How Does Pensions Affect Savings in Nigeria? Evidence from Quarterly Data

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Abstract

This study investigates the effect of pensions on savings in Nigeria using quarterly data over the 2004-2015 period. Employing the ARDL bounds testing technique, the empirical evidence reveal that there is cointegration between pensions and savings, along with internal conflicts, unemployment, real interest rate and income level. The results indicate that pensions has a negative and significant effect on savings in the short-run, while its effect on savings is positive and significant in the long-run. These findings suggest that the availability of pensions will displace savings in the short-run, while it provides an avenue for individuals to increase their retirement income in the long-run, leading to higher national savings. In addition, internal conflicts and unemployment have a negative and significant effect on savings in the short-run and the long-run. Based on these findings, this study recommends policies to promote pension contributions, including reducing internal conflicts and unemployment to raise savings in Nigeria in the long-run.

Keywords: savings; pensions; internal conflicts; Nigeria; ARDL.

JEL classification: E21; F51; H53; H55.

1. INTRODUCTION

Several studies have pointed out the importance of savings in economic development process (see Abu and Karim, 2016; Lucas, 1988; Romer, 1986; Solow, 1956). Unfortunately, Nigeria has failed to mobilize adequate savings needed to attain higher and sustained levels of economic development. The World Development Indicators (various years) reveal that Nigeria has lagged behind other developing countries such as Malaysia, South Africa, and Cape Verde, to mention just few, in terms of savings rates. This has wider implications that include inadequate domestic investment and unimpressive economic growth (Abu *et al.*, 2013, 2015).

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Nigeria's inability to raise adequate savings has been blamed on several factors including low income level and income growth, high inflation, low money supply, unattractive interest rate, low level of financial sector development and unfavourable terms of trade, among others (Abu and Wafure, 2009; Adelakun, 2011, 2015; Antai *et al.*, 2015; Bamidele *et al.*, 2015; Imoisi *et al.*, 2018; Mojekwu and Ogbulu, 2017; Olusoji, 2003; Otiwu *et al.*, 2018; Ozioma *et al.*, 2016; Uremadu, 2007; Nwachukwu and Egwaikhide, 2007; Nwachukwu and Odigie, 2011).

However, these studies rarely emphasized the role of pensions in savings mobilization in Nigeria. Moreover, almost all the existing studies on pension in Nigeria focused mainly on the problems, challenges and prospects of the pension industry (see Abdulazeez, 2015; Adeniji *et al.*, 2017; Aigbepue and Ojeifo, 2014; Akpan and Ukpong, 2014; Ibeme and Aniche, 2016; Uzoh and Anekwe, 2018). In fact, none of the studies examined the effect of pensions on savings, probably due to the lack of adequate information or data on pension contributions in Nigeria.

The evolution of pension schemes/plans and growth of pensions funds over the years have attracted researchers' interests to examine the relationship between pensions and savings. There are two main opposing views on the linkage between pensions and savings. The first group believed that an increase in retirement pensions reduces the incentives to save for old age (see Bailliu and Reisen, 1998; Feldstein, 1978; Munnell, 1976). However, the second group argued that rising pensions tends to promote savings because pension plans provide an avenue for individuals to increase their retirement income (see Cagan, 1965; Katona, 1965).

Given that the availability of pension schemes can lead to increases in retirement income (and savings), it can help to boost investment spending in an economy. Anderson (1990) had pointed out that pension funds have been used to meet both budgetary and political needs of countries. This suggests that pension funds can complement scarce resources and facilitate the attainment of developmental objectives. Thus, in the face of declining inflow of international capital, pension funds can be used to augment low domestic savings to drive Nigeria's economic growth and development.

In Nigeria, efforts have been made to promote the growth of pension funds and its administration over the years. This is to ensure that upon retirement, workers have ready source of income (a form of savings). Although pension contributions have grown from time to time, the industry has faced challenges ranging from inadequate funding, to mismanagement/embezzlement of funds to the detriment of the beneficiaries, lack of competent personnel who sometimes fail to compute precisely beneficiaries' pension accounts as well as keep up to date information on the beneficiaries. These have led to delay in payments of benefits to retirees, with some even dying on queue during verification or while travelling to the venue of verification exercise.

Besides, the delay or lack of payments of benefits to pensioners has resulted in huge liabilities of retirement benefits or payment arrears. Given the rising liabilities and financial constraints of the Nigerian state, it has become more difficult for the economy to mobilize funds for investment purpose. Despite the pension reforms of 2004 and 2014 aimed at improving the performance of the industry, some problems (i.e. delay in payment of benefits, low coverage and lack compliance) still linger. It is not surprising therefore that Nigeria is bedeviled by wave of crimes including kidnapping, insurgency, cattle rustling, and corruption, to mention just few.

Nigeria's pension contributions (PEN) in Naira value has increased steadily over the past twelve years. From N15.60 billion in 2004, the value of PEN (private plus public) rose to N180.09 billion in 2008, N505.57 billion in 2012, and N558.96 billion in 2015 (see Figure no. 1). The overall pension funds stood at N3.55 trillion in 2015 (NPC, 2016). On the other hand, aggregate or gross national savings (GDS) fluctuated during the same period. GDS increased from N1,239.30 billion in 2004 to N6,324.99 billion in 2008, N24,180.29 billion in 2012, before declining to N15,606.53 billion in 2015.
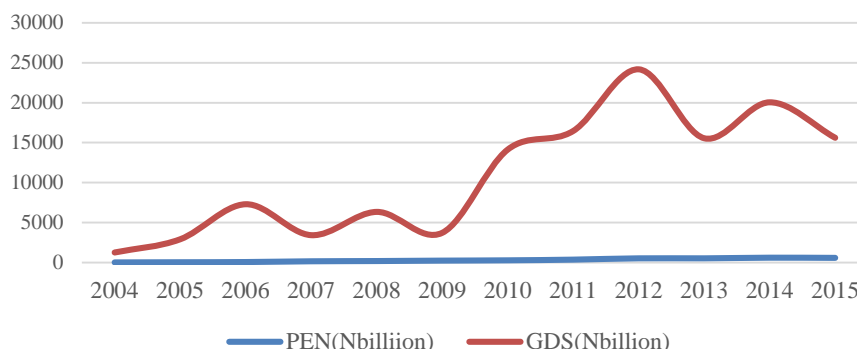

Figure no. 1 – Plots of aggregate pension contributions and gross national savings in Nigeria in billions of Naira

