

Appraisal of the Impact of Contributory Pension Fund Investment on Economic Growth in Nigeria

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Abstract— The focus of this study is to offer evidence on the impact of contributory pension fund investment by private and public sectors on economic growth in Nigeria spanning from 2004Q1 to 2019Q2 using Ordinary Least Square. It is undauntedly obvious from the estimation results that increase in pension fund contribution either from the private or public sector in Nigeria positively and significantly influenced economic growth as the scheme encouraged the release of un-invested funds by channelling excess liquidity into the capital and money markets. Also, the study unravelled that sectoral pension fund contribution has formed huge investment of funds in the capital and money markets than its aggregate thereby creating employment opportunities as well as improving investment climate. The estimation results further revealed that both the private and the public sector whether aggregated or disaggregated, market capitalization and investment in money and capital markets can have an appreciable effect on sustained economic growth in Nigeria. Consequently, this study recommended that Gross Domestic Product statistics reported from Nigeria can be improved upon if the estimates of the unreported (hidden) activities are captured. Furthermore, there is need for existing national statistical agencies to increase their capacities for data collection and documentation processes in order to deepen further analysis and understanding of the informal sector.

Index Terms— Contributory pension funds, Investment, Economic growth.

I. INTRODUCTION

The exploit of every government hugely relies on the growth of its economy towards national development. Therefore, achieving a high and stable economic growth become genuine to every government since economic growth is key to citizens' wellbeing. An employee who has worked with an establishment for some years deserve certain benefits which could be in form of gratuity and pension payable to such employee by its employer at the time of retirement [24]. Pensions are mechanisms designed to curb the risk of old age poverty and a means of smoothening lifetime income to maintain a sound living standard and financial security in retirement.

The Contributory Pension Scheme being a mandatory scheme, has compelled employees and employers in the public and private sectors to collectively save a minimum of eighteen percent of an employee's monthly emolument into the employee retirement saving account (RSA), from where employees will be paid retirement benefits. This has

increased national savings. As at December 2018, the Net worth of Pension Assets under the Contributory Pension Scheme was N8.6 trillion. This occurred against a background of Federal government budgetary pension deficit estimated at N2 trillion as at June 2004, when the Contributory Pension Scheme took off. Out of the N8.6 trillion Net Assets Value, 76.48% was invested in Federal Government Nigeria (FGN) Securities, 7.51% in domestic Ordinary shares, 9.0% in local money market securities, 1.7% in States government's securities, 2.7% in Real Estate properties and 2.61% in corporate bonds [4]

The Private sector contributions shall be deemed to be non-obligatory contributions made by an individual on a regular basis with the main aim of providing retirement benefits under the Contributory Pension fund investment. The new scheme has been corroborated by a Micro Pension Fund (MPF) that considers contributors not below the age of 18 years with legitimate source of income eligible for participation in the CPS as contained in PRA 2014, Self-employed persons that belong to a trade, profession or business association; Self-employed persons with a business registration as a company or enterprise and Employees operating in the informal sector who work with or without formal written employment Contract.

Over years, managing and administering pension funds have persistently posed a great malady to Nigerian government before the emergence of Contributory Pension Scheme with most workers not shielded by any reasonable form of retirement benefit while the few schemes suffered from poor management [24]. Thus, it becomes necessary for this study to appraise how the pension assets accumulated by both the private and public sectors facilitate the improvement in welfare of pensioners as well as driving forward the wheel of economic development in Nigeria for the period 2004Q1 to 2019Q2.

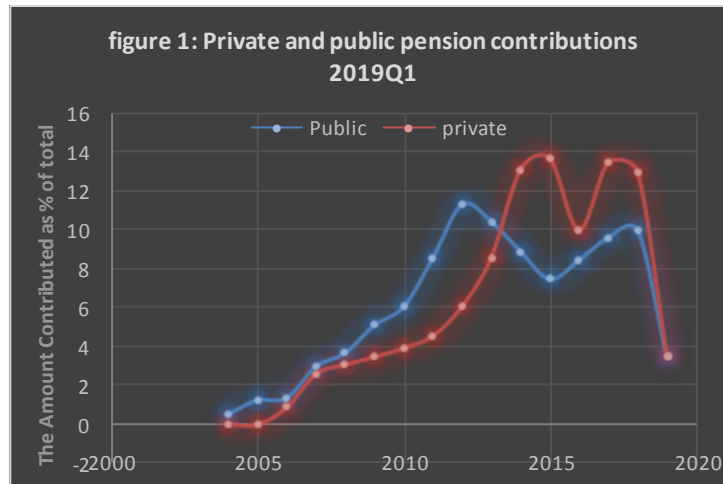
II. STYLIZED FACTS

The money realized via Contributory Pension funds that is managed and administered by Pension Fund Administrator who is certified to open Retiree Savings Account (RSA) on behalf of employees, invest and manage the pension funds while the pension assets are kept by the Pension Fund Custodian (PFC). The PFC is a financial institution that holds customer's securities for safekeeping so as to minimize the risk of thievery or loss. Custodians by this instance hold securities and other assets in electronic or physical form.

