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Business Cycle, Macroeconomic Variables and Economic Growth in Nigeria (1986-2014); A Time Series Econometric Approach

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Keywords: business cycle, government expenditure, money supply, hodrick prescott, time series and vector autoregression.

Abbreviations: Real Gross Domestic Product (RGDP), Business Cycle (BCY), Government Expenditure (GEXP), Broad Money Supply (M2) and Hodrick-Prescott Filter (HP).

I. Introduction

Traditional macroeconomists are of the view that business cycle and growth are unrelated areas of macroeconomics, that is, business cycle does not affect economic growth, and both should be remain separate. However, modern macroeconomists are of the view that business cycle and growth cannot be treated independently because cyclical fluctuations in an economy play a significant role in the growth of such an economy. Kydland and Prescott (1982) were the first to analyze macroeconomic variations in a manner that integrates growth and business cycle theories. Also, Rafferty (2003) argued that if business cycle affects productivity, it might as well influence growth. These arguments have spurred researchers over time, into investigating the relationship between business cycle and growth in developed and developing countries of the world.

Business cycles otherwise called economic cycles are fluctuations in macroeconomic variables, particularly the Gross Domestic Product (GDP).It is defined as the regular ups and downs in a nation's output. It can also becharacterizedas movements in macroeconomic variables measured byups and downs in overall macroeconomic performance (Alimi and Atanda, 2011). These fluctuations typically involve shifts over time between periods of relatively rapid economic growth (booms) and periods of relative stagnation or decline (recessions).The Great Depression of the 1930's in the United States of America and the fluctuations in macroeconomic variables around the time led tothe emergence of the business cycle phenomena.

Nigeria over the years has witnessed periods of booms and recessions. In the 1970s, the economy was expanding due to the large inflow of crude oil income, and between 1981-1985 (when there was a fallin oil revenue), the economy declined, causing a rapid deterioration in the living standard of Nigerians (Chukwuemeka, 2014). This, in turn,led to a decline in the performance of the economy as government revenue fell, the standard of living worsened, debts (both domestic and external) rose followed by a decreasein the GDP.

The Central Bank of Nigeria (CBN) in its effort to manage the effects of the falling oil revenue and dwindling international reserves engaged in currency devaluations. The series of devaluations created transaction losses for local firms and multinational corporations exposed to dollar-denominated debt. Businesses in Nigeria are faced with new and rising cost of doing business due to the business cycle phenomena generated by dwindling foreign reserves, declining oil price, increased government borrowing, political instability coupled with tight monetary and fiscal policy framework. These makes it difficult for the economy to grow as expected.

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Macroeconomic variables such as the GDP, inflation rate, government expenditure, exchange rates, money supply and oil price are important indicators of economic performance. Shocks to any of these variables can distort the workings of the economy, particularly economic growth. Empirical evidence in the literature over time posit that shocks to some of these variables are key sources of fluctuations to the economy and as such contribute to the business cycle phenomena (Akinleye and Ekpo, 2013). The empirical relationship that exists between these macroeconomic variables, business cycle and economic growth remains a concern to economists, researchers and policy makers especially in a developing country like Nigeria.

Also, there are controversies in the literature by several authors as regards the effects business cycle on economic growth some of which are Lucas(1977), Kydland and Prescott (1982), Canova and Fabio (1994) and Celsa Machado (2001). Some argued that long-term growth and short term fluctuations in output must be explained by the same theory and some others believed it should not be so. However, it has been agreed by most scholars that the effect of business cycle on economic growth may be examined using the Real Business Cycle framework, with emphasis made on short-term fluctuations in both empirical and theoretical studies, and the adoption of the neo-classical growth model (Celsa Magado, 2001).

The crucial point to note here is that Nigeria was and is still experiencing periods of booms and recession and these spurs fluctuations in her macroeconomic variables which generates cyclical variations in the GDP. Nigeria needs to understand how business cycle affects output, the extent to which fluctuations in macroeconomic variables influence economic performance and ways to achieve the desired level of growth in the economy. The scope (period of study) chosen is to cover the eras of structurally driven policies and the attendant cyclical movements in aggregate macroeconomic variables.

