PRIVATIZATION, FISCAL POLICY AND MACRO-ECONOMIC AGGREGATES IN NIGERIA "AN IMPACT ANALYSIS"

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ABSTRACT

Privatization of public enterprises was introduced in Nigeria in the mid-1980s, as one of the key public sector policy initiated towards maintaining stability in fiscal and macroeconomic aggregates. This study investigates the impact of privatization on fiscal policy and its interactional effects on macroeconomic aggregates in Nigeria from 1986 to 2012. The study employs Ordinary Least Square method of estimation on a range of structural equation models- Auto-regressive Distributed Lag Model (ARDL) and Granger Causality Wald Test. Results shows that a percentage increase in privatization proceed increases Nigeria's fiscal responsibility significantly by 13.49% but a percentage increase in the lag of privatization proceed decreases current government expenditure by about 6.3%, though this is not significant. Privatization proceed leads to growth in government expenditure, per capita expenditure, unemployment rate, exchange rate, and GDP with a feedback effect from unemployment rate and GDP. Government expenditure responds to self- produced shocks and transmits positive shock on privatization proceed, but privatization does not produce significant responses and/or shocks to government expenditure. It also does not produce/transmit positive shocks to per capita expenditure, unemployment rate and on itself. Government should therefore, intensify its drive in privatization of public enterprises with closer attention to the management of privatization proceed.

Key Words: *Privatization; Fiscal Policy; Macroeconomic Variable; Government Expenditure*

1. INTRODUCTION

In 1970s and up to 1980s many developing countries including Nigeria made extensive use of Public Enterprises (PEs), and this was established to enhance Nigeria's socio- economic development, especially after independence in 1960. The major concern in this regard had been to accelerate development and economic self-reliance through ''economic nationalism.'' The early 1970 marked the increasing prominence in the role of oil sector in the Nigerian economy as evidenced in the boom. The major aim of government at that time was to convert as much as possible, the increasing oil revenue into social, physical, and economic infrastructural investments. Therefore, Nigeria relied heavily on public enterprises, up to the mid-1980s, for the development, management and allocation of utilities and social services (Ayodele 2004),

According to Adeyemo (2005), Nigerian public enterprises have come under gross criticism in spite of the impetus given to them; their problems were so enormous that many government/Nigerians became greatly disillusioned. These criticisms range from lack of productivity/ profitability to reliance on large government subsidies, non-repayment of debt, among others. Ogulano (1986) once argued that between 1975 and 1995, government capital investments in public enterprises totaled about 800billion Naira. In addition to equity investments, government gave subsidies of N11.5 billion to various government enterprises. All these expenditures contributed in no small measure to increase government expenditures and deficits. However, given the negative financial impacts of the global economic crisis on the Nigerian economy in the early eighties, the public sector- led development strategy became unsustainable and there came a strong need for reduction (Nwoye 2010).

To address these emerging imbalances, intensification of privatization and commercialization of Nigeria's public enterprises was embraced as one of options in line with the Structural Adjustment Programme (SAP) policy. Upon this, a broad range of objectives have been put forward by governments to justify privatization, although the priority given to each has "varied both across countries and within countries over time" (Cook and Uchida 2003). These objectives majorly grouped into microeconomic and macroeconomic objectives; at microeconomic level, "Privatization is seen primarily as a means of improving the efficiency of enterprises" (Bartel and Harrison 1999). Proponents of privatization argued that "transferring public enterprises to the private sector will expose these enterprises to the discipline of the market, thereby leading them to increase efficiency" (Richard and Mansoor 1998). While at macroeconomic level, Pinherio and Schneider (1995), asserts that Privatization is perceived to be part of the fiscal solution, other macroeconomic effects are that privatization encourages domestic and foreign capital investment locally. It reflects the

government's commitment to economic reform and a positive image to attract foreign investment, also it helps to develop the capital market, create new mechanisms for mobilizing capital and attracting national capital outside the country. It can also enhance employment opportunities, optimizing the use of the national work force, and ensuring the continued equitable increase of individual income.

However, it has not been established empirical in existing literature - the growth relationship/interaction between privatization, fiscal policy and macroeconomic variables in Nigeria. On one hand, some scholars posit that privatization produces financial and operational benefits; at least enough to offset the economic dislocation linked to it. On the other hand, others are of the view that where such improvement is recorded, it is attributed to increased competition rather than change of ownership. In the shades of these augments, the impact relationship between privatization policy, fiscal and macro- economic aggregates in Nigeria is thus an empirical question.

Despite this salient question, there is a dearth of Nigeria-base empirical studies investigating the growth interaction between privatization and other macro-economic variables in existing literature. Few attempts by authors like as Odeh (2011), Nwoye (2008), Adeyemo and Adeleke (2008) are mere qualitative reviews of Nigeria's privatization and commercialization policies. Some empirical studies have tried to argue on the impact of privatization on firm productivity in Nigeria, (see, Jerome (2003) and Amakom 2003). Pockets of empirical studies in this regard are found in foreign-base studies which include Barnett et al. (2000), Birch and Haar (2000), Jeronimo et al. (2000), Katsoulakos and Likoyanni (2002), Dolenc (2009), Kibikyo (2011), Plane (1997), Cook and Uchida, (2003), Filipovic (2005), Javadshahraki (2006), Boubakri et al. (2009). Most of the studies however, are cross-country based with little or no country-specifics.