However, the insurance companies maintain the life insurance policy of every employee in the organization.

Furthermore, RSA is an account in which each employee is required by law to open in his name with Pension Fund Administrator of his choice. This individual account belongs to the employee and will remain with him for life even if

he/she changes employers or pension Fund Administrators (PFAs). Again, total pension contributions into the retirement savings account (RSA) of employees are a joint effort of both the private and public sectors. It can be demonstrated in figure 1 below with clear emphasis on how each sector over time has been contributing to the new scheme.



Source: Author’s extraction from PenCom, 2019Q1.

From figure 1 above, the total contributions accruing from the public sector have been increasing more than the private sector from 2004 to 2013 before trickling down. On the other hand, the private sector pension contribution recorded an increase after 2013 which exceeded public contribution to 2018 with 3.60%. This implied that, private sector

contributed more than the public after 2013 towards RSA unraveling a great loophole on the part of the government in managing CPS.

The RSA can be classified based on age and sex across both public and private sectors as illustrated in table 1 below:

Table 1: RSA registration by Age, Sex and Sectors

Age Range	Public Sector		Private sector		Total		% of total
	Male	Female	Male	Female	Male	Female	
Less than 30yrs	92,099	50,182	442,466	231,909	534,565	282,091	9.53
30-39yrs	688,515	348,440	1,446,565	581,604	2,135,170	930,044	35.77
40-49yrs	670,344	406,892	1,028,905	303,205	1,699,240	710,097	28.12
50-59yrs	577,462	335,426	523,442	108,235	1,100,900	443,661	18.02
60-65yrs	230,653	96,914	148,115	19,144	378,768	116,058	5.77
Above 65yrs	111,973	31,958	85,619	8,879	197,592	40,837	2.78
Total	2,371,046	1,269,812	3,675,203	1,252,976	6,046,240	2,522,780	100

Source: Own Compilation from PenCom, 2019Q1.

A review of RSA registration by age distribution of participants shows that the contributors in the age bracket “30-39” accounted for the highest proportion of RSA holders in 2014 at 35.77 percent of total registrations as shown in table 1. However, the RSA holders in the age bracket “40-49” made the second highest proportional contribution at 28.12 % in the year. In all, these two age brackets accounted for more than half of the RSA holders at 63.89 % in 2019. The table also shows that 45.30 % of total RSA holders in 2019 were less than 40 years. The aforesaid suggests that, RSA holders are relatively young. This offers a safety net for investing Pension Funds in relatively long-term investments without fear of any immediate call for liquidity. Thus, pension funds can be conveniently invested in infrastructure, bonds and

other available instruments of long-term maturity which will yield positive real returns whilst still ensuring safety of the pension asset. It is expected that RSA registration will continue to grow as more State Governments private sector employers, and informal sector implemented the CPS. The Pension Industry would continue to leverage on the stable macro-economic policies, robust economic growth, and collaboration with other regulatory agencies.

III. CONCEPTUAL FRAMEWORK

Pension represents the amount of money paid to retirees for economic maintenance due to past services rendered to the organization. According to [23], pension is defined as a method whereby a person pays into pension scheme a proportion of his/her earnings during his working life.

Pension to [1] is the amount paid by government or company to an employee after working for some specific period of time considered too old or ill to work or have reached the legal age of retirement. It is equally seen as the monthly sum paid to a retired employee until death because the officer has worked with the organization paying the sum. Pension scheme are broadly categorized into Defined Benefit (DB) and Defined Contribution (DC). In a DC scheme, the employee bears the ultimate investment risks as there is no guaranteed performance of the fund or recourse to the employer; while the investment risk is borne solely by the employer in a DB scheme. Pension is a vital social security scheme for employees in both public and private sectors of the economy.

Investment on the other hand is an activity that is engaged in by people who have savings that is, investments are made from savings, or in other words, people invest their savings but all savings are not investment. Investment may be defined as a commitment of funds made with the expectations of some positive rate of return; however, expectation of returns is an essential element of an investment. In the financial sense, investment can be conceptualized as the commitment of a person's fund to derive future gains in the form of income, dividend premium, pension benefit, or appreciation, in the value of their capital. Thus, investments in financial aspects cut across the purchase of shares, debentures, post office saving certificates and insurance policies capable of generating financial assets. For this study, the investment combines both money and capital markets and priority is given to how these investible funds are been committed to short- and long-term investments in Nigeria.

While Economic growth according to [12] is defined as the process through which the real per capita income of a country increases over a long period of time. This implies that, growth is access by increase in the amount of goods and services produced in a country. Similarly, [25] defined economic growth as the steady process by which the productive capacity of the economy is increased over time to bring about rising levels of national output and income. Economic growth therefore is conceptualized in this study as increases in aggregate product, either total or per capita, without reference to changes in the structure of the economy or in the social and cultural value systems. In this study, economic growth will be proxied by Real Gross Domestic Product (RGDP) which referred to the monetary worth of all goods and services produced in an economy during a period of time irrespective of the nationality of the people who produced the goods and services at constant basic prices.

