INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN ECONOMICS & MANAGEMENT SCIENCES

OPEN ACCESS JOURNAL

Vol 8, Issue 1, (2019) E-ISSN: 2226-3624

Monetary Policy and the Performance of the Crude Petroleum and Natural Gas Sector in Nigeria (1986-2017)

[1]Osakwe, A. C, [2]Ibenta, S.N.O, and [3]Nzotta, S.M.

[1]Banking & Finance Dept, Chukwuemeka Odumegwu Ojukwu University, Igbariam Campus

[2]Banking & Finance dept, Nnamdi Azikiwe University, Awka.

[3]Financial Management Tech, Federal University of Technology, Owerri.

To Link this Article: http://dx.doi.org/10.6007/IJAREMS/v8-i1/5554 DOI:10.6007/IJAREMS/v8-i1/5554

Published Online: 20 March 2019

Abstract

This study examined the effect of monetary policy on the performance of the Crude Petroleum and Natural Gas sector output in Nigeria. The explanatory variables are monetary policy rate, Treasury bills rate, Cash reserve requirement and money supply; while the dependent variable is the Crude Petroleum and Natural Gas (PEGAS) sector output. The study adopted an ex-post facto research design and used secondary data obtained from the CBN Statistical Bulletin. The study covered a period of 32 years (1986 to 2017). The data were subjected to Augmented Dicker Fuller stationarity test to determine the best suitable econometric tool of analyses. The Autoregressive Distributive Lag (ARDL) was used for data model estimation. The results revealed that: monetary policy tools have no significant effect on the crude petroleum and natural gas output, both in the long and short run; that of all the monetary policy variables in the model, only money supply (M2) has a significant short run effect at the first lag period [M2(-1)]. The study thus concluded that monetary policy has not been an effective long run policy instrument that can largely influence the crude petroleum and Natural Gas sector output in Nigeria. The study recommends that the CBN use expansionary monetary policy that can increase money supply to the PEGAS to boost output indirectly. The study introduced model for the Crude Petroleum and Natural Gas sector output and monetary policy nexus in Nigeria.

Keywords: Monetary Policy, Performance, Crude Petroleum, Natural Gas Sector, Nigeria.

Introduction

Many developing economies specialise in the production of primary sector raw materials like the agriculture and exploration of natural resources such as crude oil and gold. These economies are largely under-industrialised and prone to substantial shocks, which expose them to enormous supply-side shocks (Ononugbo, 2012). The Nigerian government has made concerted efforts at diversifying her economy. The efforts gave rise to policies that encourage growth of the different sectors of the economy. The term, monetary policy are tools involving a combination of measures designed by the Central Bank to regulate the availability,

value, supply and cost of credit/money in domestic economy with the view to achieving expected macroeconomic stability/targets (Imoisi, Olatunji & Ekpenyong, 2013; Nasko, 2016). These macroeconomic targets or goals for Nigeria and most developing countries include sustained rate of economic growth, price stability, balance of payments equilibrium, exchange rate movement, cost of funds and adequate employment creation. On the other hand, instrumental variables of monetary policy are those variables within the purview of the government that can be manipulated to achieve some economic objectives. The CBN (2018) identified the instruments currently used as monetary policy rate, treasury bills rate for OMO, Reserve Requirement, as market based, while moral suasion, interest rate and control of the banking system are direct policies still applicable in Nigeria.

The extent of influence of monetary policy on macroeconomic stability and economic development depends on the strategies and implementation as well as the autonomy of the Central Bank to choose the appropriate monetary tools to formulate the monetary policy macroeconomic objectives (Alavinasab, 2016). The practice is to use monetary policy to control money supply and interest rate in a manner that counteract all undesirable trends which may include unemployment, inflation, sluggish economic growth or disequilibrium in balance of payments (Gbosi, 2002; Ibeabuchi, 2007). The Central Bank is at liberty to manipulate the quantity of money and interest rate with the view to make money either more expensive (contractionary monetary policy) or cheaper (expansionary monetary policy) according to the economic conditions and/or policy stance the government wants to drive.