The pertinent question still remain; is there interrelationship between privatization, fiscal policy and macro-economic aggregates in Nigeria?, Does variation in Nigeria's privatization process significantly account for variations in fiscal and macro-economic aggregates, in order to answer these research questions, this study examine data from 1986 to 2012 while employing Auto-regressive Distributed Lag Model (ARDL) and Granger Causality Wald Test. And the null hypotheses tested were:

- **H_{01}**: There is no significant impact of privatization proceed and selected macro-economic aggregates on fiscal policy in Nigeria.

- **H_{02}**: There is no causal relationship among privatization proceed, fiscal and macro-economic variables in Nigeria.

Theoretical and Empirical Literature;

According to Fillipovic (2005), Privatization is defined as "A method of allocating assets and functions from public sector to the private sector". As such privatization constitutes a fundamental structural change of ownership which is transferred from public to private sector, leading to a drastic shift in the underlying incentives of the respective owners and in the objectives of the firm (from politically-oriented to profit-oriented). Conceptually, the commercialization and privatization Decree 1988 perceives Privatization as, "The transfer of government owned shareholding in designated enterprises to private shareholder -- comprising individuals and corporate bodies". It involves the sales of equities in public enterprises to private investors, with or without the loss of government control in these organizations. It may take the form of deregulation of state monopolies by the abrogation of legislation restricting entry into economic activities. A world-wide era of privatization has been picking up momentum in recent decades, making it a fairly new trend in the areas of economic policy. The modern idea of privatization as an economic policy was pursed for the first time by the Federal Republic of Germany in 1957, when the government eventually sold its majority stake in Volkswagen to private investors. The next big move in privatization came in 1980s with Margret Thatcher's privatization of Britain's Telecom and Chirac's (former French Prime Minister) privatization of government-owned communication companies (Magginson, Nash, and Randenborgh 1996). Some Latin American countries launched significant privatization programs following decades of static economic policies, trade protection, heavy-headed regulation and even nationalization.

Another major contribution to the world wide process of privatization has been between the falls of the communist regime in Eastern Europe and the former Soviet Union. Recently, countries like China, and Cuba, as well as many other developing countries have begun to implement privatization in the hope of stimulating economic growth. This has spread all over the world and has been one of the major economic phenomena in the world economic history. The largest privatization in history took place in Russia between 1992 and 1995, when as many as75,000 small and medium scale enterprises were auctioned, 14,000 medium to large scale firms were also sold. In Africa, privatization took off in Ghana in 1983 and subsequently in Nigeria in 1986. It has been adopted by other African countries.

From the theoretical perspective of privatization (the Property Right Theory, Public Choice and Agency theory), it is expected that at the microeconomic level, privatized firms are well disposed to increase/enhance efficiency and productivity. There are some empirical works that supports the increased efficiency of the privatized firms **Gover (2002)** cover thirty two (32) firms which accounts for 60 percent of total transactions in **Bolivia**, the study checks whether firm's performance improved after privatization period of 1992 to 1999. It discovered that privatization had a significant impact on operating efficiency, profitability increased by over 100%, while employment fell by 15 per cent. While **Amakom, (2003**) carries out a study on three (3) privatized firms in **Nigeria**, namely; FSB International Bank Plc, Aba Textile Mill Plc and Ashaka Cement Plc, using Data Envelopment Analysis (DEA), he reveals a significant improvement in productivity of the firms. Also, **Afeikhena (2003)** assess three newly privatized firms in **Nigeria**, **t**he study appraises the post-privatization performance of the United Bank for Africa (UBA), Ashaka Cement Co. PLC and Unipetrol Nigeria Limited; the specific indicators examined are profitability, productive efficiency, employment, capital investment, output, prices and taxes. He deployed envelopment analysis (DEA) to measure the changes in any given indicator of performance by comparing its average value, five years before and five years after privatization and the results, albeit mixed, shows significant increases in these indicators and privatization is also associated with increase in technical efficiency in the affected enterprises.

At macroeconomic level; some literature covers the impact of privatization on fiscal and macroeconomic aggregates, together with studies on the impact of privatization on economic growth which is the ultimate objective of privatization. As pointed out by Cook and Uchida (2003), "economic performance is likely to be influenced by factors that affect the wider economic environment in which privatized firms operate". Therefore, an attempt is made underneath to survey some of these works.

Barnett (2000) use panel data analysis to find the fiscal and macro-economic impact of privatization on Transition and Non-transition countries, one of his major findings is that privatization proceeds transferred to the budget tend to be saved. Specifically, they were used to reduce domestic financing, and debt stock, while on the other hand total privatization proceed is correlated with an improved macroeconomic aggregates. While **Birch and Haar (2000)** did a descriptive study of the privatization experience in the last two decades in Argentina, Brazil, Chile, Colombia, Mexico, Peru, Venezuela and some Caribbean countries; they found positive effects of privatization on short and long-run macroeconomic conditions- which revealed a positive effect of privatization on productivity and a negative effect on employment. **Jeronimo (2003)** writes on "Privatization in European Economic and Monetary Union" using panel data analysis to examine whether privatization receipts have been used

as a means of reducing government deficit in Spain, Greece, Italy and Portugal. The result indicates that there is a negative and statistically significant relationship between receipts from privatization and deficit for the period under review, for the four southern countries. **Buobarkri et el, (2003)** explore the impact of privatization on fiscal variables, growth, unemployment and investment using country-level panel data of eighteen (18) countries which included ten (10) developing countries, the rest being transition economies; The empirical evidence indicates that privatization is positively correlated with real GDP growth rates. The estimated result, suggested that privatization of 1% of GDP would be associated with an increase on the real GDP growth rate of 0.5% in the year of privatization and 0.4% in the following year. For the non-transition sample, the effect would be a 1.1% increase in real GDP growth rate in the year of privatization and 0.8% in the following year. However, as acknowledged by the author himself, the results of this study are based on a select sample of countries and for a limited period for which data was available, but the author did not specify the precise span of years for the study.

