



Changes in Head of Government and Macroeconomic Fluctuations in Nigeria

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Abstract:

This study investigates the phenomena that dynamics in macroeconomic variables such as real output growth can be explained by changes or the removal of the person in charge of government, a phenomenon termed, government turnover. Using the Autoregressive Integrated Moving Average model (ARIMAX), the findings show that changes in head of government did not significantly explain variations in Nigeria's aggregate economy. In addition, changes in head of government correlated negatively with shifts in the economy. The political economy implication is that frequent changes in government (a measure of the extent of political instability) can affect negatively the aggregate economy. On the other hand, the insignificance of the political dummy variable measuring government turnover reflects either that: First, political shifts is a negligible source of fluctuation, secondly, that the Nigerian economy is resilient to absorb readily politically induced shocks and thirdly, that changes in head of government has an indirect impact on the economy.

Keywords: Political Cycle, Government Change, Government Turnover, Fluctuations, ARIMAX JEL Classification: E32, H11, H10

I. Introduction

Almost all nations experience a change in political governance at one point or the other. It includes a change from one political party, political ideology and president/leader. For instance, in May 2015, General Muhammad Buhari from a different political party and with a different political ideology became President after defeating Goodluck Jonathan of the People's Democratic Party that had

ruled Nigeria since the return to democracy in 1999. Muhammad Buhari becomes the 14th head of government in 55 years of post-independence. This political outcome may induce changes in economic outcomes. Against this background, we investigate the phenomena that dynamics in macroeconomic variables such as real output growth can be explained by government turnover. Government turnover is defined as a change or removal of

the person in charge of government per time. A change of head of government implies that a new government with distinct policy preferences alters or abandons his predecessor's economic policies, which is then likely to disrupt economic outcomes.

Based on the preceding argument, this study is largely related to the examination of Political business cycle. However, taking note of peculiarities of the structure of Nigeria's political economy structure, we argue that existing formal models of political business cycle are inadequate in explaining politically-induced fluctuation in the country. This is explained by the political business cycle literature currently existing along two strands: opportunistic and partisan. While the opportunistic school (Nordhaus, 1975) see economic fluctuations as arising from politicians' manipulation of economic policies, for the purpose of re-election; the partisan variant (Hibbs, 1977) hypothesize that the ideologies (left or right winged) possessed by politicians, triggers an economy cycle as presidents are alternated between the left and right ideologies.

One central implication deduced from the two current thoughts on political business cycle models, is that both strands are premised on a stylized democratic political structure within an electoral system. However, Nigeria's post-independent political history presents a mix of civilian and military

regimes, rather than a strictly democratic structure. A second anomaly between current political cycle theories and political reality in Nigeria depicts a nascent democratic institution where voters' decisions are unlikely to count in the election and re-election of politicians. For instance, the World Governance Indicator (2013) rates Nigeria poorly on Voice and accountability, Political stability and violence and Rule of law. This implies that politicians may not need to manipulate policies for re-election purposes as stated by the opportunistic view. However, there are positive indications that the 2015 general elections in Nigeria largely reflected the decision of voters. In the third stance, we argue that unlike the partisan proponents, there are no clearly defined (left-right) ideologies among Nigerian politicians. For instance, there are many episodes of defection of politicians across political parties in Nigeria

To address the three discrepancies identified in applying existing political business cycle (PBC) models to Nigeria, politically-induced fluctuations is defined in this study as: the economy shifting as power is transferred from one president to another, not due to the manipulation of policies (Nordhaus, 1975) or differing ideologies (Hibbs 1977), but due to the distinct personal preferences of politicians. Personal preferences refer to an individual's personality traits and value that guides his choice. With

reference to politicians, they are the traits and values that determine the political choice of policies made by a politician (Carprara, Schwartz, Capanna, Vecchione and Barbarenelli, 2006). Based on this, the thesis of this paper is: for every change in government, an economy is bound to shift due to adjustments in preferences of a new government from its predecessor.

By defining politically induced fluctuation as based on the personal preferences of politicians, this paper opines that existing empirical studies that have applied PBC theories to developing economies, especially Africa, may have ignored the fact that since politicians face little or no constraints in their decision making power (Acemoglu, Johnson, Robinson and Thiaichaoren, 2002), then macroeconomic outcomes are susceptible to politicians' choices and thus changes in these choices as government changes can distort the economy. Secondly, our stance in this paper, removes all forms of restrictions to situating PBC theories within the boundaries of electoral systems alone.

Therefore, this paper investigates the phenomena that the turnover or changes in government regimes is an impulse to inducing economic fluctuations in Nigeria. The rest of the paper is structured as follows: In section two, related literature is reviewed. Stylized facts on politics and economic fluctuations in Nigeria are presented in section three. In section four and five, the theoretical

framework and technique of analysis is shown. Section six contains the estimation results. In section seven, we conclude.