In terms of growth rate (%), both pension contributions and savings exhibited fluctuations between 2004 and 2015, increasing sometimes and decreasing at other periods. For instance, the growth of savings (GDSG) was 133.32% in 2005, -41.51% in 2009, 46.95% in 2012, and -22.16% in 2015. Similarly, the growth of pension contributions (PENG) was 122.31% in 2005, 26.78% in 2009, 45.09% in 2012, and -3.91% in 2015 (see Figure no. 2).
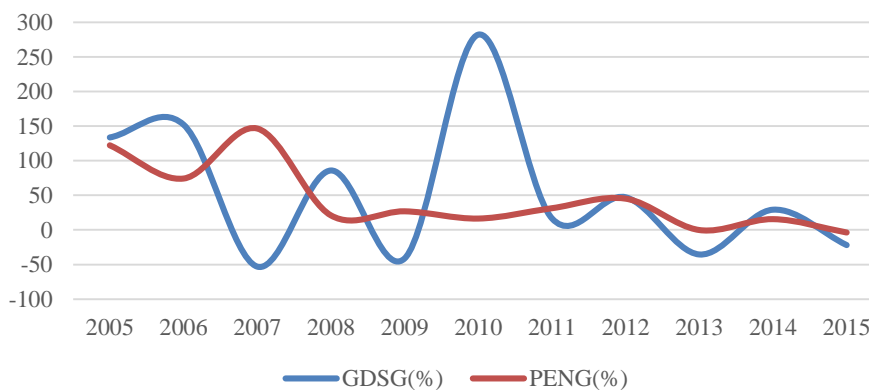

Figure no. 2 – Plots of growth rate of aggregate pension contributions and gross national savings in Nigeria

Although Figure no. 2 gives a rough idea on the movements in both pensions and savings, it does not provide adequate information on the connection between them. Also, it is not easy to conclude, for instance, that the movement in savings was caused by movement in pensions. Thus, it becomes imperative to empirically examine the relationship between the variables to make policy recommendations.

Studies focusing on savings-pensions connection have employed either cross-section or panel data. On the other hand, only a few studies looked at the relationship at country-specific level. Moreover, these studies were conducted in developed countries, while there is dearth of empirical research on developing economies. In addition, Athukorala and Sen (2004) opined that cross-country studies are based on highly restrictive assumptions, and any results generated based on them might not be generally accepted. Therefore, they advised on the need for country-specific studies.

The main objective of this study is to examine the effect of pensions on savings in Nigeria. The remainder of the paper is arranged as follows. The 2nd Section is the review of previous studies on savings and pensions, while the 3rd Section contains theoretical framework and the model. The 4th Section is for data, econometric techniques and discussion of results, while conclusion and recommendations are taken up in the 5th Section.

2. REVIEW OF PREVIOUS STUDIES ON SAVINGS AND PENSIONS

Scholars have attempted to examine the effect of pensions on savings, and almost all the studies were conducted outside Nigeria. For example, Feng et al. (2011) examined the response of households savings to pension reform in urban China during the 1995-1999 period. The results of analysis reveal that pension reform raised household savings rates during the period. Enache et al. (2015) employed an error correction approach to examine the effect of pension reform on capital market development in ten Central and Eastern European countries during the 2001-2010 period. The empirical results indicate that pension funds do have a short-term positive and significant effect on capital market development. In addition, pension assets have a long-term positive and smaller impact on market capitalisation. Chetty et al. (2014) established that pension contributions increase savings more, especially for those who are less prepared for retirement in Denmark. Card and Ransom (2011) employed Tobit and extended Tobit models to analyze the connection between the saving behaviour of professors and pension contributions in the United States. The results suggest the existence of a negative relationship between savings and pensions. In addition, the empirical evidence indicates that savings responds more to employees contributions than employers contributions in the United States.

Attanasio and Rohwedder (2003) investigated the relationship between pension savings and discretionary private savings in the United Kingdom, using both time-series and cross-sectional variation to identify individual household's behavioural response. The results show that the earnings-related tier of the pension scheme has a negative effect on private savings, while the effect of the flat-rate tier of the pension scheme has no significant effect on savings.

Disney et al. (2001) investigated the relationship between pensions and savings in Britain, using time series and household micro-data. The authors concluded that the effect of pensions on savings dependent on the choice-based structure. Samwick (2000) evaluated the effect of social security on saving in a panel of countries over 25 years. The author used variation in the characteristics of social security systems to ascertain whether less reliance

on a pay-as-you-go, unfunded system leads to an increase in national savings. The results suggest that savings rates did not increase significantly in countries that implemented defined-contribution reforms. In addition, savings rates tend to be less in countries with pay-as-you-go systems, and the negative effect increases with the coverage rate. Disney (2000) attempted to answer the question whether falling public pensions will be offset by private provisions in OECD countries. The author submitted that there is evidence which suggest a positive response of private savings to cuts in public pensions.

Gustman and Steinmeier (1999) examined the effect of pensions on savings using the ordinary least squares (OLS), median and robust regressions to analyze data from health and retirement study for the United States. The authors confirmed that increases in pensions lead to increases in savings.

Bailliu and Reisen (1998) tested the hypothesis that higher funded pension wealth leads to higher aggregate savings in a sample consisting of industrialized and emerging markets (OECD members) from 1982 to 1993. The empirical evidence using OLS and two stage least squares (TSLS) estimators indicate that pensions do have a positive and significant effect on savings. Poterba et al. (1996) examined whether pension schemes contribute to savings. They found that schemes such as IRA and 401(k) promote savings. Dicks-Mireaux and King (1984) assessed the connection between pension assets and savings, using data for 8279 households in Canada. The authors found a positive effect of pension funds on private savings.

Green (1981) investigated the effect of occupational pension scheme on savings in the United Kingdom, using the OLS estimator to analyze survey data. The results suggest that pensions have contributed positively to savings in the United Kingdom. Munnell (1976) assessed the effect of private pension coverage on the saving behaviour of men aged 45-59 in 1966. The results show that pension coverage reduces savings. Feldstein (1974) employed the extended life-cycle model to examine the effect of social security on individual's decision to retire and save in the United States over the 1929-1971 period. The results of empirical analysis demonstrate that social security dampens personal savings by 30% to 50%. Analyzing time series data covering the 1929-1974 period, Feldstein (1974) discovered that the growth of private pensions did not reduce private savings, but claimed that it may have raised private savings by a small amount.

Cagan (1965) examined the saving behaviour of over 15,000 members of the Consumers Union between 1958 and 1959. The author found that private pensions promotes saving behaviour among individuals. Similarly, Katona (1965) investigated the saving response of almost 2,000 consumers to pension plans between 1962 and 1963. He confirmed that pensions raises voluntary savings.

In Nigeria, researchers have made efforts to ascertain factors that influence savings. However, none of the studies consider pensions as a potential determinant of savings in their analysis. For instance, Imoisi et al. (2018) employed OLS and cointegration method to investigate the determinants of aggregate savings in Nigeria over the 1982-2016 period. The empirical evidence indicates that savings deposit rate and national income are positively and significantly related to savings. Otiwu et al. (2018) examined private domestic savings determinants in Nigeria during the 1981- 2015 period, using vector error correction model. The results illustrate that financial inclusion and income per capita have a strong influence on private domestic savings in Nigeria.