While **Dolenc (2009)** analyzes the impact of privatization in a post-communist economy to check the macroeconomic effect of privatization in Slovenia, using co-integration analysis to test the effect of privatization proceed on selected macroeconomic variables; Engel Granger test was used at 5% level of serial correlation and he concluded that privatization has no statistical significant impact on any of the variables, except on public debt. On the other hand, **Sunderland (2011)** uses pooled OLS (Ordinary least square) regression to check the fiscal impact of privatization in forty seven (47) developing Countries using information from World Bank's database on privatization revenue from 1988 to 2008 and panel data technique. He found that privatization revenue is correlated with a worsening of the fiscal budget balance – lending support that revenues from the sales of State-Owned Enterprises are used to finance a large deficit. **Kibikyo D. (2011)** evaluates fiscal impact of privatization in Uganda between 1992 and 2007. The study investigates the fiscal impact of privatization in Uganda and the findings showed a mixed result.

2. METHODS

There are various theoretical models that have been developed to explain the different ways in which privatization as a process of economic reform could be beneficial to the macro-economy at large. For example (see Barnet 2000, Katsoulakos and Likoyanni 2002), but the most recent is Dolenc (2009) who employed a simple regression model using Cointegration and Eager – Granger statistics, to test the effect of privatization proceed on selected macro-economic variable. This study uses structural equation models, to unravel the effects of

privatization on fiscal policy, and macro-economic aggregates in Nigeria. To achieve this, we examine the effects in two major ways – privatization and selected macroeconomic impact on fiscal policy, and causality among the variables. Therefore, we employ Autoregressive Distributed Lag Model (ARDL) and Granger Causality Wald model.

2.1 Model Specification

i. Unit-Root Test:

There often exists the problem of non-stationarity in empirical research involving time series data and this renders the traditional tools of econometrics (like OLS and 2SLS) inappropriate. To overcome this unit-root problem, we test for stationarity of the series in use. The Augmented Dickey-Fuller test (ADF) is of choice in this study because of its efficiency in detecting unit root. It is specified as follows:

$$\Delta Y_t = \theta_o + \theta_1 Y_{t-1} + \sum_{i=1}^{k} b_i \Delta Y_{t-i} + \mu_t \quad \text{.....} \quad (1)$$

where, Y_t is a vector of all variables in the model θ_i and b_i are parameters of the model, μ_t is the white noise at time while k and Δ remain as defined in equation (6) above. This we will achieve, conducting the test by first or second level difference if the series are integrated of order one or order two (i.e. I(1) or I(2)). The null hypothesis here is that Y_t has a unit root (that is, non-stationary) and the alternative is that there is no unit root (that is, stationary). If the variables turn out to contain unit roots, we will therefore, conclude that they are non-stationary.

- **Cointegration Test:** Next is cointegration test to check for existence of a stable long-run relationship among the variables; given that cointegration test examines whether some linear combination of non-stationary series in the regression produces a white noise process or not. The ADF cointegration test is employed in the estimation. Should a long-run relationship be identified among the variables, the short run dynamics will be examined using the Error-Correction Mechanism (ECM).

ii. The Auto Regressive Distributed Lag (ARDL) for Objective (1)

In other to capture objective I (that is, impact of privatization proceed and selected macro-economic aggregates on fiscal policy) we adopt Auto Regressive Distributed Lag (ARDL) Model specified as follows:

- **Functional Specification:**

GOVTEXP = *f(*PRIVP, PEXP, UNEMR, GFCAP, EXHR, GDP) ..... (2)

Equation (1) describes fiscal policy, proxied by government expenditure (GOVTEXP) as a function of PRIVP, PEXP, UNEMR, GFCAP, EXHR, INFL and GDP.

where, GOVTEXP = Government Expenditure

PRIVP = Privatisation Proceeds

PEXP = Per capita Expenditure

UNEMR = Unemployment Rate

GFCAP = Gross Fixed Capital Formation

EXHR = Exchange Rate,

GDP = Gross Domestic Product

and f = functional notation..