The contributory Pension Scheme (CPS) as the name entails is contributory, fully funded, based on individual accounts that are privately managed by Pension Fund Administrators with the pension fund assets held by Pension Fund Custodians (PenCom, 2005). The contributions are deducted immediately from the salary of the employee and transferred to the relevant retirement savings account. By so doing, the pension funds exist from the onset and payments

will be made when due. Being a contributory scheme, employees are to contribute minimum of 7.5 percent of basic salary, housing and transport allowances while employers contribute a matching fund. So, the total minimum monthly contribution of a typical employee contributor under the scheme is 15 percent of basic salary, housing and transport allowances. However, according to the amended Act (PRA, 2014), a minimum sum of 18% of the sum of the monthly emolument is expected to be remitted to the Retirement Savings Account (RSA) of the employee with the PFA. This 18% is probably coming from both the employer and the employee with the former paying 10% and while 8% from the latter's payroll deductions in a CPS.

IV. EMPIRICAL REVIEW

The relationship between pension fund and economic growth in Nigeria was examined by [4] using secondary data collected from PenCom spanning from 2004 to 2016 for private and public sectors in Nigeria. To this effect, estimated results from multiple regression analyses using ordinary least square affirmed positive and significant relationship between contributory pension funds by public sector and real economic growth while a negative and insignificant tie exists between contributory pension funds by private sector and real economic growth. Similarly, [10] appraised the evidence on the effect of the operation of the funded pension scheme on economic growth in Nigeria using Error correction mechanism (ECM) and ordinary least square (OLS) between 2004 and 2014. Findings from its estimates revealed pension fund contribution from both private and public sectors in Nigeria affects economic growth in Nigeria positively.

[22] provided empirical evidence and impact of contributory pension scheme on economic growth for the period 2005 to 2016 in Nigeria. The study employed Statistical packages for Social Science (SPSS) software in computing the dataset sourced from PenCom annual reports and World Bank Development Indicators. The estimation results unraveled that, pension fund assets and contributory pension funds mobilized have positive but insignificant impact on economic growth in Nigeria. Relatedly, the impact of contributory pension scheme on Economic growth was evaluated by [24] for the period 2006 to 2016. The study used secondary data drawn from CBN and was analyzed using OLS methodology. Estimated findings reaffirmed that, contributory pension funds asset has significant impact on Economic growth while population of pensioners has no significant effect on the growth of the Nigerian economy.

Furthermore, the impact of contributory pension scheme on economic growth in Nigeria for the period 2004 to 2012 was examined by [18]. In computing the nexus between CPS and Economic growth, the study applied Ex-post-facto research design. Estimation results from Ordinary Least Square (OLS) uncovered that, pension funds have negative and significant impact on economic growth while pension savings had positive and significant impact on economic growth. The study also finds that pension savings contribution from both private and public sector has positive

and significant impact on economic growth. Similarly, an assessment of the impact of contributory pension scheme on Nigerian economic development was ascertained by [7]. The study used survey research design and sample size of 30 and 70 for both staff and customers of Legacy Pension Ltd for the period 2007 to 2010. It adopted correlation analysis for testing secondary data and ANOVA for the primary data. The estimation results from t-test affirmed that, CPS has significant positive impact on pension fund management and economic growth in Nigeria.[11] examined whether contributory pension scheme serve as a machinery of enhancing economic growth in Nigeria over the period 2007 to 2010. Secondary data collected from Annual Reports of National Pension Commission were analyzed using descriptive statistics, percentages and charts. The study reveals that Pension Fund Investments in domestic quoted equities amounted to N240.38 billion (2.36% of total market capitalization) in 2007, 3.17% in 2008, 4.42% in 2009 and 4.53% in 2010; also, the value of total Pension Fund Assets stood at N2,029 billion as at 2010. Therefore, CPS has significantly contributed to the increase in growth and development of not only the Nigerian capital market but the economy in general.

The impact of contributory pension scheme on employees' savings and investment in Nigeria particularly Anambra State was examined by [15]. The study employed cross-sectional primary data sourced through a structured questionnaire administered on 378 respondents, those that have been in the service for the period greater or equal to 5 years and on grade level greater or equals 8. The empirical analysis reveals that, majority of the respondents prefer to save outside any pensionscheme implying that they are participating because it is compulsory. Also, most of the respondents are not aware of their employers' own contribution to their CPS

[6] studied pension reforms in Nigeria for the period 2006 to 2010. The study reveals that the funded pension system has not had any significant impact on the development of financial market and that real sector investment was not boosted by savings from pension scheme. Also, the macroeconomic credibility of the government has declined. The willingness of Ebony State Government in Adopting CPS in Nigeria was assessed by [19]. The study made use of 108 personnel of the Department of Pension, office of the Head of Service and staff of the Sub-Treasury, Ebony State Ministry of Finance. Questionnaire was administered to 108 respondents, out of which 85 were returned. Data generated revealed government's unwillingness to pass the contributory pension bill into law.

