549 | 4,874 | 8,231 | 8,803 | 6,609 | 6,731 |

Source; National Pension Commission

#### 2.1.2.3 Annuity Payout

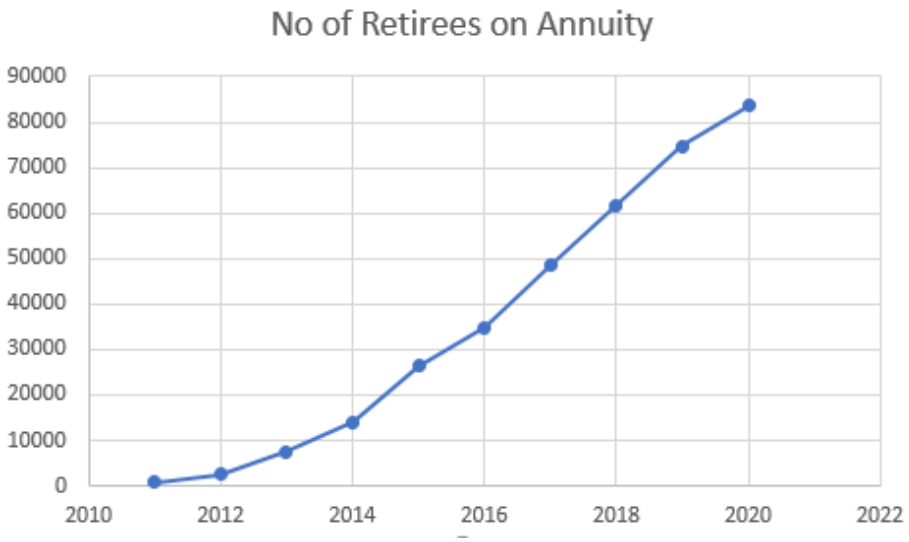
The Pension Act gives a retiree the option of either embracing programmed withdrawal or using the balance in his RSA account to pay for insurance annuity premiums and subsequently will be getting a fixed monthly pension for life. This has been a major decumulation point for pension retirement funds and the trend has been going high recently the PFAs are putting up a spirited fight to curtail the trajectory.

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Table 3: Annuity Payout Decumulation 2011 to 2020

| ANNUITY PAYOUT | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|
| No of Retirees on Annuity | 706 | 2,434 | 7,499 | 14,062 | 26,333 | 34,876 | 48,539 | 61,652 | 74,805 | 83,568 |
| Annuity Premium Billions | 3.06 | 12.09 | 24.75 | 32.62 | 60.14 | 40.97 | 71.05 | 87.23 | 78.43 | 57.22 |

Source; National Pension Commission




**2.1.2.4 En bloc Payment**

Retirees whose Retirement Savings Account balances are insufficient to fund 50 per cent of their last emoluments (i.e. Basic, Housing and Transport) are approved for en bloc payment of RSA balances. The implication is that they will get a one-off payment and thereafter there will be no monthly receipt of pension.

Table 4: En Bloc Decumulation 2011 to 2020

| En Bloc Payout | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|
| En bloc number | 9,387 | 11,496 | 15,252 | 12,328 | 14,250 | 13,172 | 10,511 | 7,778 |
| En bloc Amount billions | 2.5 | 2.85 | 4.15 | 3.33 | 3.83 | 3.73 | 2.35 | 2.35 |

**2.1.3 Sustainability Strategies**

The fear of old age poverty is one of the major reasons pension funds crave sustainability. Under the contributory pension scheme contributors with an RSA balance less than N555, 000 are paid en bloc because the accumulated fund over their work period is not adequate to sustain a reasonable monthly pension. But in a recent secular PenCom introduced programmed withdrawal en bloc which requires that contributors with an RSA balance of more than N550, 000 but got a monthly pension of less than one-third of the current minimum wage (N30, 000). "Where the RSA balance cannot provide 50% of the retiree's Annual Total Emolument as monthly/quarterly

pension, such retiree shall be entitled to a concessionary Regulatory Lumpsum of 25% of the RSA balance. Also, where the RSA balance cannot provide a monthly/quarterly pension or annuity of at least one-third of the prevailing minimum wage, the retiree shall be allowed to take the entire balance in the RSA en bloc" (PenCom 2022).

#### 2.1.3.1 Programmed Withdrawal

At the point of retirement contributors with sufficient balance in their account are placed on monthly income to be paid over their expected life span and beyond. They are paid beyond life span because returns on their RSA balance invested are added back into their RSA and as a result of this, some contributors have their monthly income enhanced periodically.