Mojekwu and Ogbulu (2017) employed a multiple regression model to evaluate national savings determinants in Nigeria from 1981 to 2015. The authors submitted that

financial deepening has a significant and positive effect on savings in Nigeria. Ozioma *et al.* (2016) studied private domestic savings determinants in Nigeria from 1980 to 2015, by employing cointegration test and vector error correction method. The results reveal that in the long-run, the main determinants of private savings in Nigeria are interest rate and income level, with positive and negative effects, respectively. Adelakun (2015) examined the savings and investment determinants in Nigeria using the error correction model, for twenty nine years. The results reveal that inflation rate has a negative effect on savings, but interest rate has a positive effect savings.

Antai *et al.* (2015) used a vector error correction model to estimate the determinants of savings rate in Nigeria from 1970 to 2008. The results demonstrate that income per capita and income or economic growth have a positive effect on savings rate, while bank density and financial sector development have a negative impact on savings rate in Nigeria. Bamidele *et al.* (2015) assessed savings determinants in Nigeria over the 1960-2013 period, using dynamic error correction techniques. The authors confirmed the main determinants of domestic savings to include inflation rate, current account balance, real income per capita, real interest rate, financial intermediation, and financial reforms.

A survey of the literature indicates that no study has been conducted to investigate the savings-pensions relationship in Nigeria. Thus, this study contributes to the literature by examining the effect of pensions on savings in Nigeria.

3. THEORETICAL FRAMEWORK AND THE MODEL

The framework for analysis for this study is based on the life-cycle theory (Ando and Modigliani, 1963; Modigliani and Brumberg, 1954). Explaining the theory from different perspectives, scholars have argued that it is not clear the exact direction savings will move if pensions benefits are available (Gustman and Steinmeier, 1999). For example, the life-cycle hypothesis argues that individuals will reduce their savings if they anticipate higher benefits from government pension scheme (Bailliu and Reisen, 1998; Munnell, 1976). Since individuals see pensions as a tax-favoured savings mechanism, they will substitute pensions for other forms of savings (Gustman and Steinmeier, 1999). In particular, for middle-income and low-income households, social security (pensions) may be a substitute for retirement savings (Feldstein, 1974), so that savings decreases with rising pensions.

But early empirical studies (see Cagan, 1965; Katona, 1965) which discovered that pensions did raise savings rather than reducing it instigated researchers to look at other factors that may have accounted for their findings. A possible explanation for the positive impact of pensions on savings from the studies of Cagan (1965) and Katona (1965) is that pension plans/schemes raise the awareness for retirement needs, and provides an avenue where individuals can accumulate adequate retirement income (Munnell, 1976). Contributing to this debate, Feldstein (1974) suggested that workers who are covered by pension schemes tend to retire earlier compared to those without pension coverage. This may encourage them to accumulate wealth so as to finance their early retirement.

From the foregoing, pensions tends to affect savings. Thus, a model in which savings (GDS) is dependent on pensions (PEN) is specified as follows:

$$GDS_t = f(PEN_t, \varepsilon_t) \tag{1}$$

Beside the interest variable (pensions), previous studies on savings-pensions relationship also considered unemployment as an important determinant of savings (see Feldstein, 1978). Unemployment (UNEM) can be used to capture precautionary saving effect related to macroeconomic uncertainty (Athukorala and Tsai, 2003). Rising unemployment may give signal to households that the economy and working environment have become riskier, forcing them to increase their savings for precautionary purpose. On the other hand, unemployment can have a dampening effect on savings as households draw from their savings in order to smoothen consumption (Athukorala and Tsai, 2003).

In addition, internal conflicts (INTCO) which have become a common feature of Nigeria can also affect the level of savings. Conflicts between Fulani herdsmen and farmers in many Nigerian states have led to many deaths and displacement of farmers and non-farmers. Moreover, despite degrading Boko-Haram insurgents, there are reported cases of the group carrying out deadly attacks in Northeast Nigeria. These have negative consequences including low production and income, as well as rising unemployment, and as a result lower savings.

Furthermore, the literature on savings has assigned an important role to both real interest rate (RIR) and income level (GPDC) (see Athukorala and Sen, 2004; Athukorala and Tsai, 2003). Taking these variables into account, the new savings model is:

$$GDS_t = f(PEN_t, GDPC_t, RIR_t, INTCO_t, UNEM_t, \varepsilon_t) \tag{2}$$

If re-written in an explicit form, the model above is specified as:

$$GDS_t = \beta_0 + \beta_1 PEN_t + \beta_2 GDPC_t + \beta_3 RIR_t + \beta_4 INTCO_t + \beta_5 UNEM_t + \varepsilon_t \tag{3}$$

4. DATA, ECONOMETRIC TECHNIQUES AND DISCUSSION OF RESULTS

4.1 Data issues

The data used in this study are quarterly data over the 2004-2015 period. The data were collected from the National Pensions Commission (PENCOM), World Development Indicators (WDI), Political Risk Service's International Country Risk Guide (ICRG), and National Bureau of Statistics (NBS). Specifically, the data on gross savings, income (GDP) per capita and real interest rate were obtained from the WDI. The data on unemployment were collected from the NBS, while data on pension contribution were gathered from the PENCOM. Corruption index was obtained from the ICRG.

The variables are measured/defined as follows. Gross savings rates (GDS) is gross national savings as a percentage of real GDP (as used in Abu *et al.*, 2013, 2015; Balde, 2011; Bloom *et al.*, 2003; Bloom *et al.*, 2007; Cook, 2005). Real interest rate (RIR) is the lending interest rate adjusted for inflation. GDP per capita (GDPC) is real gross domestic product divided by total population. Unemployment rate (UNEM) is the share of the labor force that is without work but available for and seeking employment. Gross pensions (PEN) is the total pension contributions by both the private and public sectors (as used in Browning, 1982). Internal conflicts (INTCO) is measured by the ICRG internal conflicts index. The index takes a value of 0 to 12, and higher values indicate that internal conflicts is lesser and vice versa. However, the index is rescaled by subtracting each value from the maximum value (i.e. 12) to make its interpretation straightforward. Thus, a positive sign of

the coefficient of INTCO implies that an increase in internal conflicts has a positive effect on savings, while a negative sign illustrates that an increase in internal conflicts has a negative impact on savings. Three variables – GDS, RIR and UNEM are in rates (%), while the natural logarithm of GDPC and PEN were used in this study.

A major constraint of a study of this nature is getting annual data for a considerable number of years or observations (i.e. 30 or above). For example, the data on the pension contributions is available for a short period (2004-2015) only for Nigeria. But other data such as savings rates, GDP per capita, real interest rate, unemployment rate, and internal conflicts are available for a substantial number of years. This might explain why researchers have paid less attention to savings-pensions connection in Nigeria. This shortcoming can be overcome by employing the Gandolfo (1981) technique of data interpolation to convert annual data to quarterly data, leading to the availability of a higher number of observations. The method has been employed in recent empirical studies (see Baharumshah *et al.*, 2006; Baharumshah and Rashid, 1999; Tang, 2008). In addition, Browning (1982) used quarterly data to study savings-pensions linkage in the United Kingdom. More so, Smith (1998) (cited in Tang, 2008) noted that if series are interpolated, they do not lead to bias in the estimates of cointegrating vectors even in small sample. Thus, applying the Gandolfo's interpolation technique to the series, we are left with the quarterly data - 2005:1-2014:4 (T = 40) as both the first year and last year of the series are eliminated during interpolation. The procedure for interpolation can be found in Tang (2008).