Also, the lack of adequate and untimely budgetary provisions coupled with poor retirees' welfare smacked off the introduction of the new pension scheme, otherwise called the contributory pension scheme. In a related study undertaken by [3]; the effects of the new Pension Scheme on Retirees in Nigeria over the period 2004 to 2014 was analyzed. The study employed qualitative and exploratory approach as well as descriptive analysis of secondary data sourced from PenCom annual publications. It was confirmed

by the computation results that, most retirees are not aware of the operations of the pension managers, Pension Fund Administrators and Pension Fund Custodians. Also, the rules and regulations set in place to checkmate and safeguard retirees' fund failed to work as a result of ecological challenge in Nigeria.

[2]evaluated the challenge of pension Administration and capital formationin Nigerian. The cardinal goals of the study are to provide retirement benefit to retirees; to provide uniform guidelines for administration and payment of benefit. The pension scheme could be funded by contribution(s) either by the employer or the employee or employer/employee contribution. Pension scheme provides retirement benefit including incentives to employees. It was inferred by the research that; effective pension administration and capital formation is capable of industrializing the Nigerian economy.

[21] compared the old pension scheme with the Pension Reform Act 2004. The study adopted comparative analysis method to evaluate and contrast the pre-2004 pension scheme with Pension Reform Act 2004. The study finds that the PRA 2004 is better than the pre-2004 pension scheme, and that the PRA 2004 is expected to help remedy the deficiencies and inadequacies prevalent in the old pension scheme.

V. GAP IN PREVIOUS STUDIES

In the literature summarized above, there is no reservation whatsoever that a plethora of empirical works exists in the area of Contributory Pension funds investment in Nigeria though most of these studies were based on Pension Reform Act 2004, 2014 and its impact on Economic growth; PRA and retirees' benefits; Pension administration and capital formation [7], [10];[21][18];[4]. [19];[2]; while few others evaluated the impact of Contributory pension funds on economic growth in Nigeria [5];[11], [8],[19]; [12]; and its peculiar measures failed to capture the mechanism through which Contributory Pension funds investment have on Economic growth in Nigeria.

Most of the related studies reviewed used primary data on one hand while few others used primary as well as secondary dataset which made the results of their findings doubtful and inconclusive due to inadequate coverage and dearth of relevant information especially in an event of non-return of instruments from the field in respect to the operation and influence of the new pension scheme on investible assets. But as a point of departure from other studies, an updated and high frequency secondary data from 2004Q1 to 2019Q2 have been used in tracking the chain of transmission from short run to long run dynamism.

VI. METHODOLOGY

This section explained the relevant framework within which contributory pension fund investment affects economic growth in Nigeria. It demonstrates how the data will be collected and analyzed as well as how the model will be specified justifiable. It describes the means of data sources

and software package to be used for the analysis.

VII. DATA SOURCE AND DESCRIPTION

To empirically estimate the impact of Contributory Pension funds investment on economic growth in Nigeria, the study explored secondary data drawn as: Real Gross domestic product (RGDP) used as a measure of economic growth over the period of the study sourced from Central Bank of Nigeria [6]; Investment (INV) used as the measure of the aggregate of investments both in the money and capital markets in Nigeria extracted from World Bank Development Indicators [27]; Contributory pension funds by public sector (CPPUS) explored as funds contributed by the participating civil and public servants (government workers). The variable is used in this study as a percentage of the total contribution and is drawn from PenCom 2019Q2; Contributory pension funds by private sector (CPPRS) are funds pooled from the informal sector. This variable combined workers across low income earners; small and medium income enterprise (SME)

and high-income earners. Private sector pension funds contribution is used as a percentage of the total contribution sourced from PenCom 2019Q2. Total Contributory pension funds (TCP) are funds contributed by both public and private sectors drawn from PenCom 2019Q1; PenCom 2019Q2; and Market capitalization also known as market value is the share price times the number of shares outstanding including several domestic companies quoted. The variable in this case is expressed in this study as a percentage of gross domestic products for Nigeria drawn from Nigeria Stock Exchange (NSE, 2019). All data collated will be arranged and sorted in Microsoft excel for easy importation into the estimation software E-views 10.

VIII. MODEL SPECIFICATION

The model is specified to capture objectives one and two in estimating the impact of the dynamics of Contributory Pension fund investment on Economic growth in Nigeria as thus:

A. MODEL I

Model I is fraternized to encapsulate the impact of contributory pension fund investment by private sector on economic growth in Nigeria as established below:

$$RGDP_t = f(CPPRS_t, TCP_t, MCAP_t, INV_t) \dots \dots \dots (1)$$

It can be further put across in an estimable form to describe the dynamic impact of contributory Pension funds investment by private sector on economic growth in Nigeria as demonstrated below:

$$RGDP_t = \alpha + \beta_1 CPPRS_t + \beta_2 TCP_t + \beta_3 MCAP_t + \beta_4 INV_t + \mu_t \dots \dots \dots (2)$$

Where:

RGDP_t: Real gross domestic product as a measure of annual economic growth in Nigeria within the period t; **CPPRS_t**: Contributory pension funds by private sector as a percentage of the total contribution at time t, **TCP_t**: Total Contributory pension funds by both private and public sectors within the period t, **MCAP_t**: Market Capitalization at time t; **INV_t**: Investment (as a measure of the sum of investment in both money and capital markets) within the period t.