II. Review of Related Literature

Research into politically-induced fluctuations sprang formally from the work of Nordhaus (1975). Nordhaus (1975) formalised the idea of an opportunistic political cycle. Under this framework, politicians induce economic fluctuations due to their re-election motive. In order to maximise his/her chances of re-election, an incumbent politician is pressured to 'manipulate' policies by implementing expansionary policy so as to reduce unemployment prior to election, and then austere policy measures, after elections. In a different dimension, the idea that parties have electoral ambitions that influence them to implement policies favouring their core constituencies (Hibbs, 1992) culminated into the Hibbs (1977) partisan or ideological cycle model. In this model, politicians or political parties who are either left wing or right wing alternate between expansionary and austere policies. Other notable contributions to the theoretical literature on political cycle sprang from the rational expectation models of Rogoff (1990) and Alesina and Sachs (1986) who introduced the rational variant of the opportunistic and the ideological cycle respectively.

From the empirical angle, it was needful to subject existing theoretical models to empirical testing, in a bid

to confirm the validity of proposition of the existence of politically-induced fluctuations. Empirical work in this research area focus on the central question: Does a political cycle exist?

Nordhaus (1975) in his seminal work is the first to empirically test the existence of a political cycle. He tested his opportunistic model for 9 countries, using annual unemployment data for the period 1947-1972 in these countries with a non-parametric binomial probability method. Specifically testing the hypothesis that during an electoral period, unemployment should rise in the first half and fall in the second half, he failed to find evidence for his model in 4 of the 9 countries, found evidence in 3 countries only, while evidence on the remaining 2 countries, remained inconclusive. This result suggests a bleak performance of his model to empirical testing.

However, unlike Nordhaus (1975)'s inconclusive result on opportunistic cycles, Hibbs (1977) in his study, found convincing evidence for the existence of partisan/ideological cycles. Specifically, Hibbs (1977) sought to test the hypothesis that shifts in political regime of government will be associated with gradual changes in economic variables. Using time series quarterly unemployment data for the United States and Great Britain over the period 1948:1 to 1972:4, and with a Box-Tiao (1975) Intervention analysis, he showed that fluctuations

in unemployment data were significantly influenced by the ideology of political party. His results show that under left wing government, unemployment reduced and inflationary trends gained momentum, than right wing governments.

Following Nordhaus (1975) and Hibbs (1977), other empirical studies have followed with mixed empirical evidence on the existence of political cycles. For instance while Tufte (1978); Barberia and Avelino (2011) finds evidence, McCallum (1978) and Paldam (1979) (as cited from Alesina and Roubini (1992)) test the opportunistic model in the United States and OECD countries, respectively and failed to find evidence of political cycles

However, in the empirical evidence of PBC models in Sub Saharan Africa and then, in Nigeria, we find sparse literature. This includes Block (1999) who used annual data for 44 SSA countries over the period 1980 to 1995 and finds evidence for cycles in policy variables such as fiscal deficits, expenditures, government consumption, etc. For him, Political business cycle may mean frequent reversals in fiscal and monetary policy reforms. Block's findings may be unsurprising since a portion of his study period (1989-1995) coincided with increased political transition in Africa.

In a study on Nigeria, Tarawalie, Ahorator, Adenekan and Comte (2011) provide empirical evidence of the existence of political cycles in

Nigeria using annual data on real GDP growth, inflation rate, government expenditure, money growth and money/GDP ratio, over the period 1999 to 2007. However, this study differs from Tarawalie *et al* (2011) on several grounds. First, political cycle is defined in a different manner. While Tarawalie *et al* (2011) defines political cycle using the conventional opportunistic and partisan cycle, political cycle is defined in this study as the economy shifts that occurs when there is a change from one head of government to the other. Secondly, a longer time frame is used in this study (capturing both democratic and military regimes), as 1999 to 2007 (only democratic regimes) presents a short time frame to make any meaningful statistical conclusion.

111. Stylized Facts: Politics and Economic Fluctuations in Nigeria

Fluctuation in economic activity defined as deviation from trend growth in Real Gross Domestic Product (especially when triggered

by unexpected changes), is an outcome that policymakers and politicians seek to minimize. For one reason, economic fluctuation implies that an economy deviates from its potential growth path, with the effect that it leads to decline in real income and welfare. Yet it turns out that as politicians seek to curtail distortions in the economy, they are also a potential source to it. In this section, preliminary statistical facts on the link between politics and economic fluctuations are given to back this assertion.

Figure 1 provides a time series plot of cyclical series on Real Gross Domestic Product (RGDP) from 1960 to 2012. The cyclical series was derived from de-trended RGDP data on Nigeria using the Hodrick Prescott filter. Cyclical RGDP reveals an unstable pattern in real output for Nigeria, judging by the deviation of the cyclical series from origin. The figure also depicts that Nigeria has had more recessions than booms over the sample period.

