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CONTRIBUTORY PENSION SCHEME AND ECONOMIC GROWTH IN NIGERIA

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Abstract

The lingering and persistent challenges confronting the investments of pension fund assets stimulate the interest in investigating the impact of contributory pension schemes (CPS) on economic growth in Nigeria. Hence, this study examined the impact of the contributory pension scheme on the Nigerian economy. The data employed for the study were secondary and retrieved from the PenCom website, CBN website, and the World Development Indicator. Augmented Dickey-Fuller was employed as the estimation technique. Results showed that the four components of pension fund assets (Federal government of Nigeria Securities of the pension fund, Domestic ordinary share of pension fund, Local market money securities of the pension fund, and Real estate property of the pension fund) significantly influenced Nigeria's economic growth. The macroeconomic variables included in the model, inflation and interest rate, significantly influence economic growth, while the exchange rate was insignificant. Consequently, the study concluded that domestic ordinary shares, the federal government of Nigeria securities, local market money securities, and real estate property of the pension fund are major drivers of economic growth in Nigeria. Therefore, the study recommended that PenCom should continue to invest in federal government securities, considering the low risk associated with the investment. Similarly, Pension Fund Administrators should also continue to invest in domestic ordinary shares because, in the long run, the value of the shares would appreciate, and there would be a higher return on the investment.

Keyword: Contributory Pension Schemes, Pension Fund Assets, Economic Growth, ARDL, Nigeria.

Introduction

Economic growth has been a focal point in both empirical and theoretical studies. Elias and Obi (2015) further emphasized that one of the primary reasons for the significant focus on economic growth is its crucial role in ensuring a country's long-term stability and progress. Any nation aspiring for sustained growth must prioritise the development of its economy (Akinwumi *et al*., 2023). Economic growth, often represented by Gross Domestic Product (GDP), brings numerous advantages, such as improving the overall quality of life for the population through increased per capita national income, facilitating more equitable income distribution, and hastening the fulfillment of the needs of the greater percentage of the populace (Uwakaeme, 2015).

Like many developing nations, the Nigerian economy has experienced fluctuating growth patterns. As noted by Ekpo and Umoh (2004), between 1969 and 1997, Nigeria's economy demonstrated imbalanced growth, mainly attributed to fiscal mismanagement. Furthermore, the worldwide decrease in oil prices during the latter half of 2014 resulted in a decline in revenue (CBN, 2017). Given the diminishing value of crude oil, there is a pressing need for proactive measures to diversify the economy. It is imperative to shift focus away from oil as the primary economic pillar. The African Development Bank (AfDB) emphasized that the implementation of the Economic Recovery and Growth Plan (2017-2020) is crucial for Nigeria to reduce its reliance on crude oil (AfDB Report, 2018).

Adopting the Pension Reform Act (PRA) 2004, as amended by PRA 2014, has positively impacted the Nigerian government's economic growth, according to PenCom (2016). The Contributory Pension Scheme (hereafter, CPS) has promoted fiscal discipline within budgetary processes, established a strong foundation for economic progress, and fostered labour market flexibility, ensuring pensioners are no longer solely reliant on employers. Various potential mechanisms can elucidate the favourable correlation between the size of the contributory pension fund and economic growth. An increase in pension savings may indicate higher overall savings, making more funds available for investments. Additionally, pension funds possess long-term liabilities, enabling them to engage in enduring investments such as long-term equity stakes. Even in cases where these savings replace bank savings, it could still positively impact economic growth if banks predominantly focus on short-term gains (Micheal *et al.,* 2017). For example, by December 2017, the Nigerian government had borrowed a substantial amount of N5 trillion from pension funds to support the budget since the inception of the scheme in 2004 (Pencom, 2017). Furthermore, the contributory pension scheme's role in providing investment intervention funds has significantly expanded over the past decade, alleviating the strain on unsustainable Pay-As-You-Go (PAYG) benefits.

The CPS empowers employees to manage their Retirement Savings Account (RSA), granting them control over their retirement savings. This has led to the accumulation of RSAs by millions of workers, creating substantial long-term funds for potential investment in the economy (Hyeladi *et al*., 2023). The economies of scale related to pension assets allow for an indirect

contribution to financial development. The nature of pension assets facilitates reduced transaction costs, risk diversification, and enhanced information processing capabilities. (Hyeladi, *et al*., 2023; Pencom, 2017).

As a result, Pension Fund Administrators (PFAs) are authorized to invest these substantial funds in various categories of pension fund assets according to prescribed guidelines. This allows them to generate profits while simultaneously contributing to the economy. Therefore, this research delves into the practical implications of the CPS on the Nigerian economy. Besides the obstacles encountered by PFAs, Nigeria's economy is currently grappling with the repercussions of decreasing crude oil prices in the global market, leading to a surge in inflation, a drop in GDP, and a rise in unemployment rates (CBN, 2021). Consequently, there is a need to explore whether the difficulties faced by the CPS can be linked to the economic situation. Hence, this study examines the contributory pension scheme's influence on Nigeria's economic growth concerning pension fund assets.

The importance of CPS in driving a country's economic progress is crucial because the implementation of CPS can serve as a tool to achieve the goal of increasing savings, strengthening financial markets, and improving capital market development, ultimately promoting economic growth (Akinwumi *et al*., 2023; Hyeladi *et al*., 2023; Asekunowo, 2009). Additionally, pension funds can significantly contribute to economic growth through improved corporate governance and capital management practices. This underscores why CPS has recently garnered attention from government entities, stakeholders, academics, the National Pension Commission, and fund managers.