II. Literature Review

Different types of business cycles have been discovered over time in the literature and the major ones are the Kitch in inventory cycle of 3-5 years identified by Joseph Kitch in in 1923, Kuznets infrastructural investment cycles of 15-25 years proposed by Simon Kuznets (1958), Kondratiev wave cycle of 45-60 years identified by Nikolai Kondratiev (1922) and the Jugular fixed investment cycle of 7-11 years popularised in the 1860s by Clement Jugular. The Jugular cycle is the most recognized cycle of all others as it relates to the modern concept of business cycle. The global economic meltdown of 2007, the great depression of the 1930s and the events of the 1920s (to mention a few) depicts business cycles, but the great misery is of a higher magnitude and this event triggered off a new wave of intellectual economic thinking.

The great depression describes the economic crisis of the 1930s in the USA that precedes the existence of the Keynesian school of thought. It was a situation when in the face of weak fiscal performance, authorities continued with the laissez-faire policies of the era.Several authors have proffered various explanations to help elucidate the causes of business cycles and in particular the great depression. According to the Austrian School led by Ludwig von Mises, business cycle is caused by the intervention of monetary authorities in the money market. They posit that interest rate is a major factor that guides investment decisions. Gusmorino (1996) stated that the causes of the great depression include inequality in wealth distribution, poor and short-sighted government policies, mass speculation in the US stock market, etc.

Some empirical studies over time have examined the relationship between business cycle and growth in developed and developing countries of the world. Kydland and Prescott (1982) analyzed the extent to which movements in aggregate economic variables affect output in the US under some imposed assumptions. The model formulated was applied to quarterly data of the US economy, and the result showed that the business cycle component, display a moderately high degree of resistance. Consumption is strongly pro-cyclical and fluctuated about a third as much as output in percentage terms; investment is strongly pro-cyclical and oscillated about a third as output.

Similarly, in an attempt to examine what accounts for business cycle fluctuations and long-run movement of output and prices using quarterly data for the period 1951:2 to 1987:2 of the US economy. Shapiro and Watson (1988) adopted a Structural Vector Autoregressive (SVAR) specification to estimate the model and analyze the time series properties of the data. The results show that aggregate demand shocks account for about twenty to thirty percent of output fluctuations, technology shocks account for roughly one-quarter of cyclical movements and shocks that permanently affect labor input account for the balance of fluctuations in output.

Lee *et al.* (2003)applied a VAR model to analyze the role of US and Japanese business cycles on the Australian economy and found that the fluctuations of output in the US and Japan affected the Australian business cycle in addition to oil price shocks. Furthermore, they found that the linkage between the US and Australian business cycles became stronger since the early 1980s, while the relationship between Australia and Japan became weaker after 1990s.

Peiris and Sax egaard (2007), evaluates monetary policy trade-offs in low-income countries using

a DSGE model for Mozambique The study used the Bayesian method to estimate the model covering the period 1996:1 to 2005:4 on 18 macroeconomic variables. The result of the study suggests that exchange rate peg is significantly less effective than inflation targeting at stabilizing the real economy due to higher interest rate volatility. This researchis seemingly one of the few ones to date in macroeconomic modeling in Sub-Sahara Africa with exception of South Africa for which DSGE models have been developed to simulate the economy.

In Nigeria, Olekah and Oyaromade (2007) estimated a DSGE model for the Nigerian economy. This model appears to be one of the earliest DSGEMs on Nigeria. The study presents a small-scale DSGE model of the Nigerian economy with the aim of aiding monetary policy decisions. The authors employ Vector Autoregressive (VAR) method of estimation. The results show that changes in prices are influenced mainly by volatility in real output while exchange rate and inflation account for significant proportion of the variability in the interest rate.

Following the study of Olekah and Oyaromade (2007), a small business cycle model in the spirit of Dynamic Stochastic General Equilibrium (DSGE) model was developed for Nigeria by Alege (2009). The aim was to examine the sources of business cycle and draw implications for policy analysis using the Bayesian method and the Vector Auto regression analysis, between 1970 and 2004. The results obtained in this study showed that the Nigerian business cycle is determinedby both real and nominal shocks.

Also, Alimi and Atanda (2011) investigated the relationship among globalization, business cycle and economic growth in Nigeria between 1970-2010 amidst cyclical fluctuations in foreign investments used an autoregressive model on annual data between this periods. The result showed that globalization has a positive and significant effect on economic growth while the effect of business cycle on economic growth in Nigeria was positive but insignificant.