While other variables retained their previous meanings, Equation 2

α = Intercept, $\beta = 1 - 4$ Are the elasticities of the parameter estimate of the independent variables

μ_t = is the stochastic error term and other variables retaining their previous meanings.

The disturbance or residual terms (μ_t) are assumed to be normally distributed and white noise. The co integrating model can simply be specified as thus:

$$\Delta \mu_t = \delta \mu_{t-1} + \gamma_i \sum_{i=1}^k \Delta \mu_{t-1} + \varepsilon_t \dots \dots \dots (3)$$

Where Δ is the first difference operator, μ_t as errors generated from co-integrating regression, μ_{t-1} as one period lag of the co integrating regression error term, k described as the amount of lag used, ε_t is assumed to be normally distributed and white noise. The adopted Error Correction Model (ECM) for objective one has been demonstrated as follows:

$$RGDP_t = \varphi + \theta_1 CPPRS_t + \theta_2 TCP_t + \theta_3 MCAP_t + \theta_4 INV_t + \delta ECM_{t-1} + \varepsilon_t \dots \dots \dots (4)$$

Where ECM_{t-1} explained one period lag of the residual term from the long-run relationship (should there be co-integration); δ are the convergence speed of the ECM to equilibrium after long run shocks; $\theta = 1 - 4$ designated the parameters for the explanatory variables while ε_t is the residual term assumed to be normally distributed and white noise.

The a priori expectation of the independent variables in respect to the dependent variable shows that:

$$\theta_1, \theta_2, \theta_3, \theta_4 > 0.$$

This implies that, contributory pension funds by private sector; total contributory pension funds, market capitalization and Investment are expected to have a positive impact on economic growth in Nigeria because as the pension funds increases, it accrues to capital formation.

B. MODEL II

Model two explored the impact of contributory fund investment by public sector on economic growth in Nigeria demonstrated as hence:



$$RGDP_t = f(RGDP_{t-1}, CPPUS_t, TCP_t, MCAP_t, INV_t) \dots \dots \dots (5)$$

The dynamic effects of Contributory Pension funds by public sector on economic growth from equation 5 can be expressed in an estimable form as demonstrated below:

$$RGDP_t = \beta + \theta_1 RGDP_{t-1} + \theta_2 CPPUS_t + \theta_3 TCP_t + \theta_4 MCAP_t + \theta_5 INV_t + \mu_t \dots \dots \dots (6)$$

Where $RGDP_{t-1}$: described the one period lag of the real gross domestic product at time t
 $CPPUS_t$: Contributory pension funds by public sector for the period under study t
 While other variables retained their meanings as previously explained.

From equation 6 above, β is the intercept, $\theta = 1 - 5$ are the parameter estimates of the control variables and μ_t is the residual or stochastic error term. The disturbance or residual terms (μ_t) are assumed to be normally distributed and white noise. Thus, giving rise to a co-integrating model as specified below:

$$\Delta \mu_t = \delta \mu_{t-1} + \gamma_i \sum_{i=1}^k \Delta \mu_{t-1} + \varepsilon_t \dots \dots \dots (7)$$

Where Δ is the first difference operator, μ_t as errors generated from co-integrating regression, μ_{t-1} is the one period lag of the co integrating regression error term, k described as the maximum lag length used, ε_t is assumed to be normally distributed and white noise. The adopted Error Correction Model (ECM) for objective two takes the following expression:

$$RGDP_t = \sigma + \varphi RGDP_{t-1} + \theta CPPUS_t + \phi TCP_t + \beta MCAP_t + \alpha INV_t + \varpi ECM_{t-1} + \xi_t \dots \dots \dots (8)$$

Where ECM_{t-1} explained one period lag of the residual term from the long-run relationship (should there be co-integration); ϖ is the convergence speed of the ECM to equilibrium after long run shocks ; $\varphi, \theta, \phi, \beta, \alpha$ designated the parameters for the explanatory variables while ξ_t is the residual term that have been assumed to be normally distributed and white noise.

The a priori expectations of the independent variables in respect to the dependent variable presupposes that; the independent variables are expected to be greater than zero or positively related to economic growth:

$$\theta_1, \theta_2, \theta_3, \theta_4, \theta_5 > 0$$

IX. MODEL JUSTIFICATION

The choice of Ordinary Least Square (OLS) in estimating objectives one and two is informed by the nature of the dataset, availability of data, period of study and the model selected. The choice is also due to conflicting results emanating from previous methodological issues that could lead to misspecification of regression results, omitted variables and or endogeneity problem capable of producing biased estimates of some coefficients.

X. ESTIMATION TECHNIQUE

In analysing the dataset collated, the study employed techniques commonly used in quantitative research. The study engaged Ordinary Least Squares (OLS) multiple regression methodology which primarily confirm the descriptive properties of the variables by subjecting them to some series of pre –diagnostic test like unit root, co

integration and multi co linearity test. While the estimation results will be exposed to post-diagnostic test like: autocorrelation, heteroscedasticity, error specification test, stability test and normality test.