4.2 Econometrics techniques

Although economic theory requires that series/variables are stationary (or have no unit root) prior to estimating any relationship between them, the method of data analysis employed in this study, that is, the autoregressive distributed lag (ARDL) bounds testing approach (Pesaran and Shin, 1999; Pesaran *et al.*, 2001) does not require pre-testing series (Akinlo, 2006; Duasa, 2007). In essence, there may be no need to conduct a unit root or stationarity test when employing an ARDL estimation technique. Thus, whether the series are stationary after first differencing [I(1)], or a combination of I(0) and I(1), the technique can be used to estimate the relationship between the variables.

In addition, unlike other residual-based cointegration methods including the Johansen cointegration technique which require large sample sizes for validity, the ARDL bounds testing method is more superior in validating whether a cointegrating relationship exist in small sample sizes. In fact, it has been established that ARDL as well as Dynamic Ordinary Least Squares (DOLS) of Stock and Watson (1993) and the Fully Modified Ordinary Least Squares (FMOLS) of Phillips and Hansen (1990) generate more efficient estimates in small samples (see Alhassan and Fiador, 2014; Narayan and Narayan, 2004). The advantages of the ARDL over other cointegration methods such as the residual-based technique (Engle and Granger, 1987) and Maximum Likelihood test (Johansen, 1988, 1991; Johansen and Juselius, 1990) are well documented (see Abu, 2017, 2019; Abu and Staniewski, 2019; Ozturk and Acaravci, 2010, 2011; Tang and Shahbaz, 2011).

The ARDL bounds testing tests the null hypothesis of no cointegration against the alternative hypothesis of cointegration. The computed F-statistic is compared with the critical values provided by Pesaran *et al.* (2001) and/or Narayan (2005). If the computed F-statistic is greater than the upper bound I(1), we reject the null hypothesis of no cointegration and conclude that there is cointegration between the series. On the other hand,

if the computed F-statistic is lesser than the lower bound [I(0)], then we accept the null hypothesis and conclude that there is no cointegration among the series. Furthermore, if the calculated statistic is between I(0) and I(1), the inference would be inconclusive. The ARDL model to be estimated is specified as follow:

$$
\begin{aligned}
\Delta GDS_t = \beta_0 &+ \sum_{i=1}^{n} \beta_{1i}\, \Delta GDS_{t-i} + \sum_{i=0}^{n} \beta_{2i}\, \Delta LPEN_{t-i} + \sum_{i=0}^{n} \beta_{3i}\, \Delta LGDPC_{t-i} + \sum_{i=0}^{n} \beta_{4i}\, \Delta LRIR_{t-i} \\
&+ \sum_{i=0}^{n} \beta_{5i}\, \Delta INTCO_{t-i} + \sum_{i=0}^{n} \beta_{6i}\, \Delta UNEM_{t-i} + \sigma_1 GDS_{t-1} + \sigma_2 LPEN_{t-1} \\
&+ \sigma_3 LGDPC_{t-1} + \sigma_4 RIR_{t-1} + \sigma_5 INTCO_{t-1} + \sigma_6 UNEM_{t-1} + \varepsilon_{1t}
\end{aligned}
\tag{4}
$$

4.3 Discussion of results

The results of the cointegration test using bounds testing (Table no. 1) demonstrate that the computed F-statistic (13.26) is greater than the upper bound (i.e. 4.15), implying that there is a cointegrating relationship between the series. Thus, the variables have a long-run equilibrium relationship.

Table no. 1 – Results of bounds test

Dependent Variable	Function					F-Statistic	
GDS	f(GDS/LPEN,LGDPC,RIR,INTCO,UNEM)					13.2589***	
Critical Values Bounds							
10%		5%		2.5%		1%	
I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
2.08	3.00	2.39	3.38	2.70	3.73	3.06	4.15

*Note: *** denotes statistical significance at 1%. L denotes logarithm.*
Source: authors' computation.

Given the confirmation of a long-run relationship between the variables, the ARDL model was estimated taking into consideration the optimal lag-length (1,1,0,0,1,1) suggested by the Akaike Information Criterion (AIC). The long-run and short-run results for the selected models are reported in Table no. 2.

The long-run results (Panel A) reveal that pensions has a positive and significant effect on savings at 10% level. A 1% increase in pensions raises savings by 0.05 percentage. The results also indicate that internal conflicts and unemployment have a negative and significant effect on savings at 1% and 10%, respectively. A 1 unit increase in the internal conflicts index (an increase in internal conflicts) reduces savings by 6.50 percentage. Also, a 1% increase in unemployment rate reduces savings by 0.61 percentage. However, real interest rate and income per capita are not significant in explaining savings in the long-run.

The short-run results (Panel B) show that pensions have a negative and significant effect on savings at 1% level. A 1% increase in pensions reduces savings by 0.09 percentage. In addition, internal conflicts and unemployment have a negative and significant effect on savings at 10% level and 1% level, respectively. A 1 unit increase in internal conflicts index (an increase in internal conflicts) reduces savings by 0.95 percentage. Similarly, a 1% increase in unemployment rate leads to 1.78 percentage decrease in savings. However, real interest rate and income per capita do not have a significant effect on savings in the short-run.

Table no. 2 – Results of ARDL model

Panel A: Long Run Coefficients - Dependent Variable is GDS				
Regressor	**Coefficient**	**Standard Error**	**T-Ratio**	**Prob.**
C	303.7196	207.1465	1.4662	0.1541
LPEN	5.3947	2.7109	1.9899	0.0568
LGDPC	-24.7163	18.5435	-1.3328	0.1937
RIR	0.0515	0.1179	0.4369	0.6656
INTCO	-6.4950	1.9929	-3.2589	0.0030
UNEM	-0.6084	0.3011	-2.0204	0.0534

Panel B: Short Run Coefficients - Dependent Variable is ΔGDS				
Regressor	**Coefficient**	**Standard Error**	**T-Ratio**	**Prob.**
ΔGDS(-1)	0.2273	0.0730	3.1133	0.0043
ΔLPEN	-9.3136	1.0397	-8.9573	0.0000
ΔLGDPC	0.0033	1.0107	0.3076	0.7607
ΔRIR	0.0060	0.0216	0.2809	0.7809
ΔINTCO	-0.9532	0.5018	-1.8995	0.0682
ΔUNEM	-1.7832	0.1888	-9.4402	0.0000
ECM(-1)	-0.2283	0.0294	-9.4655	0.0000
R^2	0.8428			
F-stat.	14.4860			0.0000
D.W.	2.0251			

Note: L denotes logarithm, Δ is the first difference operator.

Source: authors' computation.