Prior evidence (Dibal *et al*., 2023; Michiel *et al.,* 2017; Meng & Pfau, 2010), have examined various factors that could impact pension fund assets, such as capital allocation, market efficiency, labour force growth, inflation, interest rates, risk management, investment suitability, institutional and pension fund ownership, and industry size. However, there is limited research on these aspects in Nigeria. Even the few empirical studies on the influence of pension funds on economic growth in Nigeria (Akinwumi *et al*., 2023; Adeoye, 2015; Nwanne, 2015; Farayibi, 2015) overlooked key variables like interest rates, exchange rates, federal government securities, domestic ordinary shares, local money market securities, real estate property, and inflation, despite established findings in prior studies (Michiel *et al*., 2017) indicating their potential impact on pension funds and economic growth.

Literature Review

This research was based on the Solow Growth Model introduced by Solow (1956). According to the model, technology and population growth are crucial factors affecting economic outputs in addition to capital and labour, which are compensated based on their marginal physical products. The Solow growth model states that physical capital accumulation contributes to short-term economic growth. Conversely, the long-term growth is propelled by technological progress, which is typically treated as an external factor in models, overlooking the explicit influence of knowledge and its dissemination effects. The model assumes that the saving rate, population growth, and technological progress are external factors. It incorporates capital

accumulation through savings as the capital stock per effective unit of labour k = (K - *AL*) determines output per effective unit of labour y = (Y - *AL*).

The Solow growth model emphasizes the importance of saving, population growth, and technological progress, which are also crucial for pension fund assets. Population growth within the pension fund scheme represents the workforce participating. Technological progress, as defined by Mankiw *et al*. (1999), pertains to advancements in knowledge. This model is consistent with this study as pension fund administrators who oversee pension funds require extensive knowledge of investment strategies, management abilities, risk management, and a skilled workforce with relevant investment expertise to navigate the dynamic business environment effectively (Mankiw *et al.,* 1999).

Empirical Review

Odia and Okoye (2012) conducted an analysis of the old pension scheme and the Pension Reform Act of 2004. Employing a comparative analysis method, the study examined and contrasted the pension system before and after the enactment of the Pension Reform Act 2004. Results indicate that the Pension Reform Act 2004 surpasses the pre-2004 pension scheme, and it is anticipated to address the shortcomings and insufficiencies inherent in the previous system

Gunu and Tsado (2012) explored the contributory pension system's role in fostering economic growth in Nigeria. Utilizing percentages, and charts, the study analyzed the collected data. Their results indicated that the contributory pension scheme has started to positively impact the growth of the Nigerian capital market and overall economic development.

Edogbanya (2013) used analysis of variance to evaluate the influence of the contributory pension scheme on the economic development of Nigeria during the years 2007 to 2010. Findings indicated a positive correlation between risk prevalence and pension fund management, highlighting the significant positive impact of the contributory pension scheme on the country's GDP.

Nwanne (2015) explored the impact of contributory pension plan on Nigeria's economic development through ordinary least squares (OLS) regression. The findings revealed that pension deposits exerted a significant influence on economic development. However, pension funds were found to have adverse impact.

Adeoye (2015) evaluated the pension industry in Nigeria, assessing both its successes and challenges resulting from various reforms, focusing on the impact of the Pension Reform Act (PRA) 2004 on economic growth. Findings indicated that the PRA 2004 facilitated the industry's expansion. Furthermore, the study revealed a favourable correlation between economic growth and the Contributory Pension Scheme (CPS).

Fariyibi (2016) studied the effect of the funded pension system's operational performance on Nigeria's economic development. According to the report, Nigeria's public and private sectors have significantly expanded their pension fund contributions, creating a sizable investment pool for the capital and money markets. The study also suggested that contributory pensions would help Nigeria's economy expand if pension administrators and custodians exercised cautious risk management and vigilant portfolio control. Also, Erhijakpor (2020) established

that Nigeria's pension fund contributions from private and public sectors have significantly expanded, creating a sizable investment pool for the country's capital and money markets.

Okoye *et al*. (2022) examined the sustainability of the CPS in Nigeria. The studies' findings showed a strong relationship between the CPS expenditure and economic growth in Nigeria.

Abdullahi et al. (2022) employed correlation analysis to examine the influence of the contributory pension scheme on economic growth in Nigeria between 2016 and 2020. Their study discovered that pension fund assets and the mobilization of pension contributions during this period had a positive but statistically insignificant impact on economic growth. Also, Hyeladi *et al*. (2023), findings revealed that the CPS significantly impacts the GDP.

Akinwumi et al. (2023) examined how the contributory pension scheme affected economic growth and capital market development between 2005 and 2021, using the auto-regressive distribution lag (ARDL) model. Findings revealed that total pension fund asset exhibited significant impact on economic growth in both the short and long run. Also, total pension fund asset also displayed significance impact on capital market development in both short and long run.

Ukwu et al. (2023) delved into an investigation of the Contributory Pension Scheme, examining the causes and consequences of dissatisfaction among pensioners within the system. Their findings highlighted several issues, including the ongoing lack of timely remittance of contributions by both employees and employers, challenges faced by pensioners in accessing their benefits promptly, delays in the verification process, and the prevalence of corrupt practices leading to embezzlement.