XI. RESULTS AND DISCUSSION

C. INTRODUCTION

This chapter deals with presentation and analysis of empirical data generated from various sources stated in the earlier part of the work for both the pre-diagnostic and post-diagnostic tests of regression using Eviews 10 statistical package.

D. PRE-DIAGNOSTIC TEST

i.Descriptive Statistic

The descriptive test is conducted to unveil the natural characteristics of the individual variables as they may be use in nesting the ties between the dependent and the independent variables.

Table 2: Summary of results from descriptive statistics

	RGDP	CPPUS	CPPRS	TCP	MCAP	INV
Mean	256.105	48.90000	1558.75	341.500	393.700	8.93364
Median	257.409	42.8400	1550.56	330.230	475.910	8.08000
Maximum	205.112	158.540	364221	591.540	561.070	24.5500
Minimum	21.1209	13.550	34.6500	12.8900	15.4100	0.00000
Std. dev	70.1432	52.51874	1368.603	178.1926	178.4432	6.857526
Kurtosis	1.677769	3.365501	1.625256	2.148773	2.888376	3.597947
Jarque-bera	0.89324	4.34281	2.12789	0.56342	3.23176	1.54380

Source: Owns compilation from Eviews 10, 2020.

As observed from the descriptive table above, the value of the mean and median of the variables are not too far from each other except that of market capitalization. This is an

indication of no extreme drift and thus making the variables normal for analysis. This analysis indicated that, the variables used in investigating the impact of contributory pension fund

investment on economic growth in Nigeria are significant.

ii. Unit root test

The essence of conducting unit root test is to find out if the mean and the variance of the variables are constant over time.

The pre-test analysis of the data began with Augmented Dickey Fuller (ADF) unit root tests at 5% critical value with its results as shown in table 3 below:

Table 3: Unit root test

Variables	ADF stat	1% Crit.Val	5% Crit. Val Value	10% Crit.Value	Constant	Order of integra	Lag-length
RGDP	-11.041	-3.634	-2.952	-2.952	Yes	I(1)	2
INV	-4.366	-3.634	-2.950	-2.608	NO	I(1)	2
CPPUS	-6.961	-3.634	-2.950	-2.608	NO	I(1)	2
CPPRS	-8.692	-3.634	-2.952	-2.610	NO	I(1)	2
TCP	-5.595	-3.628	-2.950	-2.608	Yes	I(1)	2
MCAP	-3.986	-3.634	-2.952	-2.608	Yes	I(1)	2

Source: Researcher's computation from Eviews 10, 2020.

From the table above, all the variables are non-stationery at levels. However, at first difference; thus, they are integrated of order one. Since all variables have the same order of integration with the independent variables at 5% level of significance; the need to conduct co-integration test become expedient.

To further establish the conformity of the models to the sufficient condition for error correction mechanism, co integration tests were conducted by using the reduced ranked procedure developed by [15] and [14] as well as [9] to ascertain whether or not the dependent variable is co-integrated with the explanatory variables.

iii. Co integration Analysis

Unrestricted Co integration Rank Test (Trace) for model one

Hypothesized No. of CE(s)	Eigen-value	Trace Statistic	0.05 critical value	Prob.**
None	0.494480	65.76060	69.81889	0.1010
Atmost1	0.426543	39.83822	47.85613	0.2283
Atmost2	0.235699	18.70751	29.79707	0.5141
Atmost3	0.184449	8.493357	15.49471	0.4142

Trace test indicates no co integration at the 0.05 level

*denotes rejection of the hypothesis at the 0.05 level

** Mackinnon Haug-Michelis (1999) p-value

Unrestricted Co integration Rank test (Maximum Eigen value) for model one

Hypothesized no. of CE (s)	Eigen- value	Maxi-Eigen stat	0.05 Crit. Val	Prob.*
None	0.4944	25.9223	33.876	0.3255
Atmost1	0.4265	21.1307	27.5843	0.0084
Atmost2	0.2356	10.2141	21.1316	0.7243
Atmost3	0.1844	7.7478	14.2646	0.4049

Max-eigen value test indicates 1 co integration at the 0.05 level

*Denotes rejection of the hypothesis is at the 0.05 level

** Mackinnon – Haug-Michelis (1999) p-values

It is asymptotically hypothesized that, when the trace statistic is greater than the critical value at 0.05 level of significance, the null hypothesis should be rejected or otherwise do no reject. Alternatively, when the p-value is less than 0.05 critical values, the null hypothesis should be rejected or otherwise do not reject. From table 4a above, it is glaring that we have one; two and three co integrating equations which we ought not to reject from model one.

It is inferred further that, when the max-eigen statistic is greater than the critical value, the null hypothesis should be rejected or when the critical value at 0.05 level is greater than the max-eigen statistic, the null hypothesis should not be rejected implying the variables have a long-run relationship which has been confirmed by our results in table 4b above with one; two and three co integrating equations.

Table 5: Co-integration results for Model two

Variable	t-ADF	Critical Val. @ 1 %	Critical Val. @ 5 %	Critical Val. @ 10 %
Residual (U_{t-1})	-3.612	-3.628	-2.950	-2.608

Source: Author’s compilation from Eviews 10, 2020.