- **Econometric form of the ARDL Model**

In other to take care of the presence of white noise, we introduce the error term in the model which transforms the mathematical model to an econometric model as specified in equation (3) below:

$$\mathbf{GOVTEXP}_t = b_o + b_1\mathbf{PRIVP}_t + b_2\mathbf{PEXP}_t + b_3\mathbf{UNEMR}_t + b_4\mathbf{GFCAP}_t + b_5\mathbf{EXHR}_t + b_6\mathbf{INFL}_t + b_7\mathbf{GDP}_t + \mathbf{b}_8\mathbf{GOVTEXP}_{t-1} + b_9\mathbf{PRIVP}_{t-1} + b_{10}\mathbf{PEXP}_{t-1} + b_{11}\mathbf{UNEMR}_{t-1} + b_{12}\mathbf{GFCAP}_{t-1} + b_{13}\mathbf{EXHR}_{t-1} + b_{14}\mathbf{INFL}_{t-1} + b_{15}\mathbf{GDP}_{t-1} + \mu \text{ ..... (3)}$$

where, Inflation (INFL) is introduced in the model as a control variable. $b_{i's}$ are the model parameters, t is current year while t-1denotes the previous year. Other variables remain as defined in equation (1) above. The ARDL model expresses government expenditure as dependent on the explanatory variables and their previous values where, ***μ*** = the white noise.

iii. Granger Causality Test for Objective (2)

To solve the second research objective of checking if there exists a causal relationship between Nigeria's privatization proceeds and macro-economic variables within the period under review, we employ the Granger causality test. Accordingly, the general form is specified as follows:

$$Y_t = \beta_o + \sum_{k=1}^{m} \beta_k Y_{t-K} + \sum_{P=1}^{n} \alpha_P X_{t-P} + \mu_t \text{ ..... (5)}$$

$$X_t = \gamma_o + \sum_{k=1}^{m} \lambda_k Y_{t-K} + \sum_{P=1}^{n} \gamma_P X_{t-P} + V_t \text{ ..... (6)}$$

where; Y_t and X_t are the variables μ_t and V_t are the mutual uncorrelated error terms, *t* denotes time and *K* and *P* are the number of lags. The null hypothesis is $\alpha p = 0$ for all *P's* and $\lambda k = 0$ for all *K's* versus the alternative hypothesis that $\alpha p \neq 0$ and $\lambda k \neq 0$ for at least some *P's* and *K's*. If the coefficient $\alpha p's$ are statistically significant while, λk 's are not, then *X* is said to cause *Y*. On the other hand, if λk 's are statistically significant while $\alpha p's$ are not, then *Y* is said to cause *X* (uni-directional causality). However, if both αp and λk are statistically significant, then causality is said to run both sides which is known as bilateral or bi-directional causality. We adopt a Granger causality Wald test for this purpose. In this case, if the probability of the computed Chi^2-value is sufficiently low (less than 0.05) we reject the null hypothesis, and accept if otherwise.

- **Variable Definition**

Privatization Variable (PRIVP): Privatization Proceed refers to funds that are accruing to government as a result of change in ownership of government investment in public enterprises. It has been variously been used by Plane (1997), Cook and Uchida, (2003). Boubakri et al, (2004) and privatization related studies. Plane (1997), Cook and Uchida (2003) and Barnett (2000) argued that total privatization proceed is a good proxy in accessing the relationship between it and other macro-economic variables. Its economic relationship with government expenditure is positive.

Government Expenditure (GOVTEXP): is government spending incurred by central, state and local governments of a country in a bid to satisfy the collective social wants of the people. A fiscal crisis is a major determinant of; if not a necessary condition for the decision to privatize public enterprises. Privatization is perceived a part of fiscal solution. Since it provides revenue that can be used to offset deficit and free government from the burden of subsidizing loss-making state enterprises. Eliminating subsidies given to state enterprises has a clear positive impact. In many cases, government has used revenues from privatization to reduce the stock of public debt, but the ultimate use of privatization revenues is a function of the overall fiscal performance of government (see Katsolakos 2003, Barnet 2000, and IMF 2000)

- **Source of Data**

Annual time series data is sourced from World Bank Indicators (2010) and 2011 edition of the CBN statistical bulletin while 2011 and 2012 series are extrapolated using the popular Moving Average Method.

- **Software Packages**

Stata11 is used to run the regression while Microsoft Excel 2013 is used to enter the data.

3. RESULTS ;

The unit root test result indicates that all variables (log_govtexp, log_gdp, log_infl, log_exhr, log_gfcap, log_pexp, log_unemr, and log_privp) are all integrated of order (1). This is because the absolute values of their computed ADF test statistics are greater than the absolute value of their tabulated ADF critical values at their level form given 5% level of significance. The unit root is tested with trends and intercept at level form but the result indicates that both the trends and intercepts are insignificant. log_govtexp, log_gdp, log_infl, log_exhr, log_gfcap, log_pexp, log_unemr and log_privp are not stationary at level with insignificant trend and intercepts but are stationary at 1st difference. Hence, they are integrated of order one I(1). The result is summarized in table 3.1 below.

Table 3.1 Summary of Unit Root Test Result

Variables	ADF t-statistics	5% Critical Value	Order of Integration
D.log_govtexp	-7.671	-3.000	order one (i.e. I(1))
D.Log_gdp	-3.616	-3.000	I(1)
D.log_infl	-5.074	-3.000	I(1)
D.log_exhr	-4.395	-3.000	I(1)
D.log_gfcap	-3.753	-3.000	I(1)
D.log_pexp	-9.497	-3.000	I(1)
D.log_unemr	-6.963	-3.000	I(1)
D.log_privp	-5.983	-3.000	I(1)

- **Cointegration Test:**

In order to investigate whether there exist long run relationship among the variables using the Augmented Dickey-Fuller (ADF) cointegration test at 5% level of significance. The result reveals that all variables do not have long run relationship with log_govtexp. This implies that they are not cointegrated (see Appendix for result). This is because, the absolute value of the computed Augmented Dickey-Fuller test statistic (-2.240) is less than the tabulated Augmented Dickey-Fuller statistic (-3.000) at 5% level of significance. Therefore, there is no cointegration among the variables.