The negative impact of pensions on savings in the short-run is consistent with the findings of Feldstein (1974) and Samwick (2000). This outcome suggests that pensions reduce savings in the short-run. On the other hand, the positive effect of pensions on savings in the long-run is in line with the work of Bailliu and Reisen (1998); Cagan (1965); Green (1981); Gustman and Steinmeier (1999); Katona (1965). This finding indicates that pensions raise savings in the long-run. Therefore, if employers put in place pension plans and more employees are covered by the schemes, it will provide an avenue for individuals to increase their retirement income, leading to higher savings.

On the other hand, internal conflicts and unemployment which have become common features of the Nigerian economy have a damaging impact on savings mobilization in Nigeria, not only in the present but also in the future. The negative effect of unemployment suggests that rising unemployment will reduce savings. High unemployment reduces production of goods and services, and income levels. The consequences of low incomes include savings among other things. Similarly, the negative impact of internal conflicts implies that internal conflicts displace individuals and lead to destruction of properties. These force people to abandon their source of livelihood as well as farmlands. Consequently, income generating opportunities are lowered, leading to a decline in savings.

The coefficient of the error correction term lagged by one period [ECM (-1)] is statistically significant and correctly signed, indicating that 23% of the deviations from the equilibrium will be corrected within one year.

4.4 Results of diagnostic tests

The use of time series data for estimation purpose can lead to problems such as serial-correlation and heteroscedasticity. The presence of these problems can invalidate or make unreliable any estimates generated. To ascertain the reliability of the estimated results, diagnostic tests were conducted. The results of diagnostic tests are reported in Table no. 3.

Table no. 3 – ARDL-ECM model diagnostic tests

LM Test Statistic	Results
Serial Correlation: CHSQ(2)	0.1291[0.9375]
Functional Form (Ramsey Test): CHSQ(1,26)	0.7102[0.4011]
Heteroscedasticity: CHSQ(10)	6.6197[0.7608]

Source: authors' computation.

The results show that the ARDL model does not have problems of serial correlation, functional form, and heteroscedasticity. This illustrate that the estimated results are valid and reliable.

4.5 Results of stability test

In order to evaluate the stability of the model and estimated parameters, the Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMQ) tests were used to conduct the stability test. Greene (2003) and Tang and Lean (2007) argued that the parameters are said to be unstable if the plots of the CUSUMQ breaks in the lower or upper bounds. The results of the stability tests are reported in Figure no. 3 and Figure no. 4.

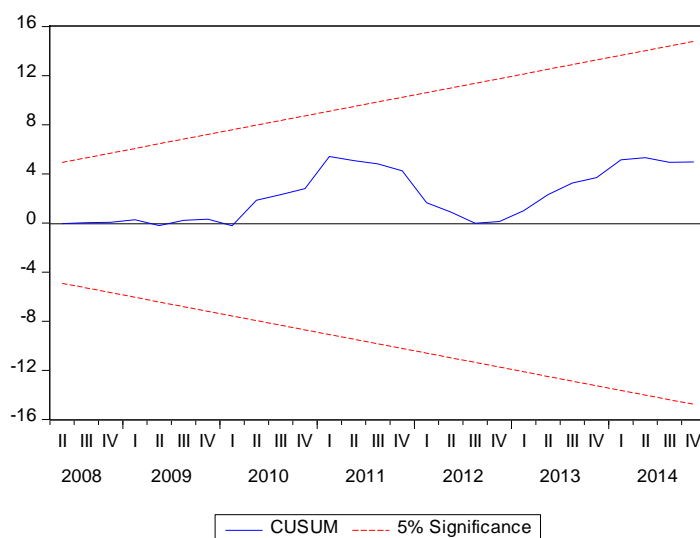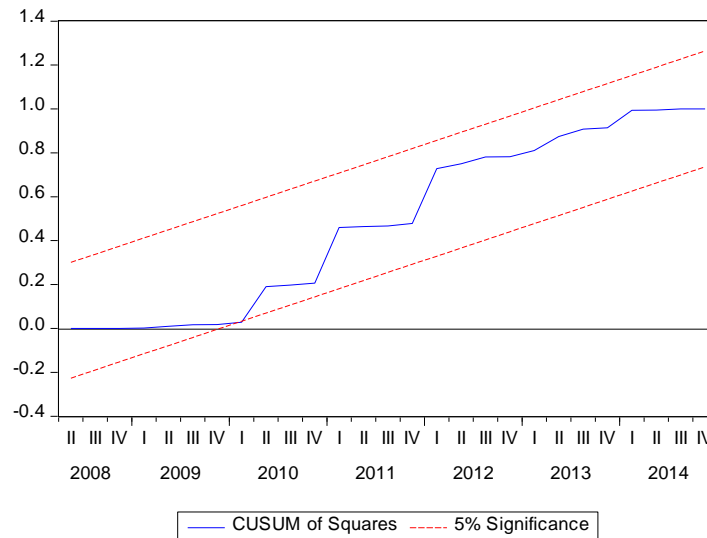**Figure no. 3 – Plots of cumulative sum of recursive residuals**

Figure no. 4 – Plots of cumulative sum of squares of recursive residuals

The plots of the CUSUM and CUSUMQ fall within the upper and lower boundaries. This indicates that the model and the coefficients of the regressors are stable over the long-run. In sum, the results of estimation illustrate that pensions reduce savings in the short-run, but promote savings in the long-run in Nigeria. Furthermore, the results are free from serial-correlation and heteroscedasticity problems, and estimated parameters are stable over the long-run.

4.6 Alternative estimation method

In an attempt to check the consistency and robustness of the estimates generated earlier using the ARDL bounds testing method, the DOLS (Saikkonen, 1992; Stock and Watson, 1993) method of estimation was used to examine the savings-pensions relationship. The DOLS estimator like the ARDL bounds testing technique performs well in small sample sizes and it corrects for potential simultaneity bias and/or endogeneity among regressors and serial-correlation of residuals (see Alhassan and Fiador, 2014; Montalvo, 1995; Narayan and Narayan, 2004; Singh, 2015). Moreover, Montalvo (1995) and Kao and Chiang (2001) argued that the DOLS is more superior to certain estimation methods such as the FMOLS estimator. Furthermore, using these methods of analysis allows for comparison and/or to check for consistency and robustness of the results. The method involves using fixed lead and lag length of 1 and long-run variance with Bartlett Kernel and Newey-West fixed bandwidth. The results of estimation using the DOLS are presented in Table no. 4.

For example, the results show that pensions do have a positive and significant effect on savings at 5% level. However, unemployment and internal conflicts have a negative and significant impact on savings at 10% and 1%, respectively. Since the results of DOLS are similar to the ones obtained using the ARDL technique, we can conclude that the results are robust.