Fredrick *et al* (2014) employed VAR and Granger Causality Tests to analyze the effect of business cycle on economic growth in Nigeria and the direction of causality between them, using annual data between1970-2012. The result showed that money supply shocks affect the economy more than all other shocks and a bi-directional causality running between money supply and government expenditure and a unidirectional causality between exchange rate and government revenue.

III. Methodology

a) Model Specification

This paper adapts the econometric model adopted by Alimi and Atanda (2011) and Fredrick *et al.* (2014) to investigate business cycle and economic growth in Nigeria. Government expenditure (GEXP)and money supply (M2) are used as the proxy for macroeconomic variables because they are major indicators of output performance in the economy. They are also important sources of business cycle in Nigeria. Real gross domestic product (RGDP) is used as the proxy for economic growth and the business cycle (BCY) component will be generated from Nominal GDP (NGDP) using the Hodrick-Prescott (HP) filter. The reason for this is that nominal GDP has not been corrected for inflation or any smoothening process and the cyclical part of GDPcan be accurately accounted for. The HP filter is used to decompose nominal GDP into its trend and cyclical components. The cyclical component is used as the proxy for business cycle in this paper. Thus, the vector (Z_t) of endogenous variables included in the reduced-form VAR can be expressed as:

$$Z = \begin{Bmatrix} RGDP \\ GEXP \\ M2 \\ BCY \end{Bmatrix} \quad (1)$$

Where RGDPis the gross domestic product, BCY is business cycle generated by the HP filter, M2 is money supply,and GEXP is government expenditure. M2 and GEXP are used as the proxy for macroeconomic variables in this study because they are important macroeconomic variables in Nigeria and they are used by studies such as Agenor *et al.*(2000) and Fredrick *et al.*(2014). In this model, all variables are assumed to be endogenous, affecting each other contemporaneously as well as with lags. In vector form, the equation is specified as:

$$Z_t = k + \beta_1 Z_{t-i} + \beta_2 Z_{t-i} + \beta_3 Z_{t-i} + \ldots\ldots\ldots + \beta_p Z_{t-p} + \mu_{1t} \quad (2)$$

Equation (2) can be expressed clearly as follows:

$$\Delta RGDP_t = \alpha_0 + \sum_{i=1}^{p} \phi_i \Delta GDP_{t-i} + \sum_{i=1}^{q} \beta_i \Delta BCY_{t-i} + \sum_{i=1}^{r} \gamma_i \Delta GEXP_{t-i} + \sum_{i=1}^{s} \sigma_i \Delta M2_{t-i} + \mu_{2t}$$

$$\Delta BCY_t = \alpha_0 + \sum_{i=1}^{q} \beta_i \Delta BCY_{t-i} + \sum_{i=1}^{p} \phi_i \Delta GDP_{t-i} + \sum_{i=1}^{r} \gamma_i \Delta GEXP_{t-i} + \sum_{i=1}^{s} \sigma_i \Delta M2_{t-i} + \mu_{3t}$$

$$\Delta GEXP_t = \alpha_0 + \sum_{i=1}^{r} \gamma_i \Delta GEXP_{t-i} + \sum_{i=1}^{p} \phi_i \Delta GDP_{t-i} + \sum_{i=1}^{q} \beta_i \Delta BCY_{t-i} + \sum_{i=1}^{s} \sigma_i \Delta M2_{t-i} + \mu_{4t}$$
$$\Delta M2_t = \alpha_0 + \sum_{i=1}^{s} \sigma_i \Delta M2_{t-i} + \sum_{i=1}^{p} \phi_i \Delta GDP_{t-i} + \sum_{i=1}^{q} \beta_i \Delta BCY_{t-i} + \sum_{i=1}^{r} \gamma_i \Delta GEXP_{t-i} + \mu_{5t} \quad (3)$$

b) Time Series Properties and Diagnostics Test

To investigate the time-series property of the variables to avoid spurious results, the Phillip-Peron (PP) testwith constant and linear trend is conducted to test for the order or integration of all series. The ADF test is based on the Null Hypothesis that a unit root exists in the autoregressive representation of the time series. However, to adhere strictly to the underlying assumptions for an autoregressive model, both the Breusch-Pagan test for serial correlation and the ARCH test for hetero sced as city are employed as diagnostics test.

IV. Data Source

The quarterly time series data on the real gross domestic product, nominal gross domestic product, government expenditure and money supply were sourced from the Central Bank of Nigeria (CBN) statistical bulletin 2014.