The Engle-Granger (1987) approach for testing the null hypothesis of no co integration for the residual from equation 8 is $I(0)$ suggesting that, the null hypothesis of no co integration is rejected at 5% level of significance. This is justified by the fact that, the calculated ADF is more negative than the critical value at 5% level of significance (-3.612 > -2.950). Thus, there exist a long run relationship streaming between economic growth and contributory pension funds by public sector; total contributory pension funds by both public

and private sector; Market capitalization and Investment.

iv. Multicollinearity

Multicollinearity is a statistical phenomenon in which there exists a perfect or exact relationship between two or more explanatory variables. It has been suggested that, if the pair-wise correlation coefficient between two regressions are high, say in excess of 0.8; then multicollinearity exist or is present and is capable of posing serious estimation challenge.

Table 6: Multicollinearity of model one

	RGDP	CPPRS	TCP	MCAP	INV
RGDP	1.00000				
CPPRS	0.020073	1.00000			
TCP	0.020073	0.18915	1.00000		
MCAP	0.020073	0.18915	0.07082	1.00000	
INV	0.020073	0.18915	0.07082	0.01334	1.00000

Source: Own compilation from Eviews 10, 2020.

Table 7: Multicollinearity of model two

	RGDP	CPPUS	TCP	MCAP	INV
RGDP	1.0000				
CPPUS	0.027561	1.00000			
TCP	0.027561	0.0162	1.00000		
MCAP	0.027561	0.0162	0.07825	1.00000	
INV	0.027561	0.0162	0.16584	0.09152	1.00000

Source: Own compilation from Eviews 10, 2020.

From the correlation matrices intables 6 and 7 above; it can be affirmed that there is no pair-wise correlation coefficient that exceeded 0.8. Thus, there is no multicollinearity among the independent variables. Having met the pre-diagnostic requirements, the analysis and interpretations of the models become crucial as shown below.

XII. ESTIMATION AND INTERPRETATION OF MODEL ONE

The results from the long-run equation are however presented below:

Table 8: Long-run Result for model One
Dependent variable: RGDP

Variable	Coefficient	t-Stat	Prob. Val
C	26.5116	4.7589	0.0071
CPPRS	1.1483	2.4042	0.0023
TCP	-0.5602	-3.9671	0.0132
MCAP	-1.1396	-2.6429	0.05243
INV	0.3055	5.5406	0.0000
$R^2 = 0.9486$		Adjusted $R^2 = 0.9321$	
F-stat.= 24.3571		Prob. (F-stat.) = 0.000012	
Durbin-Watson = 1.6240			

Source: Compiled from Eviews 10, 2020.

The coefficient of contributory pension funds by private sector (CPPRS) and Investment (INV) are statistically significant and positively signed in consonance with apriori. This implies that, any unit increase in CPPRS and INV boost economic growth by 1.1483 and 0.3055 respectively in Nigeria. The positive and significant relationship between INV and RGDP concurred to the findings of [22] which justified increased in economic development as a result of an increase in investible assets drawn from improvement in productive economic activities. Furthermore, the coefficient

of total contributory pension funds by both private and public sector (TCP) and Market capitalization (MCAP) are negative and statistically relevant. By implication, any unit decrease in TCP and MCAP will lead to 0.5602 and 1.1396 increase in Economic growth in Nigeria in that order. This finding agreed to the result of [11]. The negative tie between TCP and economic growth revealed that, it would have had the needed impact if disaggregated. Also, the negative impact between market capitalization and economic growth designated that pension contribution do not drive capital market but rather

foreign investment and investment from other sectors of the economy.

Parsimonious Error Correction Results for model one
Dependent Variable: RGDP

Variable	Coefficient	t-Stat	Prob.Val
CPPRS	87.144537	0.563308	0.684201
D(CPPRS(-1))	0.173581	0.241340	0.190235
TCP	3.120369	0.879212	0.365870
D(TCP(-1))	-0.149376	-0.67902	0.28135
MCAP	-0.098276	-3.01853	0.002173
D(MCAP(-1))	12.002218	1.56843	0.089256
INV	-0.892781	-2.03841	0.002036
D(INV(-1))	0.985190	4.21098	0.015327
ECM(-1)	-0.728360	-2.43680	0.000013
R ² =0.8924 F=65.038			
Adjusted-R ² =0.8705 Prob(F-stat)=0.00001			
Durbin –Watson =1.8954			

SOURCE: Author’s Computation from Eviews 10, 2020.

The coefficient estimates for the ECM_{t-1} (-0.728360) term above is negative and statistically significant (-2.43680) implying that, any change in an attempt to boost a sustained economic growth in Nigeria will be restored at an average speed of 72 percent the next year by CPPRS, TCP, MCAP and INV. The coefficient of determination R² (**0.8924**)

justified the holistic influence of the explanatory variables in stimulating the flux in the dependent variable (economic growth). Therefore, changes in Economic growth are explained by 89% variation in the explanatory variables while 11% come from other variables outside the model.