Aliu, Abdul-Hamid, Suleiman, and Olanrewaju (2023) conducted a study to investigate the impact of transparency and compliance on the sustainability of the Nigerian contributory pension scheme, using partial least square structural equation modeling. The findings indicated that transparency has a significant positive effect on the sustainability of the contributory pension scheme in Nigeria, whereas compliance, although positive, did not demonstrate significant impact.

Several researchers (Abdullahi *et al*., 2022; Gunu & Tsado, 2012; Edogbanya, 2013; Adeoye, 2015; Nwanne, 2015; Farayibi, 2016) have conducted empirical studies regarding the influence of the CPS on the economic growth of Nigeria. The literature review generally suggests that the connection between the contributory pension scheme and economic growth remains a topic of debate within the academic community. While existing literature predominantly supports the idea of a link between pension assets and economic growth, Nigerian literature has limited or no information about how pension assets interact with factors such as exchange rates, interest rates, inflation, and economic growth. These macroeconomic variables, including exchange rates, interest rates, and inflation rates, are crucial determinants capable of altering the trajectory and development of a country's economic stability (Eme & Johnson, 2011). The Pension Act of 2014 expands the range of pension fund investment opportunities to include real estate, infrastructure, equities, and money market securities, previously influenced by market risks.

Methodology

Drawing an inference from the endogenous growth theories examined, this study utilized the Augmented Solow growth model developed by Mankiw *et al*. (1999). The initial model presented is expressed as follows:

$$In(\frac{Yt}{Lt}) = In\ A_0 + gt + \{(\alpha/1-\alpha)\ In(s)\} - \{(\alpha/1-\alpha)\ In(n+g+\delta)\} \quad \ldots\ldots\ldots (1)$$

Where: $(\frac{Yt}{Lt})$ = output per capital, A_0= prior level of tech and other considerations, gt= tech progress, g= rate of tech progress, s= savings rate, n= labour force growth.

$$\lambda = sy_t - (n+g+\delta)K_t = \{(\alpha/1-\alpha)\ In(s)\} - \{(\alpha/1-\alpha)\ In(n+g+\delta)\} \quad \ldots\ldots\ldots (2)$$

λ proxy capital formation

$$In(\frac{Yt}{Lt}) = InA_0 + gt + \lambda \quad \ldots\ldots\ldots (3)$$

Equation 3 was modified with the dependent variable becoming growth in GDP(ΔGDP). Vector A_0 was expanded to incorporate the new variables introduced for the study. The vector A_0 is expanded and stated as:

$$A_0 = FGNS, DOS, LMMS, REP, EXCHR, INF, INT \quad \ldots\ldots\ldots (4)$$

Substituting equation 4 into 3

$$In\Delta GDP = \beta_0 + \beta_1 lnFGNS + \beta_2 InDOS + \beta_3 InLMMS + \beta_4 InREP + \beta_5 EXCHR + \beta_6 INF + \beta_7 INT + \varepsilon \ldots (5)$$

Capital formation (λ) is dropped because of the unavailability of quarterly data.
The variables are defined as:
InΔGDP = log of GDP
lnFGHS = log of Federal Government securities of the pension fund
InDOS = Log of Domestic Ordinary Shares of the pension fund
InLMMS = Log of Local Market Money Securities of the pension fund
InREP = Log of Real Estate Property of the pension fund
EXCHR = Exchange rate
INF = Inflation rate
INT = Interest rate
This study employed the *ex post facto* research design, establishing a relationship between variables. *Ex-post facto* research design is research undertaken after the event has already occurred and the data are already in existence. This design suits the study because it probes existing facts and utilizes existing (secondary) data.
The study included a total of 29 Licensed Pension Operators, which comprised 18 Pension Fund Administrators (PFAs), 7 Closed Pension Fund Administrators (CPFAs), and 4 Pension Fund Custodians (PFCs). The list of all licensed operators registered with the Pension Commission (PenCom) of Nigeria as of December 31, 2019. All the registered, licensed operators were considered for the study since the study got the data from the PenCom office.

Secondary data were employed for the study, with data retrieved from the PenCom website and CBN Statistical Bulletin. The study covers quarterly data for 13 years (2007Q1 to 2019Q4).

Table 1
Description of Variables for the Study

Variable Notation	Definition	Unit of Measurement	Source	*A Priori* expectations
MAIN VARIABLES				
Δ**GDP**	Growth in Gross Domestic Product	Change in the Gross Domestic Product	CBN Statistical Bulletin, 2019	
FGHS	Federal Government of Nigeria securities of the pension fund	Proportion of pension fund asset that goes to the Federal Government of Nigeria securities	Pencom website	+
DOS	Domestic Ordinary Shares of the pension fund	The proportion of pension fund assets that goes toDomestic Ordinary Shares of the pension fund	Pencom website	+
LMMS	Local Market Money Securities of the pension fund	Proportion of pension fund asset that goes to local Market Money Securities of the pension fund	Pencom website	+
REP	Real Estate Property of the pension fund	The proportion of pension fund assets that goes to real Estate Property of the pension fund	Pencom website	_
CONTROL VARIABLES				
EXCHR	Exchange rate	The ratio of Naira to dollar	CBN Statistical Bulletin, 2023	+
INF	Inflation rate	Percent of rise in average price level	CBN Statistical Bulletin, 2023	_
INT	Interest rate	The interest rate charged on loanable fund	CBN Statistical Bulletin, 2023	+