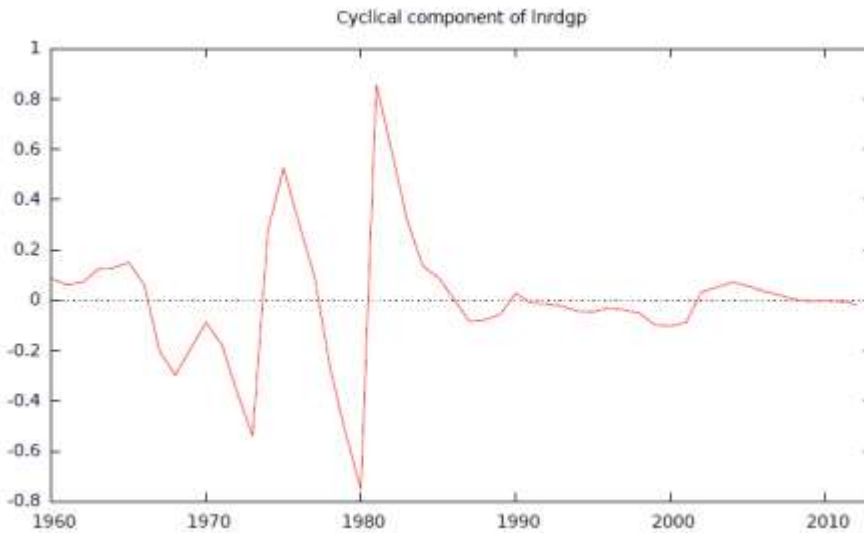


Fig I: Cyclical Component of Real GDP in Nigeria.

Source: Authors' Compilation

From a different but related stance, Lucas (1988) outlines many episodes of sudden and large changes in developing country growth rates, relative to developed countries, as a statistical regularity depicting fluctuation. Supporting the assertion of frequent changes, Table 1

provides descriptive statistics on annual growth rates of RGDP in Nigeria. With standard deviation at 80.4 accompanied by a mean value greater than 1, growth rates in real economic activity are volatile and subject to wide variability.

Table 1: Summary Statistics on Growth Rate in RGDP

	Mean	Standard deviation	Min	Max
Growth rate in RGDP	20.72	80.42	-16.99	550.53

Turning to explaining political outcomes using past and current government regimes in Nigeria, one finds that Nigeria operates a federal system of government. In this system, it has a central government, 36 state governments and 774 local governments. The central government is the most powerful of

the three tiers of government and controls most of Nigeria's resource Table two provides a summary of heads of government since independence. It presents statistical facts on the number of years in office, regime type (military or civilian) and ethnic origin (North or South) characterising the personal

attributes of past heads of government in Nigeria. These statistics were used to compute the following facts:

Table 2: Summary of Heads of Government in Nigeria

Tenure	Head of Government	Number of years in office	Regime type	Geo-political origin
Nov. 1960- Jan 1966	Nnamdi Azikwe	5	Democratic	South
Jan 1966- July 1966	Aguiyi Ironsi	0.5	Military	South
August 1966- July 1975	Yakubu Gowon	9	Military	North
July 1975- Feb 1976	Murtala Muhammad	1	Military	North
Feb 1976-Oct. 1979	Olusegun Obasanjo	3	Military	South
Octo 1979- Dec. 1983	Shehu Shagari	4	Democratic	North
Dec. 1983-August 1985	Buhari Muhammad	2	Military	North
Aug 1985- August 1993	Ibrahim Babangida	8	Military	North
Aug 1993- Nov. 1993	Ernest Shonekan	0.25	Democractic	South
Nov 1993-June 1998	Sani Abacha	5	Military	North
June 1998- May 1999	Abdulsalaam Abubakar	1	Military	North
May 1999- May 2007	Olusegun Obasanjo	8	Democratic	South
May 2007-May 2010	Musa Yar' Adua	3	Democratic	North
May 2010- present	Goodluck Jonathan	4 (till date)	Democratic	South

Source: Authors' compilation

- a. Between 1960 to 2010, Nigeria has had 13 heads of governments. This implies that over a duration of 50 years, 13 different persons have ruled Nigeria. Then on average, political regimes have lasted for 3.85 years in Nigeria. On comparing with the United States, one finds that between 1961-2009, 9 presidents have ruled, and on average, a regime has lasted 5.33 years. See Table 3

Table 3: Summary of Political Regimes in Nigeria, compared with US

Country	Number of leaders	Duration	Average years
Nigeria	13	50	3.85
United States	9	48	5.33