The CBN Act of 1958, established the Central Bank of Nigeria as the sole monetary authority in Nigeria having the mandate to promote and maintain monetary stability and sound financial system in Nigeria. Monetary policy in Nigeria has experienced two main phases which are the era of direct control (1959-1986) and the era of market-based controls (1986-date). In the era of direct control, the CBN used directives targeted at specific sectors to fix or control interest rate, exchange rate, determine credit allocation to choice sectors, etc.

Omotor (2007) was of the opinion that the direct control mechanism was ineffective because of the heavy influence from political consideration normally conveyed to the CBN through the Ministry of Finance. The market-based era introduced through the Structural Adjustment Programme (SAP) since 1986 entail the use of indirect monetary policy instruments allowing the forces of demand and supply for money to influence macroeconomic targets through the role of interest rate. This period brought about a revamp of the financial system in Nigeria through the deregulation exercise that brought the creation of two foreign exchange markets in 1986, removal of interest rate controls, liberalisation of bank licensing and the unification of the foreign exchange markets in 1987. It also witnessed the establishment of the foreign exchange bureaus in 1988, relaxation of the bank portfolio restrictions and establishment of the Nigerian Deposit Insurance Corporation in 1988. There were some other policies that support price-based economy such as the payment of interest on demand deposits, introduction of the auction markets for government securities, and the removal of mandatory credit allocation guidelines. These reforms were to give leeway to the use of indirect monetary policy instruments. However, within these periods the CBN operated the market-based policy alongside with the direct policy (CBN, 2018).

As time progressed, the financial market deepens, the use of direct control fizzled out completely as the introduction of the Open Market Operations(OMO) of the 1993 became the new key anchor. Other market-based tools are the reserve requirements and the monetary policy rate (MPR). The OMO operations may be done through direct (outright transaction) or repurchase transactions and/or reverse repo. However, the OMO is being

complemented by other instruments which are discount window operations, moral suasion, forex sales and the standing facility introduced in December, 2006.

Daferighe, Emah, & Offong, (2017) posits that production of Crude petroleum and natural gas have positive effects on the growth of the Nigerian economy. The crude petroleum and gas sector have contributed immensely to the improvement of the performance of the Nigerian economy by being a pillar and main revenue earner to the three tiers of government in Nigeria. It also provides energy to Industry and Commerce, as well as foreign exchange supply to the Nigerian Economy for decades. The sector contribute heavily to the value added to boost Nigerian economic growth (Gbadebo, 2008). The effect of monetary policy on the Oil and gas sector performance in Nigeria remain unclear due to the absence of extant studies and literature in this area.

The Nigerian economy has had to deal with problems of high inflation, unstable economic growth, high and increasing rate of unemployment, trade imbalances, unstable exchange rate and high interest rate since the introduction of the Structural Adjustment Programme. This negates the notion that the adoption of a more open economy and the application of price reliant monetary policy is more effective in boosting economic development in developing countries like Nigeria. Despite this, previous attempts to understand the channel of monetary policy transmission on economic stabilization in Nigeria in relation to sectorial output has resulted in conflicting opinions. The existing studies disagreed based on line of significance and direction of relationship. The dichotomy saw researchers like Omini, Ogbeba, and Okoi(2017); Apinran(2016), Srithilat and Sun (2017), etc supporting significant positive effects (the Keynesian view); Srithilat and Sun (2017); Okulegu, Onwe, and Okoro(2013) averred that all the variables of monetary policy employed has a negative effect on output (classical view) while some other studies agreed with the monetarist view that money has no effect on growth (Udude, 2014; Chipote & Makhetha-Kosi, 2014; .