V. Results and Discusion

This section of the study presents the empirical results of the unit root test and regression analysis. Before the discussion of the estimated autoregressive model, the Phillip Peron unit root result is shown in table 4.1:

Table 4.1: Unit Root Test Results

Phillip-Peron (PP) Test			
Variables	Level	1st Difference	Status
RGDP	-2.3456	-10.3151	I(1)
		(0.0000)**	
GEXP	-3.0776	-12	I(1)
		(0.0000)**	
M2	-0.7796	-69.8088	I(1)
		(0.0000)**	
BCY	-4.4767		I(0)
	(-0.0025)**		

*Note: ** represents 5% level of significance*

The result of the unit root test shown in Table 1 revealed that among the considered time series variables, real gross domestic product, government expenditure, and money supply reject the null hypothesis at first difference. This implies that these variables are not stationary at level. However, business cycle, represented by the cyclical component of the nominal gross domestic product rejected the null hypothesis of non-stationarity at level. This indicates that it is non-mean reverting, converges towards its long-run equilibrium and its variance is constant over time. This means that the business cycle component is found to be stationary at level.

The results of the impulse response analysis of the vector auto regression model, are displayed in figures1, 2, 3 and four, while the variance decomposition analyses are presented in Tables 2, 3, 4 and 5.

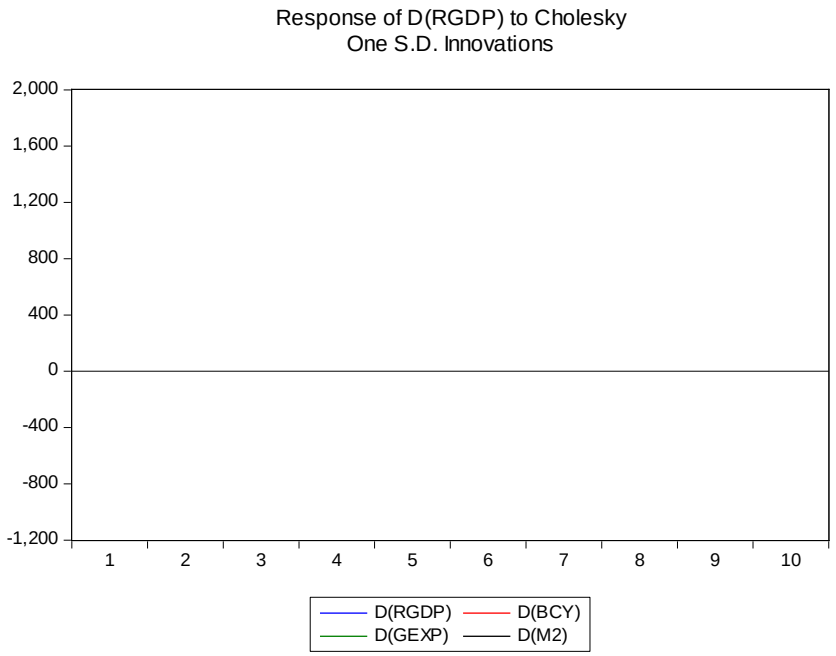

Figure 4.1: Impulse response of real gross domestic product to business cycle, government expenditure, and money supply.