- **Presentation of (ARDL) Regression Result for Objective (1)**

To achieve objective 1, we adopt Auto Regressive Distributed Lag (ARDL) Model. After a granger marginalization of the variables, some of the variables could not survive the test and consequently, dropped while Log_govtexp, log_gdp, log_infl, log_exhr, log_gfcap, log_privp, log_unemr, and log_privp survived the marginalization process. The result of the Auto Regressive Distributed Lag (ARDL) model is summarized in table 3.2 below.

Table 3.2 Summary of Results of ARDL Dependent (Variable = Log_govtexp)

Variables	Coefficient	Std.Error	t-stat	P>t
log_privp	0.1341561	0.0513699	2.61	0.020
log_pexp	0.3087684	0.1196755	2.58	0.021
log_unemr	-1.1260860	0.4343606	-2.59	0.020
log_gfcap	-0.4561435	0.1682508	-2.71	0.016
log_exhr	0.3404659	0.1261501	-2.71	0.016
log_infl	-0.0960605	0.0671134	-1.43	0.173
log_gdp	-0.4478900	0.364109	-1.23	0.238
Log_privpL1	-0.0633049	0.0432935	-1.46	0.164
Log_govtexpL1.	0.4018036	0.1533702	2.62	0.019
Log_gdpL1.	0.5818908	0 .2689122	2.16	0.047
_cons	9.5880370	2.550641	3.76	0.002

R-squared = 0.9936, Adj. R-squared = 0.9893, F(10,15) = 233.13, Prob>F = 0.0000, N = 26, and DW(11, 26) = 2.440747

From the above table, a percentage increase in privatization proceed (log_privp), increases government expenditure (log_govtexp) significantly by about 13.49%. A percentage change in per capita expenditure (log_pexp) brings about a 30.9 percentage significant increase in Nigeria government's expenditure (log_govtexp). A percentage rise in unemployment rate in Nigeria (log_unemr) has about 112.6% significant decrease in Nigerian government's expenditure (log_govtexp). More so, a percentage rise in gross fixed capital formation (log_gfcap), leads a 45.6% significant decrease on government expenditure (log_govtexp) of Nigeria. However, a percentage increase in exchange rate (log_exhr) brings about a 34% significant increase in government expenditure (log_govtexp) of Nigeria. A percentage increase in inflation rate (log_infl) leads to about 9.6% significant decrease in government expenditure (log_govtexp). In addition to the above, a percentage increase in gross domestic product (log_gdp) leads to about 44.8% insignificant decrease in government expenditure (log_govtexp).

However, percentage increases in previous years' privatization proceed (log_privpL1.) decreases Nigeria's current government expenditure (log_govtexp) insignificantly by about 6.3%. A percentage change in previous years' government expenditure (log_govtexpL1.), brings about a 40.2% significant increase in Nigeria's current government expenditure (log_govtexp). Also, a percentage change in previous years' gross domestic product (log_gdpL1.) brings about 58.2% significant increases in government's current expenditure (log_govtexp). This is true since Nigeria's GDP in constantly increasing and budget has been on incremental basis. Moreover, the constant term is positively related to government current expenditure (log_govtexp) and a unit increase in it increases government current expenditure (log_govtexp) by about 9.588 units. Here we restrict the ARDL result without

proceeding to ECM since there is no evidence of cointegration among the variables. Objective (1) is therefore, considered only in its long run steady state relations.

- **Causal Relationship (Granger Causality Wald test) Result for Objective (2)**

We examined the causal relationship between privatization, fiscal policy and macro-economic variables (that is objective two) using the Granger Causality Wald test as summarized below;

Table 3.3; Summary of Granger Causality Result

Lead Variables	Decision	
log_govtexp	granger-causes	log_infl and log_gdp only
log_privp	granger-causes	log_govtexp, log_pexp, log_unemr, log_exhr and log_gdp except log_infl
log_pexp	granger-causes	log_unemr and log_gdp only
log_unemr	granger-causes	log_govtexp, log_privp, log_pexp, log_gfcap except log_exhr and log_infl
log_gfcap	granger-causes	None
log_exhr	granger-causes	log_pexp only
log_infl	granger-causes	log_privp, log_pexp, log_unemr, log_gfcap, log_exhr except log_govtexp
log_gdp	granger-causes	log_govtexp, log_privp, log_pexp, log_unemr, log_gfcap, log_exhr except log _infl

Feedback Interrelationship among Variables

log_govtexp	⇄	log_gdp
log_privp	⇄	log_unemr, log_gdp
log_pexp	⇄	log_unemr, log_gdp
log_unemr	⇄	log_gdp, log_privp, log_pexp
log_gfcap	⇄	None
log_exhr	⇄	None
log_infl	⇄	log_gdp
log_gdp	⇄	log_govtexp, log_privp, log_pexp, log_unemr, log_infl

On feedback interrelationship among the variables, there exists a feedback or bilateral relationship (causality) between log_govtexp and log_gdp, log_privp and log_unemr, log_privp and log_gdp, log_pexp and log_unemr, log_pexp and log_gdp, log_unemr and log_gdp, as well as log_infl and log_gdp since they lead growth accordingly. More so, there exists unidirectional relationships (causality) between log_privp and log_govtexp, log_privp and log_pexp, log_privp and log_exhr, log_unemr and log_govtexp, log_unemr and log_gfcap, log_exhr and log_pexp, log_infl and log_privp, log_infl and log_pexp, log_infl and

log_unemr, log_infl and log_gfcap, log_infl and log_exhr, log_gdp and log_gfcap, and log_gdp and log_exhr.