All the existing literature have failed to incorporate the three core market based instruments like monetary policy rate(MPR), Treasury bills rate(TBR), and Cash reserve requirement(CRR), in one model. In another vein, most of the existing studies of (Udude,(2014), Apinran(2016), Srithilat and Sun (2017) among others employed the traditional Johanson cointegration test that may not adequately moderate variables with level 1(0) and first difference 1(1) stationarity in a regression estimation. Any study that employed a more robust Autoregressive Distributive Lag (ARDL) Approach is most likely to produce better and more reliable empirical results as given by Harris & Sollis, (2003). Consequently, this calls for a more robust monetary policy model that could be used to engender economic stability and enhance the performance of the crude petroleum and natural gas sector in Nigeria through this present study. The null hypothesis is that monetary policy tools have no significant effect on the performance of the crude petroleum and natural gas sector output in Nigeria.

Conceptually, there is a link between the market-based monetary policy tools : monetary policy rate(MPR), Treasury Bills Rate(TBR), Cash Reserve Requirement(CRR), Broad Money Supply(M2) as CBN anchor of monetary policy and the performance of the crude petroleum and Natural Gas sector output in Nigeria.

Theoretical Framework

This study is anchored on the Keynesian Theory of money and prices as well as the Irving Fishers' quantity theory of money. Keynesians believe that expansionary monetary policy increases the supply of loanable funds available through the banking system, causing interest rates to fall. With lower interest rate, aggregate expenditures on investment and interest-

sensitive consumption goods usually increase, causing real GDP to rise. Hence, monetary policy can affect real GDP indirectly. Irving Fisher'squantity theory of money, posits that there is a direct link between monetary policy tools, money supply, it's velocity of circulation and general price level of the economy.

Empirical Review

Omini, Ogbeba and Okoi (2017) employed the VAR (VECM) model and Granger causality test to investigate the impact of monetary policy shocks on industrial output in Nigeria between 1970 and 2015. The data on the contribution of the manufacturing and solid minerals subsectors to GDP was employed as the dependent variable while explanatory variables included monetary policy rate, exchange rate and bank credit to the industrial sector. Findings from the study revealed that the manufacturing sub-sector had a positive influence on monetary policy rate, commercial bank credit to industrial sector and exchange rates, while contribution of solid minerals sub-sector to GDP responded positively to shocks in commercial bank credit to the industrial sector and exchange rate after the first year. The causality test indicated a unidirectional relationship running from monetary policy rate and exchange rate to the contribution of manufacturing sector to GDP on the one hand, and commercial bank credit to the industrial sector and exchange rate to the contribution of solid mineral sector to GDP. Okulegu, Onwe and Okoro (2013) employed a time frame of thirty years ranging from 1980 to 2009 to examine the effect of monetary policy instruments on economic growth in Nigeria. Econometric tools of co-integration, Error correction model and Grange causality tests were employed to regress selected tools of monetary policy (money supply, interest rate, exchange rate and credit to economy) on changes in GDP as proxy for economic growth. The result indicated that long-run relationship exists between monetary policy instruments and economic growth in Nigeria. The ECM showed a significant adjustment to equilibrium as well as revealed that interest rate and credit to the economy had a significant positive effect while exchange rate had a negative effect. However, money supply was not effective on economic growth stability. Udude (2014) employed various monetary policy instruments (money supply, interest rate, exchange rate and liquidity ratio) to examine the effect of monetary policy instrument in enhancing economic growth of Nigeria economy between the period of 1981 and 2012. With the aid of econometric techniques like Augmented Dickey Fuller Unit Root Test, Johansen Cointegration Test and Vector Error Correction Mechanism (VECM), the study showed that there is long run relationship among the variable with two cointegrating vectors. Further analyses showed that only exchange rate exerted significant impact on economic growth in Nigeria while other variables did not. Equally, only money supply though statistically insignificant possessed the expected sign while others contradicted expectation. The study concluded that monetary policy does not have significant impact on economic growth of Nigeria.

Adigwe, Echekoba and Onyeagba (2015) employed the OLS regression model to examine the effect of monetary policy on the Nigerian economy between 1980 and 2010. Results from the model that built money supply, liquidity ratio and cash reserve as independent variable and GDP as proxy for economic growth showed that money supply exerts a positive impact on GDP growth.