#### 2.1.3.2 Life Insurance Annuity

An annuity was defined in section 120 of the PRA 2014 as a right to receive periodic payments usually fixed in size for life or a term of years. Retirees with a balance big enough to purchase a life annuity will pay a one-off premium to the life insurance company to enable get monthly pension payments from a chosen life annuity provider. The contract is usually for life and therefore sustainable for a lifetime. However, because the amount is fixed inflation will make it impossible for that amount to meet the purchasing needs of the retiree over time as he will not be entitled to any possible enhancement like those on programmed withdrawal.

#### 2.1.3.3 Statutory Reserve Fund

Section 81 of the PRA requires each pension fund administrator to set aside 12.5 of their annual net profits to reserve that will serve as a contingency fund from where certain claims including sustainability payments are settled. The commission has since asked PFAs to pay some of their customers who have exhausted their RSA balance either because of wrong calculation by the PFA at the point of retirement or payment of huge arrears which reduced the investible capital at the beginning.

#### 2.1.3.4 Pension Protection Fund

The Pension protection fund is equally an act of the law (Pension Reforms Act 2014) in section 82 the fund consists of contributions from Pension Fund Administrators, Pension Fund Custodians, the National Pension Commission and interest earned from investing in the fund. Proceeds from this fund will be used for;

1. the funding of the minimum guaranteed pension according to section 8**4** of this Act;

2. the payment of compensation to eligible pensioners for shortfall or financial losses arising from investment activities; and
3. any other purpose deserving protection with the Pension Protection Fund as the Commission may, from time to time, determine the essence of this fund to sustain payments to contributors who may outlive their estimated life span or suffer depleted RSA balance because of one adverse outcome or the other.

#### 2.1.3.5 Periodic Inflation Adjusted Pension

The Government Employees Pension Fund (GEPF) of South Africa announced that an annual pension increase of 5.5 per cent would be granted to its pensioners as of April 1. his pension increase was based on the 5.5 per cent inflation rate for the 12 months ending November 30, 2021, thus making the increase equal to 100 per cent of the Consumer Price Index (CPI) and higher than the 7 per cent of Consumer Price Index (CPI) provided in terms of GEP Law and Rules, This is part of activities aimed at sustaining the purchasing power of the monthly pension to keep away old age poverty.

Table 5: Ratios of Pension Assets to GDP across some Selected Countries

| s/n | Country | Ratio | s/n | Country | Ratio |
|---|---|---|---|---|---|
| 1 | Canada | 180 | 8 | Rwanda | 12.67 |
| 2 | USA | 170 | 9 | Malawi | 11.74 |
| 3 | UK | 124 | 10 | Uganda | 8.96 |
| 4 | Namibia | 100 | 11 | Nigeria | 7.98 |
| 5 | Chile | 76 | 12 | Ghana | 5.46 |
| 6 | Singapore | 42 | 13 | Zambia | 2.82 |
| 7 | Kenya | 13.3 | 14 | Egypt | 1.52 |

Source: World Bank (2019)

#### 2.1.3.6 Inflation and Sustainability of Pension Funds

Inflation can have a significant impact on pension funds. Firstly, inflation erodes the purchasing power of money over time. For pension funds, this poses a challenge as the value of the fund's assets may not keep up with the rising cost of living, potentially leading to a decrease in the real value of pensions paid out. Secondly, pension funds typically invest in a variety of assets such as stocks, bonds, and real estate. Inflation can affect the returns on these investments. For example, fixed-income investments like bonds may have lower real returns during periods of high inflation, reducing the overall growth of the pension fund. This can impact the ability of the fund to generate

sufficient returns to meet future pension obligations. Lastly, Many pension plans offer cost of living adjustments (COLAs) to help mitigate the impact of inflation on pension payments. These adjustments are meant to ensure that the purchasing power of pensions remains relatively stable over time. However, if the COLAs do not keep pace with the actual rate of inflation, pensioners may still experience a decline in their real income. In March 2022 the Government Employees Pension Fund of South Africa announced an increase in the monthly pension income of its retirees by 5.5 thus matching the inflation rate and consumer price index.