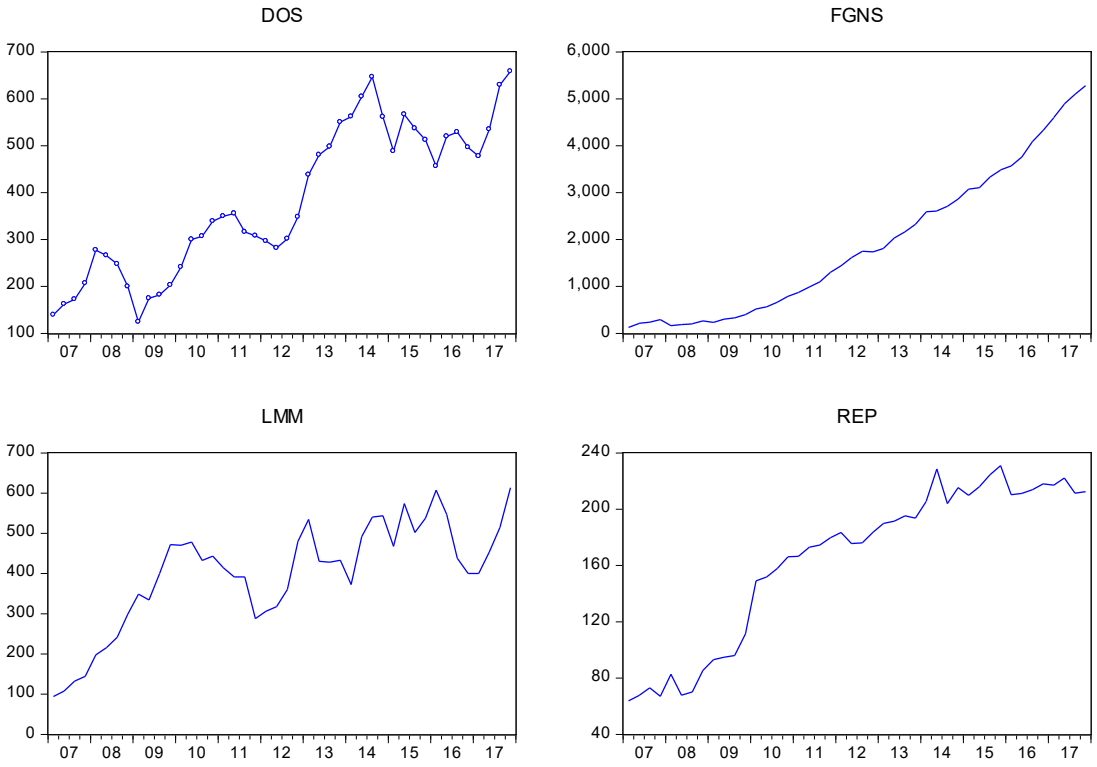
Source: Authors' compilation (2024)

All the explanatory variables except interest rate are expected to correlate with GDP directly. Keynes emphasises that interest rate and output move in opposite directions as a rise in interest rate negatively affects investment, and investment affects output. Purchasing power parity theory established a negative relationship between exchange rate and output; a rise in exchange rate makes importing industrial capital goods more expensive, reflecting the domestic cost of production and prices.

The study employed both inferential and descriptive statistics to present the result of the data analysis. The descriptive statistics were presented in a graphical style. Stationarity and co-integration tests are imperative to determine the suitable estimation techniques (Pesaran *et al.,* 2004). Parameter evaluations were subjected to the Augmented Dickey-Fuller (ADF) Unit Root and ARDL tests. Augmented Dickey-Fuller unit root test shows that the variables combined the I(1) and I(0) series; thus, ARDL examines the long-run relationship between the dependent and explanatory variables. A residual diagnostic test was conducted using the Breusch-Godfrey, Breusch-Pagan-Godfrey, Jarque-Bera, and Ramsey tests to check for autocorrelation, heteroscedasticity, normality, and specification tests.

Data Analyses and Interpretation of Results

Figure 1: Trend Analysis



Within the year under review, Figure 1 depicts the trend of the four components of pension fund assets: Federal Government of Nigeria Securities (FGNS) of the pension fund, Domestic ordinary share (DOS) of the pension fund, Local Market Money Securities (LMMS) of the pension fund and Real Estate Property (REP) of the pension fund. Following the Pension Reform Act 2004, data on its activities started in 2007. Domestic ordinary shares of pension funds rose sharply in 2007 and began to decline at the end of the last quarter till the last quarter of 2008. It then rose sharply at an increasing rate from the first quarter of 2009 till the second quarter of 2011 and then declined by 15% by the second quarter of 2012. By the third quarter of 2012, it began to rise and hit its highest point by the second quarter of 2014. It fluctuates from the third quarter of 2014 to the fourth quarter of 2017.

The Federal Government of Nigeria Security rose from the first quarter of 2007 to the fourth quarter of 2017. It shows that investment in FGNS was steady; this led credence to why it was the second most significant component. The Local Money Market rose in 2007 till the fourth quarter of 2009 and fell by 40% by the fourth quarter of 2011. From 2012 to 2016, it fluctuated and rose again in the last quarter of 2017. The Real Estate Property rose from the first quarter of 2007 at an increasing rate in the third quarter of 2014. It then rose at a decreasing rate till 2017.

Pre-estimation Test

Unit Root Test

Applying Ordinary Least Square (OLS) directly to non-stationary data may result in misleading regression outcomes (Engle & Granger, 1987). Therefore, the variables underwent a unit root test in this study utilizing the Augmented Dickey-Fuller test (see Table 2). Following the first difference, all series exhibited stationarity except for gross capital formation; the variables comprise an I(0) and I(1) series at a significance level of 5%.