Source: Authors' compilation

a. Of the 13 political regimes, there have been 5 democratic regimes and 8 military regimes. Of these, the 5 democratic regimes have lasted on average for 4.25 years, while the remaining 8 military regimes have lasted for 3.72 years

Table 4: Summary of Political Regimes by Regime Type

Regime type	Years ruled	Average years
Democratic	29.75	3.72
Military	21.25	4.25

Source: Author's compilation

b. By geo-polity, between the time frame 1960 to 2010, five (5) heads of government from the southern region have ruled Nigeria, while 8 heads of government from the north, ruled Nigeria. While Southern leaders ruled for 16.75 years , the northern ones have ruled 34.25 years

Table 5: Summary of Political Regimes by Ethnic Origin

Geo-political zone	Years ruled	Average years
North	34.25	4.28
South	16.57	3.35

Source: Authors' compilation

Based on the average years ruled by each politician 'type', one can say that there have been frequent changes in government in Nigeria.

In summary, since 1960, Nigeria has experienced frequent changes in government such that, (a.) On the average, each head of government has ruled for 3.85 years only, compared with 5.33 years in the United States (b.) On the average each military and civilian government have ruled for 3.72 and 4.25 years only, and (c.) On the average a south-led government has lasted 3.35 years compared with 4.28 years of rule of a North-led government.

An implication of stylized facts a-c is that every regime classification identified have lasted for a relatively short period in Nigeria (compared with an average of 5.33 years over similar range in the United States). This relatively short period of regime is interpreted as frequent changes in government. As a result of these frequent changes, and the accompanying short regime duration, Nigeria's economy is likely to be susceptible to distortions. Furthermore, assuming every successive regime in the country proposed new policy measures, these policies have 4 average years to be

implemented, before being abandoned.

IV. Theoretical Framework

In addressing the objective, this study draws from Hibbs' Partisan model (1977). In this model, politicians or political parties are either left wing or right wing. While the left wing politician affiliates with the working class and proposes expansionary policies, the right wing politicians align with the interest of business class individuals and propose anti-inflationary measures. Economic fluctuations are therefore, induced by the alternation of power between the left wing and right wing politician. The underlying prediction of the Partisan model is that macroeconomic policy will be expansionary (reduce unemployment, increase output and inflation) under left wing politicians than right wing ones.

The Partisan Model is relevant in defining Nigeria's political economy because Nigeria runs a variant of fiscal federalism where power is concentrated in the centre (i.e: executive arm of the presidency) while other institution of government possess limited influence and capacity. In this regard, heads of government face few constraints in their decision making power. Under this context, the President can personally take several policy decisions in response to the influence of interest groups. This has resulted in a macroeconomic policy environment susceptible to shifting and unpredictable outcomes that

inhibits investment and broad-based, private sector growth (Utomi, Duncan and Williams, 2007; Acemoglu *et al*, 2002)

From this, one can deduce that policy Choices are largely influenced by the personal ideologies of heads of government in Nigeria. This is because in countries with weak political institutions as Nigeria, where citizens are not actively engaged in the political process, and where elected officials are not responsive to the elements of governance (Natufe, 2006 paraphrased); and where checks and balances on government discretion are absent (Acemoglu *et al*, 2002), policy formulation is likely to be individualized, without recourse to formal institutions (such as citizen participation)

The facts that citizens' participation in political process is low and that, policy formulation is very likely to be individualized, is captured by the World Governance Indicator. This indicator rates six dimensions of governance: Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. In this context, we focus on Voice and Accountability that measures the extent to which citizens in a country participate in selecting their government, as well as freedom of expression, freedom of association, and free media (overall citizen participation); and on Control of

corruption that shows the extent to which public power is exercised for private gain and ‘capture’ of the state by elites and private interests (how policy formulation are personalised for private gain).

The percentile ranks for the period 1996-2013 reveal that Nigeria ranks between 0 and 45 percentile for voice and accountability and between 0 and 35 percentile for Control of corruption, using a Percentile score that ranks worse governance lower and allots higher values to better governance. This confirms the exclusion of citizens in political decision making and also depicts that policy formulation and outcomes are captured by elites and private interests in Nigeria.

Furthermore, interest groups especially ethnic-based ones, largely influence Policy choices in Nigeria. Since, in a multifaceted, ethnically-diverse society as Nigeria, political decision processes are ethnic-based struggles over redistribution of national resources. With over 250 ethnic groups and a post-colonial history of factional political conflict, the most intense ethnic divisions have historically revolved around the Hausa-Fulani, the Igbos, and the Yorubas. Moreover, the core division within the Nigerian polity over the past forty years pits the politically dominant Muslim states of the north against the economically advantaged “Christian” south (Polity IV, 2010). Inherent ethnic fragmentation has birthed political patronage in Nigeria. For instance, Utomi,

Duncan and Williams (2007) opine that past leaders have used ethnicity as an easy tactic to mobilise support, and have then come under pressure to corner a share of national resources for their people (ethnic constituency). With deep-seated ethnic divisions, it becomes difficult for politicians and political parties to develop conventional left-right political ideologies.