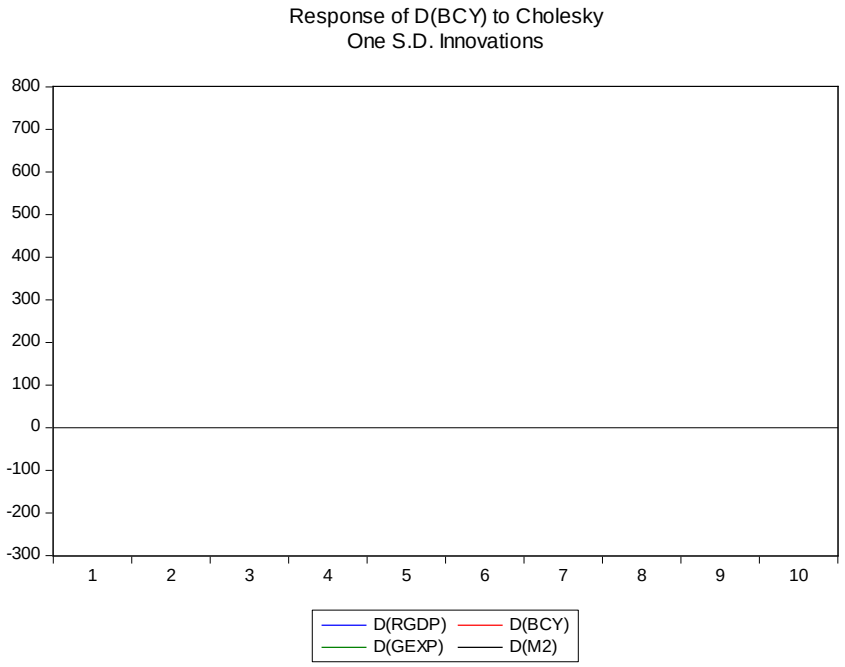

Figure 4.2: Impulse response of business cycle to real gross domestic product, government expenditure, and money supply.

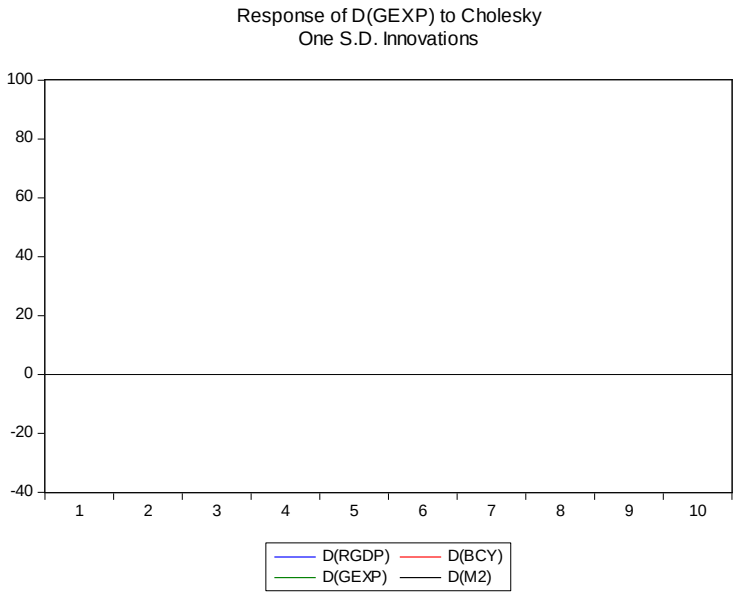

Figure 4.3: Impulse response of government expenditure to real gross domestic product, business cycle, and money supply.

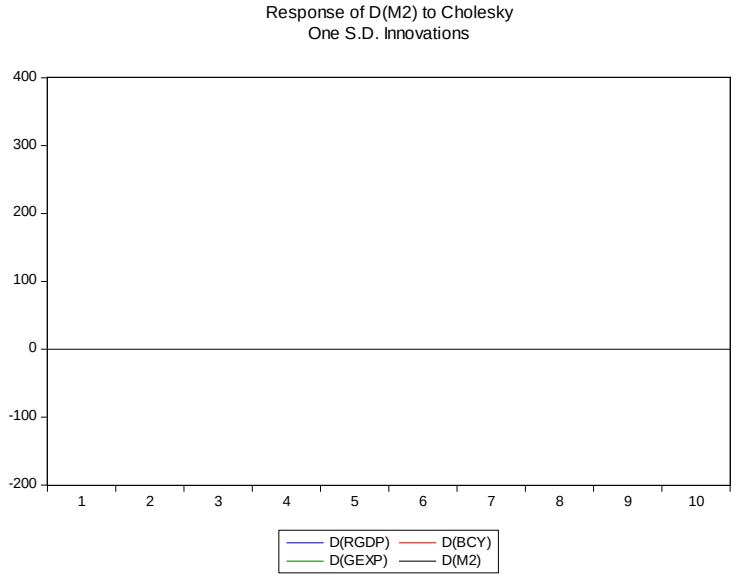

Figure 4.4: Impulse response of money supply to real gross domestic product, business cycle, and government expenditure.