Table no. 4 – Results of DOLS model

Panel C: Long Run Coefficients - Dependent Variable is GDS				
Regressor	**Coefficient**	**Standard Error**	**T-Ratio**	**Prob.**
C	196.2612	119.6907	1.6397	0.1206
LPEN	2.9062	1.3353	2.1763	0.0449
LGDPC	-14.7874	10.7762	-1.3722	0.1889
RIR	0.1257	0.1222	1.0286	0.3189
INTCO	-5.7572	1.3547	-4.2498	0.0006
UNEM	-0.4031	0.2045	-1.9711	0.0663
R^2	0.8742			

5. CONCLUSION

This paper investigates the effect of pensions on savings in Nigeria, using quarterly data over the 2004-2015 period. The results from ARDL bounds testing to cointegration indicate that pensions and savings (along with real interest rate, income per capita, unemployment rate, and internal conflicts) have a long-run relationship. The empirical evidence demonstrates that increases in pensions lead to a reduction in savings in the short-run. This lends support to the outcome of previous studies (see Bailliu and Reisen, 1998; Feldstein, 1978; Munnell, 1976). Therefore, if individuals expect higher benefits from pension schemes/plans, they will reduce their savings. In addition, the results reveal that pensions leads to higher savings in the long-run. This outcome is consistent with prior research (see Cagan, 1965; Katona, 1965), and support the claim that pension plans provide an avenue for individuals to increase their retirement income, leading to higher savings. Based on these findings, this study recommends policies that would promote pension contributions, including reducing internal conflicts and unemployment to raise savings in Nigeria in the long-run.

For instance, government should encourage both corporate organizations and government agencies to put in place pension schemes to cover more employees and raise pension contributions or funds. Certain organizations and employers are yet to capture their employees in the scheme and some employers have not been paying contributions of their employees regularly, while allegations of embezzlement/mismanagement of contributions have emanated. To this end, the regulator of the pension industry in Nigeria (PENCOM) should increase its monitoring and surveillance to ensure that employers live up to their responsibility. Also, the PENCOM should ensure that the Pension Funds Administrators (PFAs) and Pension Funds Custodians (PFCs) have up to date information on beneficiaries and do not embezzle or mismanage pension contributions to further increase people's confidence in the industry.

In addition, since unemployment has remained a serious issue in Nigeria and it reduces the ability of individuals to save, government should take steps to create employment opportunities in Nigeria so as to promote savings. This can be achieved through increased investment in infrastructure (i.e. roads, healthcare, education, power and electricity, etc.). Also, the monetary authorities should reduce the cost of borrowing or lending rate so as to encourage businesses to expand production. These among other things will reduce unemployment (increase in employment), leading to higher incomes and savings. Furthermore, government should make efforts to reduce internal conflicts which have

become a common feature in Nigeria, especially in the rural areas. Conflicts have resulted in displacement of human from their homes and destruction of their properties including source of livelihood and farmlands. These have reduced income generating opportunities and savings for many. Therefore, government should invest more in rural infrastructure and agriculture, as well as return internally displaced persons (IDPs) to their homes and farmlands. These will raise their income generating capacity and savings. Couple with these, government should establish and increase investment in community policing to put ethno-religious conflicts under control.

References

Abdulazeez, N., 2015. Pension scheme in Nigeria: History, problems and prospects. *Arabian Journal of Business and Management Review, 5*(2), 1-6. http://dx.doi.org/10.4172/2223-5833.1000120

Abu, N., 2017. Does Okun's law exist in Nigeria? Evidence from ARDL bounds testing approach. *Contemporary Economics, 11*(2), 131-144. http://dx.doi.org/10.5709/ce.1897-9254.232

Abu, N., 2019. Inflation and unemployment trade-off: A re-examination of the Phillips curve and its stability in Nigeria. *Contemporary Economics, 13*(1), 21-34. http://dx.doi.org/10.5709/ce.1897-9254.296

Abu, N., and Karim, M., 2016. The Relationships between Foreign Direct Investment, Domestic Savings, Domestic Investment, and Economic Growth: The Case of Sub-Saharan Africa. *Society and Economy, 38*(2), 193-217. http://dx.doi.org/10.1556/204.2016.38.2.4

Abu, N., Karim, M. Z. A., and Aziz, M. I. A., 2013. Low savings rates in the Economic Community of West African States (ECOWAS): The role of the political instability- income interaction. *South East European Journal of Economics and Business, 8*(2), 53-63. http://dx.doi.org/10.2478/jeb-2013-0010

Abu, N., Karim, M. Z. A., and Aziz, M. I. A., 2015. Low savings rates in the Economic Community of West African States (ECOWAS): The role of corruption. *Journal of Economic Cooperation and Development, 36*(2), 63-90.

Abu, N., and Staniewski, M. W., 2019. Determinants of corruption in Nigeria: evidence from various estimation techniques. *Economic Research-Ekonomska Istraživanja, 32*(1), 3052-3076. http://dx.doi.org/10.1080/1331677X.2019.1655467

Abu, N., and Wafure, O. G., 2009. Long-run determinants of savings in Nigeria, 1981-2007: Evidence from time series data. *Nigerian Journal of Economics and Management, 4*(1), 87-106.

Adelakun, O. J., 2011. The nexus of private savings and economic growth in emerging economy: A case of Nigeria. *Journal of Economics and Sustainable Development, 2*(6), 31-45.

Adelakun, O. J., 2015. An investigation of the determinants of savings and investment in Nigeria. *International Economics and Business, 1*(2), 1-16. http://dx.doi.org/10.5296/ieb.v1i2.8688

Adeniji, A. A., Akinnusi, D. M., Falola, H. O., and Ohunakin, F., 2017. Administration of retirement benefits in Nigeria: Periscoping the effect on retirees. *International Journal of Applied Business and Economic Research, 15*(15), 319-333.

Aigbepue, S., and Ojeifo, S. A., 2014. Transparency and accountability in the Nigerian pension funds management. *International Journal of Business and Management Invention, 3*(6), 51-56.

Akinlo, A. E., 2006. The stability of money demand in Nigeria: An autoregressive distributed lag approach. *Journal of Policy Modeling, 28*(4), 445-452. http://dx.doi.org/10.1016/j.jpolmod.2005.09.001

Akpan, I. T., and Ukpong, M. S., 2014. Pension administration and capital formation in Nigeria: The challenges. *European Journal of Business and Management, 6*(6), 116-122.

Alhassan, A. L., and Fiador, V., 2014. Insurance-growth nexus in Ghana: An autoregressive distributed lag bounds cointegration approach. *Review of Development Finance, 4*(2), 83-96. http://dx.doi.org/10.1016/j.rdf.2014.05.003

Anderson, S. J., 1990. The political economy of Japanese saving: How postal savings and public pensions support high rates of household saving in Japan. *Journal of Japanese Studies, 16*(1), 61-92. http://dx.doi.org/10.2307/132494

Ando, A., and Modigliani, F., 1963. The 'life-cycle' hypothesis of saving: Aggregate implications and tests. *The American Economic Review, 53*(1), 55-84.

Antai, A., Sylvester, I. J. J., and Anam, B. E., 2015. Estimation of the short run and long run determinants of domestic savings rate in Nigeria (1970-2008). International Journal of Innovative Research in Technology. *International Journal of Innovative Research in Technology." Basic and Applied Sciences, 1*(1), 40-58.