Apinran (2016) in his thesis explored the effectiveness of monetary policy instruments in enhancing economic growth in Nigeria between 2000 and 2015. The Johansen multivariate cointegration approach and Vector Error Correction Model (VECM) results showed that monetary policy instruments have long-term relationship with economic growth, with a low

monthly speed of adjustment to long-run equilibrium path at rate of 26%. The major discovery of this work discloses that Consumer Price Index, Real Exchange Rate, Money Supply and Interest Rate are significant monetary policy instruments that propel economic growth in Nigeria.

With the help of the time serial data covering 1990 to 2010, Nasko (2016) examined the effect of monetary policy on economic growth in Nigeria. The study employed money supply, interest rate, financial deepening as explanatory variables while the gross domestic product is the dependent variable. The result from multiple regressions revealed that money supply has negative and significant effect on economic growth of Nigeria.

Using an annual time series data from 1989 to 2016, Srithilat and Sun (2017) examined the impact of monetary policy on the economic development in Laos of Asian economy. The Johansen Cointegration and Error Correction Model used for analyses showed that long run relationship existed between monetary policy variable and economic growth, while money supply, interest rate and inflation rate negatively affected real GDP per capita in the long run and only the real exchange rate has a positive sign. The error correction model result indicates the existence of short run causality between money supply, real exchange rate and real GDP per capita. In Pakistani economy, Ahmad, Afzal and Ghani (2016) applied the Autoregressive Distribution Lag (ARDL) Cointegration approach to explore the importance of monetary measures in promoting economic growth with the period of 1973 to 2014. It adopted Gross domestic product as proxy for economic growth while money supply, Inflation and Interest rate are employed as the explanatory variables of monetary policy. The result of the study revealed a long-run relationship between monetary policy and economic growth. Further results showed that money supply and exchange rate had positive effect on economic growth, while inflation had a positive but insignificant influence on growth. However, interest rate was found to negatively affect economic growth.

Fasanya, Onakoya and Agboluaje (2013) employed a time series data covering 1975 to 2010 to examine the impact of monetary policy on economic growth in Nigeria. The effects of stochastic shocks of each of the endogenous variables are explored using Error Correction Model (ECM). The study showed that long-run relationship exists among the variables. In addition, the result of the study revealed that inflation rate, exchange rate and external reserve are significant monetary policy instruments that drive growth in Nigeria.

Chipote and Makhetha-Kosi (2014) examined the role of monetary policy in promoting economic growth in the South African economy within the period of 2000 to 2010. The Johansen cointegration and the Error Correction Mechanism results tested for the long-run and short-run dynamics among the variables, and revealed that long run relationship existed between monetary policy and economic growth in South Africa. Further results indicated that money supply, repo rate and exchange rate are insignificant monetary policy instruments that drive growth in South Africa, whereas inflation is significant.

Methodology

The study adopted an ex-post facto research design and used secondary data obtained from the CBN Statistical Bulletin. The study covered a period of 32 years (1986 to 2017). The explanatory variables are the three core market based monetary policy instruments of monetary policy rate(MPR), Treasury bills rate(TBR), and Cash reserve requirement(CRR) and money supply (M2) being the CBN anchor of monetary policy as a control. The dependent variable is the Crude Petroleum and Natural Gas (PEGAS) sector in Nigeria. The data were subjected to Augmented Dicker Fuller stationarity test to determine the best suitable

econometric tool of analyses which showed that the variables have a combination of level 1(0) and first differences1(1) of stationarity. The Autoregressive Distributive Lag (ARDL) cointegration approach developed by Pesaran and Shin (1999) and pesaran, Shin & Smith (2001) was thus used for the model estimation due to its advantages over the previous traditional cointegration methods (Harris & Sollis, 2003).

Model Specification

In the development of the model, the output performance of the crude petroleum and natural gas(PEGAS) sector is conceived as a function of monetary policy tools. Hence: PEGAS = *f*(Monetary policy tools) The model is:

PEGAS = ***f***(MPR, TBR, CRR, M2)

This can be rewritten as:

PEGAS = α_0 + + α_1MPR + α_2TBR + α_3CRR + α_4M2 + ε

Where:

PEGAS = Contribution of crude petroleum and natural gas subsector output to Gross Domestic Product.