Table 4.2: Variance Decomposition of RGDP

PERIOD	S.E.	D(RGDP)	D(BCY)	D(GEXP)	D(M2)
1	1683.765	100.0000	0.000000	0.000000	0.000000
2	1811.037	87.67649	0.758511	1.799328	9.765669
3	2006.731	71.84905	1.120656	2.105162	24.92513
4	2026.486	71.17638	1.308119	2.592058	24.92345
5	2043.324	70.04579	2.580352	2.729247	24.64461

6	2044.255	69.98807	2.605288	2.776633	24.63001
7	2045.323	70.01213	2.602793	2.779370	24.60571
8	2045.624	70.00427	2.610840	2.778794	24.60610
9	2045.907	69.98910	2.611190	2.778757	24.62095
10	2045.971	69.98477	2.611047	2.779650	24.62453

Table 4.3: Variance Decomposition of BCY

PERIOD	S.E.	D(RGDP)	D(BCY)	D(GEXP)	D(M2)
1	745.5399	8.503424	91.49658	0.000000	0.000000
2	760.9603	8.180712	88.76536	0.540447	2.513482
3	776.1860	7.864670	85.64863	0.813730	5.672970
4	780.3222	8.454987	84.90139	0.939621	5.704001
5	781.9241	8.432341	84.83634	0.940487	5.790835
6	782.2732	8.425138	84.79643	0.940059	5.838377
7	782.3647	8.431018	84.78615	0.940636	5.842200
8	782.4039	8.430813	84.78484	0.941645	5.842702
9	782.4112	8.430668	84.78366	0.941991	5.843677
10	782.4143	8.431114	84.78302	0.941984	5.843884

Table 4.4: Variance Decomposition of GEXP

PERIOD	S.E.	D(RGDP)	D(BCY)	D(GEXP)	D(M2)
1	88.73196	6.916295	3.449014	89.63469	0.000000
2	96.53529	9.352528	2.914309	76.04599	11.68717
3	99.33097	13.34292	2.961000	71.96009	11.73598
4	100.9888	13.75314	4.326003	69.70976	12.21109
5	101.6064	13.61477	4.588173	68.90558	12.89148
6	101.7500	13.59783	4.614829	68.73057	13.05677
7	101.8152	13.58401	4.676916	68.67093	13.06814
8	101.8261	13.58147	4.689250	68.66312	13.06616
9	101.8301	13.58651	4.689478	68.65853	13.06548
10	101.8320	13.58845	4.690139	68.65600	13.06541

Table 4.5: Variance Decomposition of M2

PERIOD	S.E.	D(RGDP)	D(BCY)	D(GEXP)	D(M2)
1	423.5578	13.91803	0.093989	0.692923	85.29506
2	462.5487	19.74015	0.179869	7.955237	72.12474
3	493.2805	17.35894	7.223242	7.008626	68.40919
4	494.8763	17.50529	7.183306	6.971998	68.33940
5	496.9190	17.48928	7.745434	6.945038	67.82025
6	497.1899	17.48261	7.806063	6.953555	67.75777
7	497.3114	17.48181	7.803714	6.951116	67.76336
8	497.3481	17.48789	7.804613	6.951381	67.75611
9	497.3696	17.48773	7.809103	6.951077	67.75209
10	497.3747	17.48741	7.809530	6.950934	67.75213

a) Impulse Response Analysis

Impulse response analysis traces out the responsiveness of the dependent variables in a VAR model to shocks from each of the variables (Brooks 2008). It also shows the effects of disturbances on the adjustment path of the variables. It shows the size of the impact of the shock, plus the rate at which it dissolves. It also shows how each variable reacts dynamically to shocks from other variables. Furthermore, the impulse response function shows the dynamic response of one variable to a one-period standard deviation innovation shock to the other variables.

From figure 1, RGDP has a positive response to innovations from business cycle (BCY), government expenditure (GEXP) and money supply (M2) in the first period. It responded negatively in the second phase but became positive by the third period. BCY remained positive between the third period and the seventh period. Its response became negative in the eighth period and had no response in the ninth and tenth periods. This implies that the effect of shocks to the other variables on RGDP lacked persistence in Nigeria as it faded away in the last two periods. This is contrary to the findings of Chris and Anyingang (2012) who argued that shocks affect output only in the short run. These findings show that BCY affects RGDP in most of the periods and does not support the view of traditional macroeconomics that there is no relationship between business cycle and growth.