Athukorala, P., and Sen, K., 2004. The determinants of private saving in India. *World Development, 32*(3), 491-503. http://dx.doi.org/10.1016/j.worlddev.2003.07.008

Athukorala, P., and Tsai, P., 2003. Determinants of household saving in Taiwan: Growth, demography and public policy. *The Journal of Development Studies, 39*(5), 65-88. http://dx.doi.org/10.1080/00220380412331333149

Attanasio, O. P., and Rohwedder, S., 2003. Pension wealth and household saving: Evidence from pension reforms in the United Kingdom. *The American Economic Review, 93*(5), 1499-1521. http://dx.doi.org/10.1257/000282803322655419

Baharumshah, A. Z., Lau, E., and Khalid, A. M., 2006. Testing twin deficits hypothesis using VARs and variance decomposition. *Journal of the Asia Pacific Economy, 11*(3), 331-354. http://dx.doi.org/10.1080/13547860600764245

Baharumshah, A. Z., and Rashid, S., 1999. Export, imports and economic growth in Malaysia: Empirical evidence based on multivariate time series. *Asian Economic Journal, 13*(4), 389-406. http://dx.doi.org/10.1111/1467-8381.00092

Bailliu, J. N., and Reisen, H., 1998. Do funded pensions contribute to higher aggregate savings? A cross-country analysis. *Weltwirtschaftliches Archiv, 134*(4), 692-711. http://dx.doi.org/10.1007/BF02773293

Balde, Y., 2011. The impact of remittances and foreign aid on savings/investment in Sub-Saharan Africa. *African Development Review, 23*(2), 247-262. http://dx.doi.org/10.1111/j.1467-8268.2011.00284.x

Bamidele, A., Jibrin, M., and Isa, A., 2015. Determinants of domestic gross savings in Nigeria: Lessons for policy. *CBN Economic and Financial Review, 53*(3), 16-37.

Bloom, D. E., Canning, D., and Graham, B., 2003. Longevity and life cycle savings. *The Scandinavian Journal of Economics, 105*(3), 319-338. http://dx.doi.org/10.1111/1467-9442.t01-1-00001

Bloom, D. E., Canning, D., Mansfield, R. K., and Moore, M., 2007. Demographic change, social security systems and savings. *Journal of Monetary Economics, 54*(1), 92-114. http://dx.doi.org/10.1016/j.jmoneco.2006.12.004

Browning, M. J., 1982. Savings and pensions: Some UK evidence. *Economic Journal (London), 92*(368), 954-963. http://dx.doi.org/10.2307/2232677

Cagan, P., 1965. The effect of pension plans on aggregate saving: Evidence from a sample survey. *NBER Occasional Paper, 95*.

Card, D., and Ransom, M., 2011. Pension plan characteristics and framing effects in employee savings behaviour. *The Review of Economics and Statistics, 93*(1), 228-243. http://dx.doi.org/10.1162/REST_a_00051

Chetty, R., Friedman, J. N., Leth-Petersen, S., Nielsen, T. H., and Olsen, T., 2014. Active vs. passive decisions and crowd-out in retirement savings accounts: Evidence from Denmark. *The Quarterly Journal of Economics, 129*(3), 1141-1219. http://dx.doi.org/10.1093/qje/qju013

Cook, C. J., 2005. Population growth and savings rates: Some new cross-country estimates. *International Review of Applied Economics, 19*(3), 301-319. http://dx.doi.org/10.1080/02692170500119755

Dicks-Mireaux, L., and King, M., 1984. Pension wealth and household savings: Tests of robustness. *Journal of Public Economics, 23*(1-2), 115-139. http://dx.doi.org/10.1016/0047-2727(84)90069-0

Disney, R., 2000. Declining public pensions in an era of demographic ageing: Will private provision fill the gap? *European Economic Review, 44*(4-6), 957-973. http://dx.doi.org/10.1016/S0014-2921(99)00063-X

Disney, R., Emmerson, C., and Wakefield, M., 2001. Pension reform and saving in Britain. *Oxford Review of Economic Policy, 17*(1), 70-94. http://dx.doi.org/10.1093/oxrep/17.1.70

Duasa, J., 2007. Determinants of Malaysian trade balance: An ARDL bound testing approach. *Global Economic Review, 36*(1), 89-102. http://dx.doi.org/10.1080/12265080701217405

Enache, C., Milos, L. R., and Milos, M. C., 2015. Pension reform and capital market development in Central and Eastern European countries. Economic Research. *Ekonomska Istrazivanja, 28*(1), 75-84. http://dx.doi.org/10.1080/1331677X.2015.1022388

Engle, R. F., and Granger, C. W. J., 1987. Co-integration and error correction: Representation, estimation and testing. *Econometrica, 55*(2), 251-276. http://dx.doi.org/10.2307/1913236

Feldstein, M., 1974. Social security, induced retirement, and aggregate capital accumulation. *Journal of Political Economy, 82*(5), 905-926. http://dx.doi.org/10.1086/260246

Feldstein, M., 1978. Do private pensions increase national savings? *Journal of Public Economics, 10*(3), 277-293. http://dx.doi.org/10.1016/0047-2727(78)90049-X

Feng, J., He, L., and Sato, H., 2011. Public pension and household saving: Evidence from urban China. *Journal of Comparative Economics, 39*(4), 470-485. http://dx.doi.org/10.1016/j.jce.2011.01.002

Gandolfo, G., 1981. *Quantitative Analysis and Econometric Estimation of Continuous Time Dynamic*. Amsterdam: North-Holland.

Green, F., 1981. The effect of occupational pension schemes on saving in the United Kingdom: A test of the life cycle hypothesis. *Economic Journal (London), 91*(361), 136-144. http://dx.doi.org/10.2307/2231703

Greene, W., 2003. *Econometric Analysis* (5th ed. ed.). New Jersey: Prentice Hall.

Gustman, A. L., and Steinmeier, T. L., 1999. *Effects of pensions on savings: Analysis with data from the health and retirement study*: North-Holland.

Ibeme, P. N., and Aniche, A., 2016. Diagnosing the elephantine problems in the implementation of the 2004 pension act in Enugu State civil service. *Journal of Policy and Development Studies, 10*(4), 102-127. http://dx.doi.org/10.12816/0041087

Imoisi, A. I., Iyafekhe, C., and Ezeibekwe, F. O., 2018. Determinants of aggregate savings in Nigeria. *Accounting & Taxation Review, 2*(1), 186-198.

Johansen, S., 1988. Statistical analysis of cointegration vectors. *Journal of Economic Dynamics & Control, 12*(2-3), 231-254. http://dx.doi.org/10.1016/0165-1889(88)90041-3

Johansen, S., 1991. Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica, 59*(6), 1551-1580. http://dx.doi.org/10.2307/2938278

Johansen, S., and Juselius, K., 1990. Maximum likelihood estimation and inference on cointegration - With applications to the demand for money. *Oxford Bulletin of Economics and Statistics, 52*(2), 169-210. http://dx.doi.org/10.1111/j.1468-0084.1990.mp52002003.x

Kao, C., and Chiang, M. H., 2001. On the estimation and inference of a cointegrated regression in padel data. In B. Baltagi, T. Fomby and R. Carter Hill (Eds.), *Nonstationary Panels, Panel Cointegration and Dynamic Panels* (Vol. 15, pp. 179-222). Bingley: Emerald Group Publishing Limited. http://dx.doi.org/10.1016/S0731-9053(00)15007-8

Katona, G., 1965. Private pensions and individual saving. *Survey Research Center, 40*.