Table 2:

Augmented Dickey-Fuller Unit Root Test

Variables	T-Stat	Crit. Val. @ 5% level	P-value	Order of Integration
ΔGDP	-0.014136	-2.951125	0.9535	Not stationary
D(ΔGDP)	-3.013921	-2.951125	0.0436	I(1)
DOS	-0.729208	-2.931404	0.8543	Not stationary
D(DOS)	-5.130721	-2.933158	0.0001	I(1)
FGNS	-1.798167	-2.931404	0.8411	Not stationary
D(FGNS)	-3.679995	-2.933158	0.0080	I(1)
LMM	-2.022467	-2.931404	0.2765	Not stationary
D(LMM)	-5.805715	-2.933158	0.0000	I(1)
REP	-1.697722	-2.931404	0.4252	Not stationary
D(REP)	-7.309148	2.933158	0.0000	I(1)
INF	-2.863849	-2.941145	0.0591	Not stationary
D(INF)	-3625073	-2.935001	0.0094	I(1)
EXCHR	-0.779449	-2.931404	0.9925	Not significant
D(EXCHR)	-5.157335	-2.933153	0.0001	I(1)
INT	-5.735892	-2.933153	0.0003	I(0)

Source: Authors' Computation (2024)

Table 2 output indicated that when combining I(1) and I(0) series, relying on the OLS to estimate parameters is inappropriate as it violates the conditions and may lead to spurious regression outcomes. Hence, it is essential to perform a co-integration test to determine a long-term relationship among the variables in the model. The Autoregressive Distributive Lag (ARDL) bound test is recommended as the most suitable co-integration test when dealing with variables of both I(1) and I(0) orders.

Co-integration Test (ARDL Bound Test)

The study examines the presence of a long-term connection among the variables in the model through F-stat using critical values of I(1) and I(0). Suppose the calculated F-statistic exceeds the upper bound critical value (I(1) bound value) at a significance level of 5%. Consequently, the null hypothesis of no long-term equilibrium relationship between manufacturing output and its explanatory factors is rejected, according to Pesaran *et al.* (2004). Conversely, if the F-stat is below the lower bound critical value (I(0) bound value), the null hypothesis cannot be rejected at a significance level of 5%. The test result is inconclusive if the F-statistic falls within the upper and lower bound critical values.

Table 3: ARDL Bound Test

ARDL Model (4, 3, 1, 3, 2, 1, 3, 3)

ARDL Bound Test

Sample: 2007Q1 2019Q4

Number of observations: 44

Null Hypothesis: No long-term interactions exist

T-Stat	Value	K
F-stat	**12.17242**	**6**

Critical Value Bound

Sig. Level	I(0) Bound	I(1) Bound
10%	2.12	3.23
5%	2.45	3.61
2.5%	2.75	3.99
1%	3.15	4.43

Source: Authors' Computation (2024)

The ARDL Bound Test results presented in Table 3 indicated that the null hypothesis is rejected, suggesting no long-term relationship at a 5% significance level is rejected due to the F-statistic value (12.17) exceeding the I(1) upper bound value (3.61). Consequently, it is inferred that a long-run relationship exists between economic growth and the explanatory variables formulated in the study. Given the establishment of a long-term relationship by the ARDL Bound Test, the research proceeded to estimate the short-term and long-term parameter coefficients of the ARDL model and the Error Correction Mechanism (ECM) for adjusting speeds in the long run.

Short-run and Long-run Analysis

Table 4

Short-run ARDL Model

DV: LOGGDP

Selected Model: ARDL (4, 3, 1, 3, 2, 1, 3, 3)

Sample: 2007Q1 2019Q4
Included observations: 42
Cointegrating Form

Variable	Coef.	Std. Error	t-stat	p-value
D(LOGGDP(-1))	0.4242	0.2149	1.9739	0.0719
D(LOGGDP(-2))	0.3831	0.1696	2.2595	0.0432
D(LOGGDP(-3))	0.8927	0.1122	7.9537	0.0000
D(LOGDOS)	0.0537	0.0425	1.2631	0.2305
D(LOGDOS(-1))	0.0646	0.0528	1.2230	0.2448
D(LOGDOS(-2))	0.2044	0.0609	3.3545	0.0057
D(LOGEXCHR)	0.1268	0.1081	1.1729	0.2636
D(LOGFGNS)	0.7086	0.1535	4.6147	0.0006
D(LOGFGNS(-1))	0.2362	0.0824	2.8649	0.0142
D(LOGFGNS(-2))	0.1357	0.0528	2.5679	0.0246
D(LOGLMM)	0.0376	0.0507	0.7417	0.4725
D(LOGLMM(-1))	0.0784	0.0559	1.4011	0.1865
D(LOGREP)	0.4044	0.1110	3.6426	0.0034
D(INF)	0.0016	0.0232	0.0671	0.9476
D(INF)	-0.0538	0.0458	-1.1753	0.2627
D(INF)	0.0519	0.0227	2.2856	0.0413
D(INT)	0.0084	0.0052	1.6310	0.1288
D(INT(-1))	-0.0185	0.0063	-2.9645	0.0118
D(INT(-2))	-0.0042	0.0047	-0.8932	0.3893
CointEq(-1)	-0.9214	0.2781	-3.3129	0.0062
Cointeq = LOGGDP - (0.3130*LOGDOS -0.0989*LOGEXCHR + 0.4036				
***LOGFGNS + 0.1520*LOGLMM -0.5503*LOGREP + 0.0297*INF -0.0333*INT + 7.6427)**				