**2.1.3.7 Average Rate of Return and Sustainability of Pension Funds**

The average rate of return on a pension fund can have a substantial impact on its overall performance. The average rate of return directly affects how much the pension fund grows over time. A higher rate of return will lead to faster growth, potentially increasing the fund's value and the amount available for future pension payments. Secondly, the average rate of return plays a crucial role in determining whether a pension fund is adequately funded. If the fund consistently achieves a strong average rate of return, it may accumulate enough assets to meet its future liabilities without requiring additional contributions. On the other hand, a lower average rate of return might necessitate higher contributions from employers or employees to ensure sufficient funding. Lastly, The average rate of return can impact the ability of a pension fund to generate income to meet ongoing pension obligations. A higher rate of return means that the fund is generating more income, potentially allowing for higher pension payments to retirees. Conversely, a lower rate of return may limit the fund's ability to keep up with pension obligations or necessitate adjustments to payment levels.

**2.2 Theoretical Review**

The 1995 Deferred wage theory by Rebitzer and Taylor will be the basis for this research work, Deferred wage theory views pension as yesterday's salary saved today and to be collected tomorrow. The Contributory Pension Scheme allows both the employer and the employee to put funds aside within the duration of the contract of employment for the benefit of the employee later. In some companies' pension expenses are treated as part of wages and salaries expenses. The Pension Reforms Act 2014 exempts pension deductions from taxes which makes it possible for employees to save more for their retirement under voluntary contribution from which only 50 per cent of the amount saved could be accessed every two years while the rest will be part of retirement fund to be drawn from upon retirement.

### 2.3 Empirical Review

Baridoo and Micah's (2019) evaluation of the relationship between contributory pension funds and economic growth in Nigeria between 2014 and 2016 finds a negative and insignificant correlation between private pension contribution and GDP and per capita income.

Eke and Onafaleyo (2018) investigated the relationships between investments in housing infrastructure, the safety-equity factor, and the management of Nigeria's public pension funds. The study employed an ex post facto research methodology and utilised secondary data sourced from legislative acts, gazettes, and the National Bureau of Statistics. The results of this study showed that public pension funds have substantial relationships with the safety of funds and equity return variables, among other essential requirements needed to grow and maintain public pension contracts.

Ameh et al. (2017) assessed the impact of pension fund schemes on the economic growth of Nigeria and discovered that the assets of pension funds, or pension contributions and savings, had a positive but insignificant impact on economic development.

## 3. MATERIAL AND METHOD

The study adopted the correlational research design. The study utilized time series data from PenCom and NBS from 2013 to 2022. The variables were measured as: sustainability is the ratio of liabilities to assets. According to the European Commission (2017), sustainability relates to the fiscal and financial balance between revenues and liabilities in pension schemes. The inflation rate is measured using CPI; the average returns rate is as shown in the reports and the ratio of pension assets to GDP.

The regression equation:

$SUS = \square + \beta ARR + \beta INF + \beta PGDP + \varepsilon$

Where:

SUS - Sustainability (Liability/Assets)

ARR - Average Rate of Returns

INF - Inflation

PGDP - Pension Asset/GDP

## 4. RESULT AND DISCUSSIONS

### 4.1 Data Analysis

#### 4.1.1 Descriptive Statistics

Table 6: Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Sustainability (Liability/Assets) | 10 | .33 | .52 | .4487 | .05291 |
| Average Rate of Returns | 10 | 11.60 | 15.39 | 13.5463 | 1.13481 |
| Inflation | 10 | 8.10 | 16.50 | 12.1225 | 3.06832 |
| Pension Asset/GDP | 10 | 5.07 | 8.08 | 6.2613 | .90754 |
| Valid N (listwise) | 10 | | | | |

Source: SPSS Ver. 25

The minimum value of SUS was .33 and the maximum value was .52; the average value was .4487 and the standard deviation was .05291. The minimum value of ARR was 11.60 and the maximum value was 15.39; the average value was 13.5463 and the standard deviation was 1.13481. The minimum value of INF was 8.10 and the maximum value was 16.50; the average value was 12.1225 and the standard deviation was 3.06832. The minimum value of PGDP was 5.07 and the maximum value was 8.08; the average value was 6.2613 and the standard deviation was .90754.