3.1 Discussion

- **Policy Implication of ARDL Model Result:**

Privatization proceed (log_privp) and other macro-economic variables impacted positively on public expenditure except log_unemr, log_infl, log_gdp, and Log_privpL1. While the outcome of log_unemr, log_gdp and Log_privpL1 are in contrast with their economic relationships (including log_exhr). It is important to note here that, though log_unemr does not conform to its economic relationship of being positive with government expenditure, its negative sign on log_govtexp with respect to the impact is quite realistic; as this implies that increased unemployment reduces government capacity to improve the performance of the macro-economic environment. Previous values of privatization proceed (Log_privpL1) impacts negatively on log_govtexp though this is not significant. The implication here is that, government focuses on current value of privatization (log_privp) and fails over time to track performance such that as soon as the funds are budgeted and injected in the current year, they are subsequently mismanaged. GDP is also negative which is in contrast with expectation. This is realistic given the fact that the bulk of Nigeria's GDP is linked to agricultural sector and this sector of the economy saps government expenditure given the huge sum of funds voted to it annually without reaping corresponding benefits in the areas of taxation which would have impacted positively on public finances. However, the primary variable of consideration (log_privp), has a significant positive impact at its current value which implies that privatization process generate/saves a lot of money for government especially in the current year.

- **Policy Implication of Causality Wald Test Result:**

The causality test result showed that privatization (log_privp) leads growth in log_govtexp, log_pexp, log_unemr, log_exhr and log_gdp except log_infl with a feedback relationship from log_unemr and log_gdp. Log-govtexp on the other hand, leads growth in log_infl and log_gdp only. The implication is that, privatization cause's growth in all macro-economic variables under study except inflation. Though privatization does not necessarily have to take place first before the macroeconomic variables grow. It is expected that privatization will induce efficiency in the system and consequently reduce unemployment in the country. For inflation (log_infl), one would expect an increase in money supply as a result of lump sum of money from privatized firms, which would in effect cause increase in general price level. The

outcome here suggests that the monetary authorities especially, the central bank took preventive measures within the period under review to avert increases in general price levels as a result of privatization process.

However, there is a feedback causality coming from log_unemr and log_gdp. While this is true for unemployment (log_unemr), that of gross domestic product (log_gdp) does not make any economic sense since inefficiency in the public enterprises that leads to privatization should be a drain on GDP. However, it will be economically reasonable if and only if the causal relationship is in the negative direction. In that case, it will imply that poor growth performance in GDP in the face of public enterprises fuels the move for their privatization. The causal feedback from unemployment (log_unemr) to privatization is in line with economic expectation since increase in unemployment suggests that public enterprises are not efficient enough to expand and generate employment for the country's teaming unemployed.

4. CONCLUSION

Privatization has grown in leaps and bounds to gain popularity and acceptability among economies of the world. It is an important instrument through which many economies have attained improved economic growth, production and distribution of goods and services, stream-line government structure, and reinvigorate industries hitherto controlled or managed by government. Privatization has come to stay in Nigeria with its structural effects not just on government expenditure but on other selected macro-economic variables. Our findings in this study revealed that privatization impacted significantly on government expenditure. There is also a healthy interrelationship with it and other macro-economic aggregates in the areas of causality and shock responses. Therefore, we concludes given the obtained results, that the intensification of privatization of public enterprises should make the country better off.

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ANNEX

ANNEX 1: The ARDL Model Result for Objective (1)

```
reg log_govtexp log_privp log_pexp log_unemr log_gfcap log_exhr log_infl log_gdp l1.log_privp l1.log_govtexp l1.log_gdp
      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F( 10,    15) =  233.13
       Model |  68.5582611    10  6.85582611           Prob > F      =  0.0000
    Residual |  .441122067    15  .029408138           R-squared     =  0.9936
-------------+------------------------------           Adj R-squared =  0.9893
       Total |  68.9993831    25  2.75997533           Root MSE      =  .17149
------------------------------------------------------------------------------
 log_govtexp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_privp |   .1341561   .0513699     2.61   0.020     .0246638    .2436483
    log_pexp |   .3087684   .1196755     2.58   0.021     .0536862    .5638506
   log_unemr |  -1.126086   .4343606    -2.59   0.020    -2.051904   -.2002686
   log_gfcap |  -.4561435   .1682508    -2.71   0.016    -.8147617   -.0975254
    log_exhr |   .3404659   .1261501     2.70   0.016     .0715833    .6093485
    log_infl |  -.0960605   .0671134    -1.43   0.173    -.2391092    .0469883
     log_gdp |    -.44789    .364109    -1.23   0.238     -1.22397      .32819
             log_privp |
         L1. |  -.0633049   .0432935    -1.46   0.164    -.1555828    .0289731 log_govtexp |
         L1. |   .4018036   .1533702     2.62   0.019     .0749028    .7287044  log_gdp |
         L1. |   .5818908   .2689122     2.16   0.047     .0087181    1.155063 |
       _cons |   9.588037   2.550641     3.76   0.002     4.151473     15.0246
------------------------------------------------------------------------------
. estat dwatson

Durbin-Watson d-statistic( 11,    26) =  2.440747
```