Figure 2, BCY responded positively to a one standard deviation shock in RGDP, GEXP, and M2 in the first period. However, it responded negatively to shocks in RGDP, GEXP and M2 between the second and sixth period but became positive in the sixth and seventh period. BCY did not respond to shocks to these variables in the subsequent periods. The implication of this is that the effect of the shocks to RGDP, M2 and GEXP on BCY lacks persistence in all the periods as it faded away in the last three periods. This also means that BCY's response to shocks in RGDP, M2 and GEXP is observed majorly in the short run and quite negligible in the long run in Nigeria. This supports the findings of Chris and Anyingang (2012) but is contrary to the findings of Bouzid (2012) and the general traditional macroeconomic argument that posits that business cycle and growth are unrelated areas of macro-economics.

In Figure 3, GEXP responded positively to a standard deviation shock to RGDP, BCY and M2 in the first period. It became negative in the second period but responded positively to the shock in RGDP, BCY, and M2 in the third period. GEXP further responded positively to shocks to these variables between the third and fifth period. However, its response was negative in the sixth period but showed no response in the subsequent periods. This means that fluctuations in GEXP in Nigeria may be attributed to shocks affecting RGDP, BCY, and M2 in the short run. This is because the effect of the shock is not persistent in all the periods as it faded away in the long run (ninth and tenth periods). This finding supports the findings of Bergoeing and Soto (2000).

In figure 4, M2 reacted positively to a standard deviation shock to RGDP, BCY, and GEXP in the first two periods. Its response is negative in the third period but became positive in the fourth period. M2's response is negative in the fifth and sixth periods but became positive in the seventh period. However, it had no response to shocks to RGDP, BCY and GEXP in the subsequent periods because shocks to these variables did not persist throughout the periods as it faded away in the latter periods. This is similar to the findings of Ibrahim *et al.* (2014).

b) Variance Decomposition

Variance decomposition analysis provides a means of determining the relative importance of shocks in explaining variations in the variable of interest (Andren, 2007). It offers information about the importance of each random innovation to the variables in the VAR model.

In Table 2, BCY, GEXP, and M2 did not give explanation to the variation in RGDP. In the third period, 1.12%, 2.10% and 24.93% of the variations in RGDP are explained by shocks to BCY, GEXP, and M2 respectively. The effect of the shocks to these variables increased in the subsequent periods. As at the seventh period, 2.60%, 2.77% and 24.61% of the variations in RGDP were explained by BCY, GEXP, and M2 respectively. This implies that M2 has the highest power and BCY has the lowest power to explain the variations in RGDP in Nigeria. This supports the findings of Fredrick *et al*, (2014).

In Table 3, 8.5% of the variation in BCY is explained by RGDP while GEXP and M2 did not contribute to the variation in BCY in the first period. GEXP and M2's contribution to variations in BCY increased in the third period by explaining 0.81% and 5.67% of the variations in BCY respectively. The contribution of RGDP, GEXP and M2 continued to increase in the subsequent periods as 8.43%, 0.94% and 5.84% of the variation in BCY is explained by these variables. It is observed that RGDP affects BCY in Nigeria more than M2 and GEXP respectively. This supports the findings of Rafferty (2003).

In Table 4, RGDP and BCY explained 6.92% and 3.44% of the variation in GEXP respectively in the first period, but M2 does not affect GEXP in this period. The influence of RGDP and M2 in explaining the variations in GEXP increased in the third period while the influence of BCY reduced. However, in the subsequent periods, the influence of RGDP, BCY and M2 continued

to increase (though slightly) till the tenth period as 13.59%, 4.69% and 13.06% of the variation in GEXP were explained respectively. Hence, RGDP and M2 have more power to explain variations in GEXP than BCY in Nigeria. This is similar to the findings of Agenor, Mc Dermort, and Presad (2000) and Fredrick *et al*. (2014).

In Table 5, 13.91%, 0.09% and 0.69% of the variation in M2 is explained by RGDP, BCY, and GEXP respectively in the first period. By the third period, BCY, and GEXP's contribution to variation in M2 drastically increased by explaining 7.22% and 7.01% of the variation in M2 while RGDP explained 17.22% of the variation in M2. The effects of RGDP, BCY and GEXP on the variations in M2 did not noticeably increase in the subsequent periods. The largest share of the variations in M2 is absorbed by RGDP, and this implies that the variations in M2 are best explained by RGDP in Nigeria. This is similar to the findings of Fredrick *et al.* (2014) and Alege (2009).