#### 4.1.2 Correlation Matrix

Table 7: Correlations

| | | Sustainability (Liability/Assets) | Average Rate of Returns | Inflation | Pension Asset/GDP |
|---|---|---|---|---|---|
| Sustainability (Liability/Assets) | Pearson Correlation | 1 | -.346 | -.266 | -.745* |
| | Sig. (2-tailed) | | .327 | .457 | .013 |
| | N | 10 | 10 | 10 | 10 |
| Average Rate of Returns | Pearson Correlation | -.346 | 1 | .728* | .824** |
| | Sig. (2-tailed) | .327 | | .017 | .003 |
| | N | 10 | 10 | 10 | 10 |
| Inflation | Pearson Correlation | -.266 | .728* | 1 | .701* |
| | Sig. (2-tailed) | .457 | .017 | | .024 |
| | N | 10 | 10 | 10 | 10 |
| Pension Asset/GDP | Pearson Correlation | -.745* | .824** | .701* | 1 |
| | Sig. (2-tailed) | .013 | .003 | .024 | |
| | N | 10 | 10 | 10 | 10 |

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS Ver. 25

The SUS negatively correlated with ARR (-.346), INF (-.266), and (-.745). ARR is significantly and positively associated with INF (.728*) and PGDP (.824**). The INF is significantly and positively associated with PGDP (.701*).

### 4.2 Tests of Hypotheses

The following hypotheses were tested in this study:

$Ho_1$: Inflation has no significant effect on the sustainability of pension funds in Nigeria.

$Ho_2$: The average rate of return has no significant effect on the sustainability of pension funds in Nigeria.

Given below are the outcome of the regression analysis conducted:

Table 8: Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .904[a] | .817 | .725 | .02773 |

a. Predictors: (Constant), Pension Asset/GDP, Inflation, Average Rate of Returns

Source: SPSS Ver. 25

The model had an R-value of .904, the $R^2$ value was .817 and the adjusted $R^2$ value was .725 which means that 72.5% variation in our DV, i.e., SUS was accounted for by the model explanatory variables.

Table 9: ANOVA[a]

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | .021 | 3 | .007 | 8.919 | .012[b] |
| | Residual | .005 | 6 | .001 | | |
| | Total | .025 | 9 | | | |

a. Dependent Variable: Sustainability (Liability/Assets)

b. Predictors: (Constant), Pension Asset/GDP, Inflation, Average Rate of Returns

Source: SPSS Ver. 25

The model had an F-statistic value of 8.919 with a p-value of .012; since the p-value is less than .05 we conclude that the model is statistically significant at 5%.

Table 10: Coefficients[a]

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| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | .505 | .132 | | 3.825 | .009 |
| | Average Rate of Returns | .032 | .016 | .695 | 2.091 | .081 |
| | Inflation | .005 | .005 | .297 | 1.126 | .303 |
| | Pension Asset/GDP | -.089 | .019 | -1.526 | -4.776 | .003 |

a. Dependent Variable: Sustainability (Liability/Assets)

Source: SPSS Ver. 25

**4.2.1 Decision:** The t-statistic of INF was 1.126 with a p-value of .303 which is greater than 0.05; thus, null form of hypothesis one was accepted. This implies that inflation has a strong and positive but no significant effect on the sustainability of pension funds in Nigeria. Similarly, the t-statistic of ARR was 2.091 with a p-value of .081 which is also greater than 0.05. thus, null form of hypothesis two was accepted. This means that the average rate of return has no significant effect on the sustainability of pension funds in Nigeria. This result somewhat supports Baridoo and Micah (2019) that contributory pensions have a positive significant relationship with real GDP.

## CONCLUSION AND RECOMMENDATIONS

The study concludes that macroeconomic factors play a key role in the sustainability of pension funds. Quantitative and correlational research design using a linear regression model was used to assess the effect of the inflation rate and average rate of return on pension fund sustainability. The study findings show that these factors had a non-significant positive effect on pension fund sustainability.

i. Managing fund performance by risk diversification is hereby recommended towards enhancing fund performance. Risks that pension funds managers must carefully evaluate and manage should include interest rate variations and market volatility. Hencem deploying hedging and asset-liability matching effectively as two tactical strategy response could assist fund managers in reducing these risks and safeguard the fund's long-term viability.

ii. Macroeconomic stabilisation: As sustainability of pension funds is also influenced by the laws and regulations, it is important that Policymakers endeavour to strengthen its supervisory and monitoring role, prudential laws, and supportive legislation as a way of ensuring that pension funds are managed responsibly. In the end, preserving a pension fund's long-term viability necessitates striking a rational balance between contributions, investments, governance, risk management, and legal compliance. Strategies must be

routinely reviewed, monitored, and adjusted to accommodate shifting consumer preferences and market dynamics.

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