Based on the discussions above, this study adapts Hibbs (1977) Partisan model, albeit relaxing the following assumptions:

1. Just as Hibbs (1977), this study assumes that political preferences of incumbent are the driving impulse of economic fluctuations. However,
2. In Hibbs (1977), politician’s ideology derives from the policy preferences of politician’s political parties. Instead, this study adapts this assumption to Nigeria by proposing that incumbent Politician’s ideology derive from his personal preference.
3. While Hibbs (1977) classifies policy preferences of politicians along a left-right policy dimension. This study is silent on this classification, since there faint indication of this kind in Nigeria’s politics
4. While Hibbs (1977) assumes a well-developed democratic institution, we relax this assumption based on the fact that Nigeria has had a mix of

authoritarian and nascent democratic regimes over time.

V. Technique of Estimation and Model Specification

In line with the objective of this study, the existence of political cycles is tested using an atheoretical method. The atheoretical method specifies a model with little or no recourse to economic theory. Despite this, we find the section on the theoretical framework useful at defining the macroeconomic and political variables to be specified in the study's model.

In actual testing of politically-induced fluctuations, the empirical norm is to select relevant macroeconomic variables and then, check for the presence of politically-induced cycles using the time series data of each variable. In this study, the variable: Real Gross Domestic Product growth rate (GRGDP) is used. By employing this variable, the implication is that political cycle is tested on economic growth rate in Nigeria. Then, the model specified in the study, takes the form where GRGDP is assumed to be a linear function of past lagged value of itself and intervention political dummy variables.

Specifically, the model is specified in a Univariate Autoregressive Integrated Moving Average (ARIMAX (p, q)) form. The ARIMAX (p, q) model is an extension of the Autoregressive Moving Average (ARMA) process with other time series as input variables. Succinctly, a variable Y_t

follows an ARIMAX process if it is generated by past lagged values of itself, input variables and stochastic error terms. The input variables can be numeric or categorical. If categorical, the ARIMAX model is termed an intervention model.

Following this, ARMA model with exogenous variables can be specified as:

$$Y_t = w_0(I_t) + N_t \quad (1)$$

Where,

Y_t : Dependent variable

$f(I_t)$: Intervention component (Exogenous variable(s))

N_t : Noise component (ARMA structure)

w_0 : Parameter of Intervention component

The ARIMAX framework is selected in this work, because of the intuition that as political regime changes, structural breaks are created in the economy. Then, the ARIMAX model is liable to identify such structural changes in economic series data as a result of this political change, as it assumes that mean shifts in time series are generated by a noise model and exogenous variables. The ARIMAX method used stems from Hibbs (1977). However, while Hibbs (1977) tests political cycle in unemployment data, we test political cycles on economic growth such that:

$$Y_t = \theta + \alpha_p Y_{t-p} + DUMP_t + \beta_q \varepsilon_{t-q} \quad (2)$$

Where Y_t : Real Gross Domestic Product growth rate

Y_{t-p} : Y lagged p periods
 $DUMP_t$: Political dummy variable-
proxy for change in government
 ε_{t-q} : lagged Moving Averages
of order q
 θ : Constant term
 α_p : Parameter of AR (p)
process
 β_q : Parameter of MA (q)
process

τ : Parameters showing the effect of
a shift in political variables on Y_t

Apriori expectation: τ should be
statistically different from zero at 5
per cent

Other underlying assumptions of the
model include the following: First,
variable Y_t is weakly stationary. In
ARIMAX modeling, the stationary
criteria must be met so that estimated
parameters are stable and well-
behaved. In addition, the Exogenous
Political variable $DUMP_t$ is assumed
to be an intervention variable that
induces changes in the endogenous
time series. Ideally, intervention
variables are represented as dummy
variables. In this study, $DUMP_t$ is a
dummy variable that is used to
characterize the effect of changes in
head of government on economic
growth in Nigeria, such that shifts in
the dummy variable (DUMP) are
associated with changes in economic
growth rates.

In estimating the model specified in
equation (2), a series of procedures
are used. In general, the data on Real

Gross Domestic Product growth rate
(GRGDP) is fitted to the
Autoregressive Moving Average
model with exogenous variable
ARIMAX (p, q), that was specified
in equation (1) using the Box-
Jenkins procedure. The Box-Jenkins
procedure is an iterative one with
four stages: identification,
estimation, diagnostic checking and
forecasting. However, this study
focuses only on the first three stages.