Lucas, R., 1988. On the mechanics of economic development. *Journal of Monetary Economics, 22*(1), 3-42. http://dx.doi.org/10.1016/0304-3932(88)90168-7

Modigliani, F., and Brumberg, R., 1954. Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data. In K. K. Kurihara (Ed.), *Post Keynesian Economics* (pp. 49). New Jersey: Ruthers University Press.

Mojekwu, R. O., and Ogbulu, O. M., 2017. Determinants of national savings in Nigeria: A multivariate analysis (1981-2015). *Journal of Finance, Banking and Investment, 4*(1), 112-132.

Montalvo, J. G., 1995. Comparing cointegrating regression estimators: Some additional Monte Carlo results. *Economics Letters, 48*(3-4), 229-234. http://dx.doi.org/10.1016/0165-1765(94)00632-C

Munnell, A. H., 1976. Private pensions and savings: New evidence. *Journal of Political Economy, 84*(5), 1013-1032. http://dx.doi.org/10.1086/260494

Narayan, P. K., 2005. The saving and investment nexus for China: Evidence from cointegration tests. *Applied Economics, 37*(17), 1979-1990. http://dx.doi.org/10.1080/00036840500278103

Narayan, S., and Narayan, P. K., 2004. Determinants of demand for Fiji's exports: An empirical investigation. *The Developing Economies, 42*(1), 95-112. http://dx.doi.org/10.1111/j.1746-1049.2004.tb01017.x

National Bureau of Statistics, 2019. National Bureau of Statistics Official Page. from http://nigerianstat.gov.ng

National Pension Commission, 2019. National Pension Commission Official Page. from https://www.pencom.gov.ng/

Nwachukwu, T. E., and Egwaikhide, F. O., 2007. *An error-correction model of the determinants of private saving in Nigeria*. Paper presented at the African Economic Society (AES) Conference, Cape Town, South Africa.

Nwachukwu, T. E., and Odigie, P., 2011. What drives private saving in Nigeria? . *AERC Research Paper, 212*.

Olusoji, M. O., 2003. Determinants of private savings in Nigeria: An error correction approach. *NDIC Ouarterly, 13*, 85-96.

Otiwu, K., Okere, P. A., and Uzowuru, L. N., 2018. Determinants of private domestic savings in Nigeria (1981- 2015). *International Journal for Innovation Education and Research, 6*(2), 21-40.

Ozioma, E. O. F., Idenyi, O. S., Chinyere, U. C., and Eze, A. O., 2016. The determinants of domestic private savings in Nigeria. *British Journal of Economics, Management & Trade, 15*(2), 1-16. http://dx.doi.org/10.9734/BJEMT/2016/27712

Ozturk, I., and Acaravci, A., 2010. The causal relationship between energy consumption and GDP in Albania, Bulgaria, Hungary and Romania: Evidence from ARDL bounds testing approach. *Applied Energy, 87*(6), 1938-1943. http://dx.doi.org/10.1016/j.apenergy.2009.10.010

Ozturk, I., and Acaravci, A., 2011. Electricity consumption and real GDP causality nexus: Evidence from ARDL bounds testing approach for 11 MENA countries. *Applied Energy, 88*(8), 2885-2892. http://dx.doi.org/10.1016/j.apenergy.2011.01.065

Pesaran, M. H., and Shin, Y., 1999. An Autoregressive Distributed-Lag Modelling Approach to Cointegration Analysis. In S. Strøm (Ed.), *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium* (pp. 371-413). Cambridge: Cambridge University Press. http://dx.doi.org/10.1017/CCOL521633230.011

Pesaran, M. H., Shin, Y., and Smith, R., 2001. Bound testing approaches to the analysis of level relationship. *Journal of Applied Econometrics, 16*(3), 289-326. http://dx.doi.org/10.1002/jae.616

Phillips, P. C. B., and Hansen, B. E., 1990. Statistical inference in instrumental variables regression with I(1) processes. *The Review of Economic Studies, 57*(1), 99-125. http://dx.doi.org/10.2307/2297545

Poterba, J. M., Venti, S. F., and Wise, D. A., 1996. How retirement saving programs increase saving. *The Journal of Economic Perspectives, 10*(4), 91-112. http://dx.doi.org/10.1257/jep.10.4.91

Romer, P., 1986. Increasing returns and long-run growth. *Journal of Political Economy, 94*(5), 1002-1037. http://dx.doi.org/10.1086/261420

Saikkonen, P., 1992. Estimation and testing of cointegrated systems by an autoregressive approximation. *Econometric Theory, 8*(1), 1-27. http://dx.doi.org/10.1017/S0266466600010720

Samwick, A. A., 2000. Is pension reform conducive to higher saving? *The Review of Economics and Statistics, 82*(2), 264-272. http://dx.doi.org/10.1162/003465300558777

Singh, T., 2015. Trade openness and economic growth in Canada: An evidence from time-series tests. *Global Economy Journal, 15*(3), 361-407. http://dx.doi.org/10.1515/gej-2014-0009

Smith, S. F., 1998. *Cointegration tests when data are linearly interpolated*. State University of New York at Albany.

Solow, R., 1956. A contribution to the theory of economic growth. *The Quarterly Journal of Economics, 70*(1), 65-94. http://dx.doi.org/10.2307/1884513

Stock, J. H., and Watson, M. W., 1993. A simple estimator of cointegrating vectors in higher order integrated systems. *Econometrica, 61*(4), 783-820. http://dx.doi.org/10.2307/2951763

Tang, C. F., 2008. A re-examination of the relationship between electricity consumption and economic growth in Malaysia. *Energy Policy, 36*(8), 3077-3085. http://dx.doi.org/10.1016/j.enpol.2008.04.026

Tang, C. F., and Lean, H. H., 2007. Is Phillips curve stable in Malaysia? New empirical evidence. *Malaysian Journal of Economic Studies : Journal of the Malaysian Economic Association and the Faculty of Economics and Administration, University of Malaya, 44*(2), 95-105.

Tang, C. F., and Shahbaz, M., 2011. Revisiting the electricity consumption-growth nexus for Portugal: Evidence from a multivariate framework. *MPRA Paper, 28393*.

Uremadu, S. O., 2007. Core determinants of financial savings in Nigeria: An empirical analysis for national monetary policy formulation. *International Review of Business Research Papers, 3*(3), 356-367.

Uzoh, B. C., and Anekwe, S. C., 2018. The contributory pension scheme and the fate of retired and retiring Nigerian workers. *International Journal of Academic Research in Business and Social Sciences, 8*(3), 527-541. http://dx.doi.org/10.6007/IJARBSS/v8-i3/3947

World Bank, 2019. World Development Indicators. from https://datacatalog.worldbank.org/dataset/world-development-indicators

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