Summary result of post-diagnostic test for model one

Results of diagnostic test	t-statistic	Prob. Val
Breusch –Godfrey Correlation LM test(F-stat)	1.34715	0.2785
Breusch-Pagan Godfrey Heteroscedasticity Test (F-stat)	0.75466	0.5904
Ramsey RESET test (F-stat)	1.48728	0.2340
Normality Test (Jarque-Bera)	1.32567	0.5149

Source: Author’s compilation from Eviews 10, 2020.

From table 10 above, the robustness of the diagnostic test fulfils the assumptions and non-violation of the classical linear regression model. This is because the results imply the null hypotheses of no serial correlation, no misspecification error, no heteroscedasticity and normally distributed error

term cannot be rejected. Thus, this allows for the interpretation of the regression result. The long-run estimation cannot be regarded as being spurious since a long-run relationship has been identified and the error being corrected at 5% critical level.

XIII. ESTIMATION AND INTERPRETATION OF MODEL TWO

Results from long run regression for model two
Dependent variable: RGDP

Variable	Coefficient	T-statistic	Prob. Value
C	25.0736	2.981671	0.000006
RGDP _(t-1)	0.897161	2.981736	0.008725
CPPUS	0.907826	3.762901	0.001763
TCP	-0.29862	-2.219037	0.000728
MCAP	1.029813	1.019865	0.278619
INV	-1.872601	-0.345165	0.876341
R ² = 0.94976 F-stat=56.80924			
Adjusted R ² =0.930186 Prob(f-stat)= 0.000008 DW= 1.898715			

Source: Own compilation from Eviews 10, 2020.

In table 11 above, the impact of the estimated coefficient of economic growth of last year on the current year is positive and statistically significant. This implied that, the investible assets and savings accruable from pension fund investment of last year greatly influenced current year’s economic

performance. That is, any one-point increase in current year’s economic growth must be determined by the (0.897161) rise in last year’s performance. More remarkably too, CPPUS is positive and statistically significance in accordance to a priori. By extension, any one-point rise in CPPUS increases

economic growth in Nigeria by 0.907826 in line with the studies [5]; [11].

On the contrary, TCP and INV have negative influence on economic growth. Discreetly, any one-pointfall in TCP and INV results in 0.29862 and 1.872601 rise in economic growth in Nigeria. Though the influence of total contribution by both private and public sector (TCP) is statistically significant, that

of INV is insignificant in determining economic growth. Thus, Economic growth is better affected positively if the contributory pension fund is disaggregated. Also, Market capitalization has positive but insignificant influence on economic growth owing to the intermittent influx of shares and their incessant interference by the political atmosphere in Nigeria.

The Parsimonious Error Correction model for model two

Variable	Coefficient	T-stat	Prob. Value
C	33.198765	2.876108	0.000865
RGDP(-1)	-0.298710	-3.409289	0.003482
CPPUS	0.671098	2.862012	0.018765
D(CPPUS)	-2.198038	-1.761908	0.278905
TCP	-0.369201	-0.896543	0.897204
D(TCP(-1))	0.267919	1.0297638	0.198379
MCAP	0.672981	2.876018	0.002876
D(MCAP(-1))	2.1983760	0.754982	0.897620
INV	-0.328790	-1.987543	0.085289
D(INV(-1))	0.0987641	5.398240	0.000876
ECM(-1)	-0.749872	-2.035490	0.000269
R²: 0.824871 F-stat= 44.098735 Durbin-Watson= 1.896732			
Adjusted R²= 0.813896 Prob (F-stat) = 0.000026			

Source: Own Compilation from Eviews 10, 2020.

As contained in table 12 above, the coefficient of the Error Correction Term is -0.749872 and is statistically significant and has the appropriate convergent sign. By extension, any deviation from the long-run Economic growth can be reinstated at the pace of 75 percent in the next quarter within the period of the study. This implied further that, change in economic growth is grossly influenced by 82 coefficients of determination.

XIV. CONCLUSION

This study offered evidence on the effect of contributory pension fund investment on economic growth using Eviews 10. It is undauntedly obvious from the analysis that increases in pension fund contribution either from the private or public sector in Nigeria positively and significantly affected economic growth as the scheme encouraged the release of un-invested funds by channelling excess liquidity into the capital and money markets. Also, the study unravelled that sectoral pension fund contribution has formed huge investment of funds in the capital and money markets thereby creating employment opportunities as well as improving investment climate. The estimation results further revealed that both the private and the public sector whether aggregated or disaggregated, market capitalization and investment in money and capital markets can have an appreciable effect on sustained economic growth in Nigeria. The values of the new pension scheme are ideally laudable and superior to those of the past schemes. However, the past pension schemes were plagued with financial misappropriation (corruption) which gave vent to its ineffectiveness and subsequent abrogation to this end, the study recommended that the Gross Domestic Product statistics reported from Nigeria can be improved upon if the estimates of the unreported (hidden) activities are captured. Furthermore, there is need for existing national statistical agencies to increase their capacities for data

collection and documentation in order to deepen further analysis and understanding of the informal sector.

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