ANNEX 2: Granger Causality Test for objective (2)

```
vargranger
   Granger causality Wald tests
+-----------------------------------------------------------------+
  |          Equation           Excluded |   chi2     df Prob > chi2 |
  |--------------------------------------+--------------------------|
  |       log_govtexp          log_privp |  2.5875     2    0.274    |
  |       log_govtexp           log_pexp |  4.7859     2    0.091    |
  |       log_govtexp          log_unemr |  3.4767     2    0.176    |
  |       log_govtexp          log_gfcap |  1.7887     2    0.409    |
  |       log_govtexp           log_exhr |  .69632     2    0.706    |
  |       log_govtexp           log_infl |  5.2839     2    0.031    |
  |       log_govtexp            log_gdp |  7.5197     2    0.023    |
  |       log_govtexp                ALL |  19.215    14    0.157    |
  |--------------------------------------+--------------------------|
  |         log_privp        log_govtexp |  21.327     2    0.000    |
```

```
|        log_privp          log_pexp |  16.187     2    0.000    |
|        log_privp         log_unemr |  15.966     2    0.000    |
|        log_privp         log_gfcap |  3.3892     2    0.184    |
|        log_privp          log_exhr |   10.33     2    0.006    |
|        log_privp          log_infl |  2.9378     2    0.230    |
|        log_privp           log_gdp |  18.935     2    0.000    |
|        log_privp               ALL |  93.804    14    0.000    |
|-------------------------------------+--------------------------|
|         log_pexp       log_govtexp |    5.33     2    0.070    |
|         log_pexp         log_privp |  3.4607     2    0.177    |
|         log_pexp         log_unemr |   10.86     2    0.004    |
|         log_pexp         log_gfcap |  3.1747     2    0.204    |
|         log_pexp          log_exhr |  1.4257     2    0.490    |
|         log_pexp          log_infl |  3.6782     2    0.159    |
|         log_pexp           log_gdp |  9.7205     2    0.008    |
|         log_pexp               ALL |  115.59    14    0.000    |
|-------------------------------------+--------------------------|
|        log_unemr       log_govtexp |  14.997     2    0.001    |
|        log_unemr         log_privp |  9.6275     2    0.008    |
|        log_unemr          log_pexp |  10.548     2    0.005    |
|        log_unemr         log_gfcap |  32.905     2    0.000    |
|        log_unemr          log_exhr |   4.687     2    0.096    |
|        log_unemr          log_infl |  4.9367     2    0.085    |
|        log_unemr           log_gdp |  7.1875     2    0.027    |
|        log_unemr               ALL |  145.95    14    0.000    |
|-------------------------------------+--------------------------|
|        log_gfcap       log_govtexp |  1.2455     2    0.536    |
|        log_gfcap         log_privp |  .07131     2    0.965    |
|        log_gfcap          log_pexp |  .98719     2    0.610    |
|        log_gfcap         log_unemr |  1.5577     2    0.459    |
|        log_gfcap          log_exhr |  2.8005     2    0.247    |
|        log_gfcap          log_infl |   1.353     2    0.508    |
|        log_gfcap           log_gdp |  3.9925     2    0.136    |
|        log_gfcap               ALL |  64.919    14    0.000    |
|-------------------------------------+--------------------------|
|         log_exhr       log_govtexp |  4.2546     2    0.119    |
|         log_exhr         log_privp |  2.1235     2    0.346    |
|         log_exhr          log_pexp |  7.8201     2    0.020    |
|         log_exhr         log_unemr |  4.3524     2    0.113    |
|         log_exhr         log_gfcap |  4.1266     2    0.127    |
|         log_exhr          log_infl |  .13072     2    0.937    |
|         log_exhr           log_gdp |  4.6604     2    0.097    |
|         log_exhr               ALL |  71.911    14    0.000    |
|-------------------------------------+--------------------------|
|         log_infl       log_govtexp |  1.6095     2    0.500    |
|         log_infl         log_privp |  29.004     2    0.000    |
|         log_infl          log_pexp |  10.319     2    0.006    |
|         log_infl         log_unemr |  14.897     2    0.001    |
|         log_infl         log_gfcap |  6.4846     2    0.039    |
|         log_infl          log_exhr |  16.437     2    0.000    |
|         log_infl           log_gdp |  24.206     2    0.000    |
|         log_infl               ALL |  138.62    14    0.000    |
|-------------------------------------+--------------------------|
|          log_gdp       log_govtexp |  19.108     2    0.000    |
|          log_gdp         log_privp |  19.439     2    0.000    |
|          log_gdp          log_pexp |  14.904     2    0.001    |
|          log_gdp         log_unemr |  26.712     2    0.000    |
|          log_gdp         log_gfcap |  8.4444     2    0.015    |
|          log_gdp          log_exhr |  30.539     2    0.000    |
|          log_gdp          log_infl |  9.6364     2    0.008    |
|          log_gdp               ALL |  96.692    14    0.000    |
+-------------------------------------------------------------------+
```

Unit Root Test

log_govtexp ~ I(1)