R^2 = 0.896786
Adjusted R^2 = 0.877786
F-stat= 24.2754
Prob(F-stat)=0.00004

Source: Authors' Computation (2024)

Table 5
Long-run ARDL Model
Long Run Coefficients
Selected ARDL Model (4, 3, 1, 3, 2, 1, 3, 3)

Variable	Coefficient	Std. Error	T-stat	Prob.
LOGDOS	0.312956	0.115672	2.705555	0.0123
LOGEXCHR	-0.098903	0.165365	-0.598089	0.5554
LOGFGNS	0.403600	0.075233	5.364654	0.0000
LOGLMM	0.151971	0.060768	2.500832	0.0196
LOGREP	0.550250	0.188376	2.921029	0.0075

INF	0.029670	0.009325	3.181742	0.0040
INT	-0.033324	0.013418	-2.483605	0.0204
C	7.642654	0.863248	8.853373	0.0000

Source: Authors' Computation (2024)

Descriptive Statistics

The coefficient value of -0.921 (92%) for the lag error correction term CointEq (-1) in Table 4 indicates the expected negative sign, demonstrating the speed at which adjustments occur to bring back the long-term equilibrium in the dynamic model. This coefficient is significant at 1%, indicating that a rapid adjustment to long-term equilibrium is feasible in the presence of short-term dynamic deviations.

Due to its simpler definition compared to other criteria, the Schwarz criterion (SIC) was selected to determine the order of the distributed lag function in an ARDL model.

After evaluating two hundred models, the best model was chosen for this investigation. Similarly, this model (4, 3, 1, 3, 2, 1, 3, 3) is preferred to other competing ARDL models. With an Adjusted R-squared of 0.8792, the estimated model explains 87.9% of the variation in the ΔGDP, with the stochastic error factor accounting for 13% of the change. The fact that the Prob(F-stat) value of 0.000001 is less than a 5% significant level further supports the model's good fit. All the variables were significant and conform to expected signs except the exchange rate (EXCHR). The three and four-year lag of GDP positively influences the status at a 5% significant level. Domestic Ordinary Share of the pension fund (logDOS) was found to be insignificant in the short term but significant in the long term; a 1% rise in DOS as a per cent of the total pension fund produces a 31.3% increase in ΔGDP in the long run.

Pairwise Granger Causality Test

It is important to ascertain if economic growth causes growth in pension fund assets or if the flow comes from pension fund assets. On the other hand, to also ascertain if there is a bi-directional relationship, this will recommend a proper policy framework that will allow more links between economic growth and portfolio pension fund assets. Therefore, this study carried out a causality test among the variables. Table 6 depicts the Pairwise Granger Causality Test. It shows that neither growth in GDP causes EXCHR, LMM REP and INF, nor do they cause GDP growth. It means ΔGDP and these variables are autonomous during the preview periods. The causality test shows a uni-directional relationship between ΔGDP and domestic ordinary share of the pension fund (p-value= 0.0430), flowing from the former. The causality test shows that FGNS and INT have a bidirectional relationship with ΔGDP.

Table 6
Pairwise Granger Causality Test
Pairwise Granger Causality Tests
Sample: 2007 Q1 2019Q4
Lags: 2

Null Hypothesis:	**Obs**	**F-Stat**	**Prob.**
LOGDOS do not Granger Cause LOGGDP	44	1.87910	0.1670
LOGGDP do not Granger Cause LOGDOS		3.42929	0.0430

LOGFGNS do not Granger Cause LOGGDP	44	3.46099	0.0419
LOGGDP do not Granger Cause LOGFGNS		3.70487	0.0341
LOGEXCHR do not Granger Cause LOGGDP	44	1.46507	0.2442
LOGGDP do not Granger Cause LOGEXCHR		0.94061	0.3995
LOGLMM do not Granger Cause LOGGDP	44	0.05325	0.9482
LOGGDP do not Granger Cause LOGLMM		1.81535	0.1770
LOGREP do not Granger Cause LOGGDP	44	1.71681	0.1936
LOGGDP do not Granger Cause LOGREP		1.76374	0.1855
INF do not Granger Cause LOGGDP	44	0.04478	0.9563
LOGGDP do not Granger Cause INF		0.23350	0.7929
INT do not Granger Cause LOGGDP	44	4.15944	0.0235
LOGGDP do not Granger Cause INT		4.28103	0.0213
LOGFGNS do not Granger Cause LOGDOS	44	7.00726	0.0026
LOGDOS do not Granger Cause LOGFGNS		0.49523	0.6134
LOGEXCHR do not Granger Cause LOGDOS	44	1.95877	0.1554
LOGDOS do not Granger Cause LOGEXCHR		0.49750	0.6121
LOGLMM do not Granger Cause LOGDOS	44	0.46603	0.6311
LOGDOS do not Granger Cause LOGLMM		0.12976	0.8787
LOGREP do not Granger Cause LOGDOS	44	3.92934	0.0284
LOGDOS do not Granger Cause LOGREP		0.31721	0.7301
INF do not Granger Cause LOGDOS	44	2.37177	0.1074
LOGDOS do not Granger Cause INF		0.04967	0.9516
INT do not Granger Cause LOGDOS	44	2.30377	0.1140
LOGDOS do not Granger Cause INT		3.16485	0.0539
LOGEXCHR do not Granger Cause LOGFGNS	44	0.07295	0.9298
LOGFGNS do not Granger Cause LOGEXCHR		0.89596	0.4169
LOGLMM do not Granger Cause LOGFGNS	44	2.73489	0.0780
LOGFGNS do not Granger Cause LOGLMM		0.90084	0.4150
LOGREP do not Granger Cause LOGFGNS	44	3.61819	0.0367
LOGFGNS do not Granger Cause LOGREP		5.33886	0.0092
INF do not Granger Cause LOGFGNS	44	2.35542	0.1089
LOGFGNS do not Granger Cause INF		0.23182	0.7942