In the identification stage, one finds
the appropriate ARMA process by
which the ARIMAX (p, q) model
was generated. At this stage, the
appropriate values of p and q are
determined using an autocorrelation
and partial autocorrelation function.
The autocorrelation function and
partial autocorrelation function are
plots of the autocorrelation and
partial autocorrelation as a function
of lags. The patterns of spikes or lags
in these functions are understudied to
arrive at the appropriate value for p
and q. In the estimation stage, once
appropriate order of p and q has been
determined, then the parameters of
the ARIMAX model are estimated
using a Maximum Likelihood
Estimator. The estimated parameters
of the ARIMAX (especially
intervention variable) model are
expected to be statistically different
from zero. In the context of this
work, the statistical significance of
parameter of the political exogenous
variable (DUMP) is of primary
importance. If this variable is
significant, then political cycles are
detected.

Finally, in the third stage which is diagnostic checking, one tests the likelihood that the estimated ARIMAX model is a reasonable good fit to GRGDP data. This stage requires that the residuals from the estimated models are white-noise. Upon evidence that the residuals are white-noise, the estimated model is judged adequate.

Nonetheless, in estimating the ARIMAX model, it is not uncommon to discover several plausible models for a single time series variable. In this case, the best model within the 'class of good models' is selected with recourse to the Akaike Information criterion (AIC) and Bayesian Information Criterion (BIC). The most parsimonious model is one with the lowest value of AIC and BIC. It is worth mentioning that the advantages of the ARIMAX method are its capacity to identify structural breaks and patterns in time-series data and to quantify the impact of exogenous variables. Nevertheless, the ARIMAX model is not guided by any theory and is selected using a set of arbitrary assumptions, which is trial and error based and requires the expertise of the researcher.

VII. Data Source and Measurement

Annual data on growth rate of Real Gross Domestic Product (GRGDP), which is drawn from the Statistical Bulletin (2011 and 2012) of the Central Bank of Nigeria are used. In addition, the World Bank, World Development Indicator data on

economic growth rate (RGDPGR) is used in the context of conducting robustness checks. Furthermore, two dummy variables (DUMP and DUMR) capturing government turnover and political regime type are constructed. In this regard, DUMP is measured such that years in which a head of government is removed or changed is denoted 1 and 0, if otherwise; while for DUMR, years in which the head of government is civilian is denoted 1 and years of military rule is denoted 0.

VI. Estimation and Result

The Results

The specified model in equation (2) is fitted using the stated procedures of the Box-Jenkins Iterative Method as found in Section V. Thereafter, it is estimated using the Maximum Likelihood Estimator such that:

$$GRGDP_t = \theta + \alpha_p GRGDP_{t-p} + \sum_{i=1}^q \tau_i DUMP_t + \beta_q \epsilon_{t-q} \quad (3)$$

In fitting and solving equation (3) we are concerned with the significance or not of DUMP using the t-statistics. Furthermore, an ARIMAX (2, 1, 2) model is fitted to the model.

From Table 6, it is revealed that the political dummy DUMP is not statistically significant, since the t-statistics value is less than 2. This implies that there is no evidence of the existence of political-induced changes in the Nigerian economy. In this regard, our finding differs from Tarawalie et al (2011), who find evidence of political cycle in Nigeria; but corroborates the finding of Oye (2014) that political cycle is

not a major source of economic fluctuation in Nigeria. Another dimension of the result reveals that DUMP is negatively related to the

dependent variable GRGDP, which implies that overall, changes in head of government exerts negatively on the economy.

. Table 6: ML estimation of Political Cycle in GRGDP

Dependent variable:	GRGDP
DUMP	-13.87 (-0.14)
Constant	-0.417 (-0.10)

t-statistics in parentheses

Source: Authors' compilation

A. Robustness Checks

Two robustness tests are conducted to ascertain the validity of the result reported in Table 6. First we introduce another political dummy variable (DUMR) that characterizes the political regime type-civilian or military government- into the model. The addition of this variable helps to address any omitted variable bias that may be present in

the model. After this exercise (see result in Table 7), the t-statistics of both political dummy variables, especially DUMP remain insignificant. Another test is carried out using the World Bank's WDI data on economic growth rate-RGDPGR (see Table 8). The results also show the insignificance of the political dummy variable measuring changes in head of government.

Table 7: ML estimation of Political Cycle in GRGDP with additional DV, DUMR

Dependent variable:	GRGDP
DUMP	-5.555 (-0.11)
DUMR	45.15 (1.18)
Constant	0.494 (-0.10)

t-statistics in parentheses

Source: Authors' compilation

Table 8: Comparing ML estimation of Political Cycle in GRGDP and RGDPGR

Dependent variable:	GRGDP	RGDPGR
DUMP	-13.87 (-0.14)	-2.112 (-1.04)
Constant	-0.417 (-0.10)	4.237 (3.28)*

t-statistics in parentheses

* $t > |2|$

Source: Authors' compilation

VIII. Conclusion

The objective of this study was to explain that economy-wide fluctuations in Nigeria can be explained by changes in head of government, over time. However, the empirical evidence reveal that changes in heads of government is insignificant and negative in explaining fluctuations in economic growth. Therefore, our findings do not support the existence of political cycle such that changes in government have had no significant effect on inducing changes in the economy. In short, government turnover exerted a negligible but negative effect on economic growth.