VI. Conclusion and Recommendations

This research paper analyzed the relationship among business cycle, macroeconomic variables (proxied by government expenditure and inflation) and economic growth in Nigeria between 1986 and 2014. The ve.ctor auto regression (VAR) models employed revealed that business cycle affects growth and the macroeconomic variables used in this paper through the variance decomposition and impulse response analysis. This implies that business cycle shocks affect economic growth and other macroeconomic in Nigeria, although its effect on growth lacked persistence throughout the period of study as it faded away in the latter period. Also, shocks to each of the variables affected other variables in the VAR model which establishes a dynamic interaction among the variables.

This study thus concludes that business cycle fluctuations affect growth and the macroeconomic variables used in this study in Nigeria in the last three decades. This explains to some extent the slow growth, high level of poverty and the economic recession experienced over time especially in the recent years. The business cycle-growth debate has always been inconclusive among scholars as some believe it hinders growth while some believe its effect on growth is negligible. The overall challenge to policymakers is to ensure that policies enhances the stability of macroeconomic variables are put in place as shocks to these variables affects the growth process in Nigeria. The effects of business cycle on the performance of the economy should not be trivialized as it has far-reaching effects on the economy as a whole.

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Appendix

Vector Autoregression Estimates
Date: 04/11/16 Time: 23:16
Sample (adjusted): 4 116
Included observations: 113 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	D(RGDP)	D(BCY)	D(GEXP)	D(M2)
D(RGDP(-1))	-0.185004	-0.048833	-0.003481	-0.064572
	(0.10837)	(0.04799)	(0.00571)	(0.02726)
	[-1.70709]	[-1.01765]	[-0.60948]	[-2.36858]
D(RGDP(-2))	0.375489	-0.030576	0.004058	0.006215
	(0.11459)	(0.05074)	(0.00604)	(0.02882)
	[3.27695]	[-0.60265]	[0.67196]	[0.21562]
D(BCY(-1))	0.300309	-0.116188	-0.001957	0.014713
	(0.23278)	(0.10307)	(0.01227)	(0.05856)
	[1.29011]	[-1.12728]	[-0.15956]	[0.25126]
D(BCY(-2))	-0.099750	-0.052974	-0.003175	-0.162063
	(0.22911)	(0.10144)	(0.01207)	(0.05763)
	[-0.43538]	[-0.52219]	[-0.26293]	[-2.81198]
D(GEXP(-1))	2.284562	-0.795355	-0.029258	1.456636
	(1.90261)	(0.84244)	(0.10026)	(0.47861)
	[1.20075]	[-0.94411]	[-0.29181]	[3.04348]
D(GEXP(-2))	1.418370	-0.102434	0.162894	0.255110
	(1.92497)	(0.85234)	(0.10144)	(0.48423)
	[0.73683]	[-0.12018]	[1.60577]	[0.52683]
D(M2(-1))	1.446784	0.308408	-0.084366	0.091867
	(0.44542)	(0.19722)	(0.02347)	(0.11205)
	[3.24814]	[1.56375]	[-3.59418]	[0.81990]
D(M2(-2))	-1.878481	0.369154	0.032128	-0.078393
	(0.46325)	(0.20512)	(0.02441)	(0.11653)
	[-4.05504]	[1.79973]	[1.31604]	[-0.67272]
C	152.3874	-63.11430	16.63916	158.3706
	(182.895)	(80.9823)	(9.63828)	(46.0079)
	[0.83320]	[-0.77936]	[1.72636]	[3.44225]

R-squared	0.283780	0.079234	0.228892	0.266640
Adj. R-squared	0.228687	0.008406	0.169576	0.210228
Sum sq. resids	2.95E+08	57806293	818829.5	18657729
S.E. equation	1683.765	745.5399	88.73196	423.5578
F-statistic	5.150859	1.118676	3.858855	4.726628
Log likelihood	-995.1038	-903.0450	-662.5258	-839.1527
Akaike AIC	17.77175	16.14239	11.88541	15.01155
Schwarz SC	17.98897	16.35962	12.10264	15.22878
Mean dependent	160.0527	13.02743	9.636763	167.2414
S.D. dependent	1917.194	748.6931	97.37110	476.6085

Determinant resid covariance (dof adj.)	1.56E+21
Determinant resid covariance	1.12E+21
Log likelihood	-3379.637
Akaike information criterion	60.45375
Schwarz criterion	61.32265

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