INT do not Granger Cause LOGFGNS	44	4.45681	0.0184
LOGFGNS do not Granger Cause INT		3.37876	0.0449
LOGLMM do not Granger Cause LOGEXCHR	44	2.32717	0.1117
LOGEXCHR do not Granger Cause LOGLMM		0.73441	0.4867
LOGREP do not Granger Cause LOGEXCHR	44	0.41779	0.6616
LOGEXCHR do not Granger Cause LOGREP		0.23848	0.7890
INF do not Granger Cause LOGEXCHR	44	1.06159	0.3562
LOGEXCHR do not Granger Cause INF		0.71941	0.4937
INT do not Granger Cause LOGEXCHR	44	1.58647	0.2183
LOGEXCHR do not Granger Cause INT		6.19060	0.0048
LOGREP do not Granger Cause LOGLMM	44	0.12582	0.8822
LOGLMM do not Granger Cause LOGREP		4.90692	0.0129
INF do not Granger Cause LOGLMM	44	0.47103	0.6281
LOGLMM do not Granger Cause INF		0.73694	0.4855
INT do not Granger Cause LOGLMM	44	0.84791	0.4365
LOGLMM do not Granger Cause INT		1.17317	0.3206
INF do not Granger Cause LOGREP	44	1.08409	0.3487
LOGREP do not Granger Cause INF		0.30627	0.7380
INT do not Granger Cause LOGREP	44	0.80752	0.4537
LOGREP do not Granger Cause INT		2.52133	0.0941
INT do not Granger Cause INF	44	0.36244	0.6984
INF do not Granger Cause INT	**44**	0.86399	0.4298

Source: Authors' Computation (2024).

Residual Diagnostic Test

Stability Test

The existence of co-integration does not necessarily imply that the model is void of misspecification. Thus, a misspecification test is necessary because an improperly specified model could yield misleading outcomes. Thus, used the Ramsey Reset Test to test the ARDL model's stability. Table 7 indicates that the model is not mis-specified because the probability value of the F-stat and T-stat is higher than 0.05.

Table 7

Ramsey RESET Test

Ramsey RESET Test

Omitted Variables: Squares of fitted values

	Value	Df	Prob.
T-stat	0.675770	23	0.5059
F-stat	0.456664	(1, 23)	0.5059
F-test summary			
	The sum of Sq.	Df	Mean Squares
Test SSR	0.001391	1	0.001391
Restricted SSR	0.071466	24	0.002978
Unrestricted SSR	0.070074	23	0.003047

Source: Authors' Computation (2024)

Testing for Serial Correlation

If the errors of the model are not serially independent due to the inclusion of lagged independent variables as regressors, the estimates may lack consistency. Maddala (2001) argued that the LM test is more effective than the correlogram Q-test in detecting serial correlation in autoregressive models. The hypothesis of the test is expressed as:

H_0 = Error terms are serially independent.

H_1 = Error terms are serially dependent.

The outcome presented in Table 8 indicates that H_0 cannot be disproved as the P-value of Obs*R^2 and F-stat exceeds the significance level of 0.05. This suggests that the model lacks first-order serial correlation.

Table 8

Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:			
F-stat	2.645648	Prob. F(2,22)	0.0934
Obs*R^2	8.143052	Prob. Chi-Squared (2)	0.0711

Source: Authors' Computation (2024)

Testing for Heteroskedasticity

Heteroskedasticity arises when the error term's variance in a model is inconsistent; instead, it changes with an independent variable. This inconsistency can skew standard error estimates, resulting in unreliable hypothesis testing. While various tests can identify heteroskedasticity in a model, White's test was chosen for this study due to its superior benefits.

H_0 There is homoscedasticity.

H_1= There is heteroskedasticity.

The result in Table 9 shows that all the criteria (F-statistic, Obs*R-squared and Scaled explained SS) agreed that the estimated model is not affected by heteroskedasticity as the P-value (0.8579, 0.7653 and 0.9993) is greater than 0.05 significant level.