On the one hand, the negative relationship between economic growth and the political dummy variable representing changes in government supports the hypothesis that frequent changes in government (measure of the extent of political instability) can negatively impact on the aggregate

economy. On the other, the negligible impact of political dummy variable measuring government turnover reflects can be explained by three plausible reasons. Firstly, political shocks is negligible as a source of fluctuation in Nigeria. The second reason is that the Nigerian economy may be resilient to absorb readily, politically induced shocks; while the third and most important reason is that changes in government have no direct impact on the economy but exert an indirect effect via changes in the economic policy choices that accompany changes in heads of government over time (Hicksen, Satyanath and Sergenti, 2005). Therefore future studies may consider the effect of changes in head of government on economic fluctuation via indirect channels such as changes in economic policy. Also, while this study examines the effect of politically induced changes on the economy using the atheoretical method of ARIMAX,

future studies can also address this subject based on theoretical frameworks as the Ramsey model

or even, using Dynamic Stochastic Dynamic General framework.

Appendix

1. ARIMAX Regression of GRGDP (Economic Growth) on DUMP

```
. arima grgdp dump, arima(2,1,1)

(setting optimization to BHHH)
Iteration 0: log likelihood = -305.27229
Iteration 1: log likelihood = -304.97342
Iteration 2: log likelihood = -304.92005
Iteration 3: log likelihood = -304.82126
Iteration 4: log likelihood = -304.70087
(switching optimization to BFGS)
Iteration 5: log likelihood = -304.66384
Iteration 6: log likelihood = -304.56082
Iteration 7: log likelihood = -304.27692
Iteration 8: log likelihood = -303.98595
Iteration 9: log likelihood = -303.38233
Iteration 10: log likelihood = -303.16566
Iteration 11: log likelihood = -303.09959
Iteration 12: log likelihood = -303.07276
Iteration 13: log likelihood = -303.06702
Iteration 14: log likelihood = -303.06592
(switching optimization to BHHH)
Iteration 15: log likelihood = -303.06587
Iteration 16: log likelihood = -303.06587 (backed up)
Iteration 17: log likelihood = -303.06587 (not concave)
Iteration 18: log likelihood = -303.06587 (not concave)
Iteration 19: log likelihood = -303.06587 (not concave)
(switching optimization to BFGS)
Iteration 20: log likelihood = -303.06587

ARIMA regression

sample: 1961 - 2012                Number of obs   =       52
                                Wald chi2(4)     =       32.65
Log likelihood = -303.0659         Prob > chi2     =       0.0000
```

D.grgdp	OPG		z	P> z	[95% Conf. Interval]	
	Coef.	Std. Err.				
grgdp						
dump						
d1.	-13.86939	99.08363	-0.14	0.889	-208.0697	180.3309
_cons	-.4167662	4.19067	-0.10	0.921	-8.630329	7.796797
ARMA						
ar						
L1.	-.001306	.277304	-0.00	0.996	-.5448119	.5421999
L2.	-.0388525	.4811855	-0.08	0.936	-.9819587	.9042537
ma						
L1.	-1.000006	.2067334	-4.84	0.000	-1.405196	-.5948154
/sigma	79.06391

2. ARIMAX Regression of GRGDP (Economic Growth) on DUMP and DUMR

```
. arima grgdp dump dumr, arima(2,1,2)
```

```
(setting optimization to BHHH)
Iteration 0: log likelihood = -305.06048
Iteration 1: log likelihood = -304.92261
Iteration 2: log likelihood = -304.05263
Iteration 3: log likelihood = -303.9775
Iteration 4: log likelihood = -303.44378
(switching optimization to BFGS)
Iteration 5: log likelihood = -303.34601
Iteration 6: log likelihood = -302.60492
Iteration 7: log likelihood = -301.68672
Iteration 8: log likelihood = -301.33821
Iteration 9: log likelihood = -301.27333
Iteration 10: log likelihood = -301.18857
Iteration 11: log likelihood = -301.14234
Iteration 12: log likelihood = -301.10255
Iteration 13: log likelihood = -301.02855
Iteration 14: log likelihood = -300.99952
(switching optimization to BHHH)
Iteration 15: log likelihood = -300.97931
Iteration 16: log likelihood = -300.97892
Iteration 17: log likelihood = -300.97874
Iteration 18: log likelihood = -300.97866
Iteration 19: log likelihood = -300.97863
(switching optimization to BFGS)
Iteration 20: log likelihood = -300.97858
Iteration 21: log likelihood = -300.97854
Iteration 22: log likelihood = -300.97854
Iteration 23: log likelihood = -300.97853
```