. dfuller d.log_govtexp

```
Dickey-Fuller test for unit root                   Number of obs   =        25
                               ---------- Interpolated Dickey-Fuller ---------
```

```
                 Test      1% Critical     5% Critical     10% Critical
               Statistic       Value           Value           Value
------------------------------------------------------------------------------
 Z(t)            -7.671        -3.750          -3.000          -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
log_gdp ~ I(1)
. dfuller d.log_gdp
Dickey-Fuller test for unit root                   Number of obs   =        25
                          ---------- Interpolated Dickey-Fuller ---------
                 Test      1% Critical     5% Critical     10% Critical
               Statistic       Value           Value           Value
------------------------------------------------------------------------------
 Z(t)            -3.616        -3.750          -3.000          -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0055
log_infl ~ I(1)
dfuller  d.log_infl
Dickey-Fuller test for unit root                   Number of obs   =        25
                          ---------- Interpolated Dickey-Fuller ---------
                 Test      1% Critical     5% Critical     10% Critical
               Statistic       Value           Value           Value
------------------------------------------------------------------------------
 Z(t)            -5.074        -3.750          -3.000          -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
log_exhr ~ I(1)
dfuller  d.log_exhr
Dickey-Fuller test for unit root                   Number of obs   =        25
                          ---------- Interpolated Dickey-Fuller ---------
                 Test      1% Critical     5% Critical     10% Critical
               Statistic       Value           Value           Value
------------------------------------------------------------------------------
 Z(t)            -4.395        -3.750          -3.000          -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0003
log_gfcap ~ I(1)
. dfuller d.log_gfcap
Dickey-Fuller test for unit root                   Number of obs   =        25
                          ---------- Interpolated Dickey-Fuller ---------
                 Test      1% Critical     5% Critical     10% Critical
               Statistic       Value           Value           Value
------------------------------------------------------------------------------
 Z(t)            -3.753        -3.750          -3.000          -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0034
log_pexp ~ I(1)
. dfuller d.log_pexp
Dickey-Fuller test for unit root                   Number of obs   =        25
                          ---------- Interpolated Dickey-Fuller ---------
                 Test      1% Critical     5% Critical     10% Critical
               Statistic       Value           Value           Value
------------------------------------------------------------------------------
 Z(t)            -9.497        -3.750          -3.000          -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
log_unemr ~ I(1)
dfuller  d.log_unemr
Dickey-Fuller test for unit root                   Number of obs   =        25
                          ---------- Interpolated Dickey-Fuller ---------
                 Test      1% Critical     5% Critical     10% Critical
               Statistic       Value           Value           Value
------------------------------------------------------------------------------
 Z(t)            -6.963        -3.750          -3.000          -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
log_privp ~ I(1)
```

```
dfuller d.log_privp
Dickey-Fuller test for unit root                   Number of obs   =        25
                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic          Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -5.983            -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

Cointegration Test

```
dfuller uhat
Dickey-Fuller test for unit root                   Number of obs   =        25
                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic          Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.240            -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1921
```

Econometric Tests

Correlation Matrix

```
. correlate   log_govtexp  log_privp  log_pexp  log_unemr  log_gfcap  log_exhr  log_infl  log_gdp   l1.log_privp  l1.log_govtexp
l1.log_gdp
(obs=26)
```

	log_go~p	log_pr~p	log_pexp	log_un~r	log_gf~p	log_exhr	log_infl	log_gdp	log_pr~p	log_go~p	log_gdp
log_govtexp	1.0000										
log_privp	0.6154	1.0000									
log_pexp	0.9159	0.5566	1.0000								
log_unemr	-0.2946	-0.4926	-0.0307	1.0000							
log_gfcap	0.8744	0.6082	0.9478	-0.0251	1.0000						
log_exhr	0.9665	0.5547	0.9381	-0.1247	0.9172	1.0000					
log_infl	-0.0676	0.3747	-0.0143	-0.3335	-0.0871	-0.0732	1.0000				
log_gdp	0.9480	0.6350	0.9673	-0.1171	0.9722	0.9640	-0.0825	1.0000			
log_privp											
L1.	0.6751	0.7392	0.6689	-0.3573	0.6680	0.6352	0.1431	0.7274	1.0000		
log_govtexp											
L1.	0.9923	0.5859	0.9196	-0.2729	0.8792	0.9683	-0.0835	0.9502	0.6808	1.0000	
log_gdp											
L1.	0.9387	0.5971	0.9522	-0.0905	0.9728	0.9521	-0.1499	0.9937	0.7037	0.9415	1.0000

Normality Test

```
mvtest normality log_govtexp log_privp log_pexp log_unemr log_gfcap log_exhr log_infl log_
Test for multivariate normality

   Doornik-Hansen              chi2(14) =   2.2251   Prob>chi2 =  0.0367
```

Heteroskedasticity Test

```
estat imtest, white

White's test for Ho: homoskedasticity
        against Ha: unrestricted heteroskedasticity

        chi2(25)     =     16.00
        Prob > chi2  =    0.0407

Cameron & Trivedi's decomposition of IM-test

---------------------------------------------------
            Source |       chi2     df      p
---------------------+-----------------------------
  Heteroskedasticity |      16.00     25    0.0407
          Skewness |       8.24     10    0.6058
          Kurtosis |       0.66      1    0.4165
---------------------+-----------------------------
             Total |      34.90     36    0.5209
```

Specification Error Test

```
estat ovtest
Ramsey RESET test using powers of the fitted values of log_govtexp
      Ho:  model has no omitted variables
                F(3, 12) =      2.55
                Prob > F =      0.1048
```