Table 9

Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-stat	0.602062	Prob. F(17,24)	0.8579
Obs*R^2	12.55649	Prob. Chi-Square(17)	0.7653
Scaled explained SS	4.152245	Prob. Chi-Square(17)	0.9993

Source: Authors' Computation (2024)

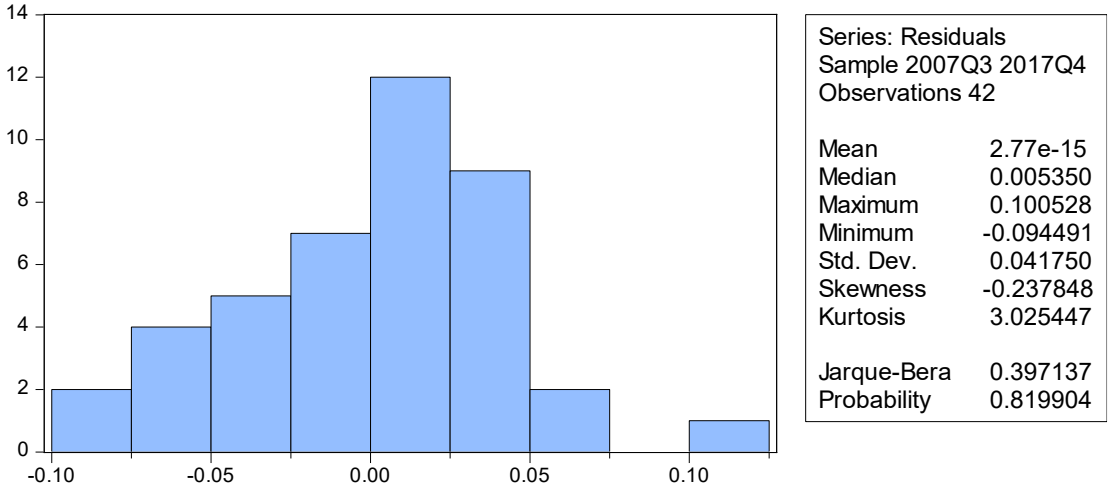
Normality Test

According to Brook (2014), co-integration does not necessarily imply stable error terms. As such, stability test is required because an unstable set of error terms will lead to unreliable results. Thus, the Jarque-Bera normalcy test was used to investigate the overall stability of the error term.

H_0 = Error terms are normally distributed.

H_1 = Error terms are not normally distributed

Figure 2: Jarque-Bera Test



Source: Authors' Computation (2024)

Figure 2 shows that the probability of the Jarque-Bera normality test is greater than 5%; therefore, the null hypothesis cannot be rejected. It shows that the error terms were normally distributed, meaning that the result from the model is unbiased and reliable.

Discussion of Findings

The graphical analysis shows that the four components of pension assets (federal government securities, domestic ordinary shares, local money market securities and real estate properties) had experienced fluctuations in their values within the year under review, except for federal government securities whose value had been on the rise. Also, the result shows that the exchange rate (EXCHR) was insignificant both in the short and long term. An exchange rate rise could make the importation of capital goods more expensive, which hikes production costs, consequently reducing output. The findings align with Edogbanya (2013), Ijeoma and Nwufo (2015).

Federal government of Nigeria Securities of the pension fund (logFGNS) significantly influence economic growth (ΔGDP) in the short and long run. The two-year lag of logFGNS significantly influences economic growth; a 1% increase in FGNS as an asset of pension scheme fund produces a 40.4% increase in economic growth. The finding also aligns with prior studies like Michiel *et al.* (2017).

Local Market Money Securities (logLMM) within the pension fund did not show significance in the short term but exhibited long-term significance. Specifically, a 1% rise in LMM as part of the pension fund's assets led to a 15.2% boost in economic growth. This outcome aligns with the conclusions drawn by Michiel *et al*. (2017).

The real estate properties held by the pension fund demonstrated significant but negative effects in the short term, possibly due to the time lag needed for property investments to generate returns. However, in the long term, their impact was significant, with a 1% increase in real estate properties leading to a 5.5% boost in economic growth. Notably, among all the pension fund assets, investment in real estate properties had the most substantial influence on economic growth following the 2004 reform. These results aligned with Adeoye's (2015) research findings.

The inflation rate (INF) exhibited positive and significant effects in the short and long term. The positive coefficients of D(INF) and INF indicate that changes in inflation, whether increasing or decreasing, occur faster or slower than changes in the gross domestic product. The results demonstrate that a 1% increase in the inflation rate is projected to boost GDP by 2.9%. This outcome aligns with the findings of Hyeladi *et al*. (2023), Abdullahi *et al*. (2022), Edogbanya (2013) and Adeoye (2015). In the long run, interest rates have a negative impact on economic growth; however, in contrast, a 1% decrease in the short term leads to a 3.3% increase in economic growth.

Conclusion and Policy Recommendations

The main goal of this study is to assess the role of CPS on the economic growth of Nigeria with emphasis on different pension asset investment portfolios. The study concluded that domestic ordinary shares, federal government securities, local money market securities, and real estate properties within the pension fund influenced Nigeria's economic growth in the past years, with real estate properties having the most substantial impact on GDP. The study inferred further that these four components (Federal government of Nigeria Securities of the pension fund, Domestic ordinary share of pension fund, Local market money securities of the pension fund, and Real estate property of the pension fund) of pension fund assets are major drivers of economic growth.

Recommendations

The study's findings led to the following suggestions.

i. The Pension Commission should continue to invest in federal government securities. The yield might be minimal, but the risk associated with the investment is also minimal because it is very liquid.
ii. Similarly, Pension Fund Administrators should continue to invest in domestic ordinary shares because the value of the shares could appreciate, and there would be a higher return on the investment.
iii. Investment in real estate properties should also be encouraged by the Pension Commission because it would help solve the nation's housing needs and generate revenue for pension fund administrators.

iv. Due to the interconnectedness of pension funds and economic growth, regulatory authorities must create a conducive environment for administrators to reinvest pension funds into the economy without facing significant losses from unfavourable business conditions. Recognizing the significant link between pension funds and economic progress, regulatory bodies must take necessary action.

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