ARIMA regression

```
Sample: 1961 - 2012                Number of obs   =        52
                                   Wald chi2(6)     =       551.07
Log likelihood = -300.9785         Prob > chi2     =        0.0000
```

D.grgdp	OPG		z	P> z	[95% Conf. Interval]	
	Coef.	Std. Err.				
grgdp						
dump						
D1.	-5.554871	48.68186	-0.11	0.909	-100.9696	89.85982
dumr						
D1.	45.14775	38.14952	1.18	0.237	-29.62394	119.9194
_cons	.4936738	5.042262	0.10	0.922	-9.388979	10.37633
ARMA						
ar						
L1.	-.6426735	.5736328	1.12	0.263	-.481626	1.766973
L2.	-.1806724	.2601054	-0.69	0.487	-.6904696	.3291247
ma						
L1.	-1.679193	.6461798	-2.60	0.009	-2.945682	-.412704
L2.	.8103647	.5891951	1.38	0.169	-.3444364	1.965166
/sigma	77.22941	7.903835	9.77	0.000	61.73817	92.72064

3. ARIMAX regression of RGDPgr (World Bank data) on DUMP and DUMR

```
. arima rgdpgr dump dumr, arima(1,0,2)
```

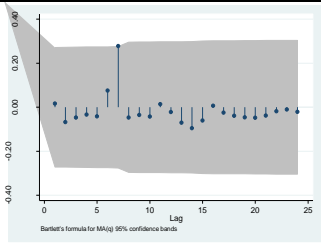
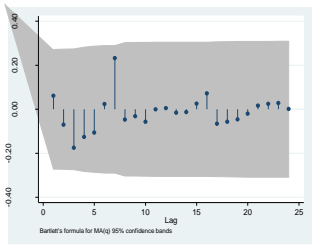
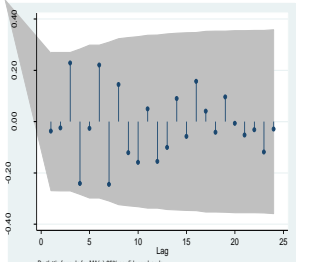
```
(setting optimization to BHHH)
Iteration 0: log likelihood = -168.8582
Iteration 1: log likelihood = -167.54186
Iteration 2: log likelihood = -166.68344
Iteration 3: log likelihood = -166.22429
Iteration 4: log likelihood = -165.6745
(switching optimization to BFGS)
Iteration 5: log likelihood = -165.52698
Iteration 6: log likelihood = -165.36958
Iteration 7: log likelihood = -165.02124
Iteration 8: log likelihood = -164.97779
Iteration 9: log likelihood = -164.97407
Iteration 10: log likelihood = -164.96839
Iteration 11: log likelihood = -164.96787
Iteration 12: log likelihood = -164.96781
Iteration 13: log likelihood = -164.9678
```

ARIMA regression

```
Sample: 1960 - 2011                Number of obs   =      52
                                   Wald chi2(5)     =     59.41
Log likelihood = -164.9678         Prob > chi2     =     0.0000
```

rgdpgr	OPG					[95% Conf. Interval]	
	Coef.	Std. Err.	z	P> z			
rgdpgr							
dump	-2.112213	2.03843	-1.04	0.300	-6.107462	1.883035	
dumr	.1725177	3.027591	0.06	0.955	-5.761451	6.106486	
_cons	4.236855	1.292308	3.28	0.001	1.703977	6.769733	
ARMA							
ar							
L1.	.7668134	.1754967	4.37	0.000	.4228463	1.110781	
ma							
L1.	-.2438436	143.8546	-0.00	0.999	-282.1938	281.7061	
L2.	-.7560935	108.7744	-0.01	0.994	-213.9501	212.4379	
/sigma	5.626399	404.485	0.01	0.989	-787.1497	798.4025	

Diagnostic Check on ARMAX Models

Variable	AIC	BIC	ACF Residual
1. GRGDP	616.13	625.89	
2. GRGDP	616.13	633.57	
3. RGDPgr	343.94	357.59	

Source: Author’s compilation

Note: AIC: Akaike Information Criterion; BIC: Bayesian Information Criterion; Q-test: Portmanteau Q-test

Judging from the autocorrelation function plot of residuals and the associated Portmanteau Q-statistics, each ARMAX models fit the data well. The various spikes at different lags under the ACF residual plot are seen to fall within the shaded region. This implies that all the lags are not statistically significant. An indication of the insignificance of this test is that the residuals of the various ARMAX models fitted are white noise. Consequently, the models are ‘best’ in their own right.

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