MPR = Monetary policy rate

TBR = Treasury Bill Rate

CRR = Cash Reserve Ratio

M2 = Ratio of broad money supply to Gross Domestic Product. $\alpha_0$is the constant while α_{1-4} are the coefficients of the explanatory variables (MPR, TBR, CRR and M2). ε is the error term.

Data Analyses

The data for the analyses were presented as Appendix 1, Appendix 2, and Appendix 3

ARDL (Bounds) Test for Cointegration

The result of the Bound test aimed to examine the presence of cointegration among monetary policy tools (MPR, TBR, CRR and M2) and national output from the sector (PEGAS). If the Fstatistic of bound test is higher than the lower and the upper bound critical value at 5% significance level, the null hypothesis of no long run relationship is rejected, whereas if the Fstatistic of bound test is lesser than the lower and the upper bound critical value at 5% significance level, long run relationship is accepted. The cointegration relation between monetary policy tools and the disaggregated output of the PEGAS sector is presented in Table 1.

Table 1.
ARDL Bounds Test for Cointegration

Models	F-Statistic	Lower Bound @ 5% Critical Value	Upper Bound @ 5% Critical Value	Remark
PEGAS Model	1.8824	2.86	4.01	No long run relationship

Source: Extract from Eviews 9 results

The results showed that the F-statistics for model PEGAS is less than the lower and upper bounds of the critical values. Thus, the study posit that monetary policy tools (MPR, TBR, CRR

and M2) have no significant long run effect on national outputs for Crude petroleum and natural gas (PEGAS) sector of the Nigerian economy.

Short Run Relationship

The result of the Autoregressive Distributive Lag (ARDL) model on Table 2 was employed to analyse the short run effect of monetary policy tools on output from the PEGAS sector of the Nigerian economy. The Adjusted R-square, F-statistic, and coefficients of regression were used to address the objectives of the study.

Effect of monetary policy tools on crude petroleum and natural gas output

The result on Table 2 revealed that PEGAS has no significant effect in the model in all the periods included in the model. This implies that PEGAS is an exogenous variable to the effect of monetary policy tool on output from crude petroleum and natural gas sector. Among the variables of monetary policy tools in PEGAS model, only money supply (M2) has a significant short run effect at 0.05 level

Table 2:
ARDL for Short run effect of monetary policy on output from crude petroleum and natural gas sector contribution to GDP
Dependent Variable: PEGAS

Variable	Coefficient	t-Statistic	Prob.*
PEGAS(-1)	0.539837	1.597816	0.1853
PEGAS(-2)	0.371572	0.710779	0.5165
PEGAS(-3)	-0.538895	-0.930854	0.4046
PEGAS(-4)	0.757882	1.898829	0.1304
MPR	-0.681687	-1.546744	0.1968
MPR(-1)	-0.161593	-0.322167	0.7635
MPR(-2)	1.111848	2.256943	0.0870
MPR(-3)	1.008882	1.907894	0.1291
MPR(-4)	0.684196	1.587677	0.1876
TBR	0.056444	0.188286	0.8598

TBR(-1)	0.012169	0.032774	0.9754
TBR(-2)	-0.268475	-0.709400	0.5172
TBR(-3)	-0.393272	-1.103672	0.3317
TBR(-4)	-0.911524	-1.999852	0.1161
CRR	0.034934	0.069264	0.9481
CRR(-1)	0.222804	0.419446	0.6964
CRR(-2)	0.351581	0.847585	0.4444
CRR(-3)	-0.064178	-0.109082	0.9184
CRR(-4)	-0.809835	-1.265679	0.2743
M2	0.271275	2.065096	0.1078
M2(-1)	-0.196893	-2.877079	*0.0451
M2(-2)	-0.066334	-1.196474	0.2976
M2(-3)	0.054747	0.588614	0.5878
C	-10.46135	-1.151410	0.3137
Adjusted R-squared	0.720087		
F-statistic	4.019936		
Prob(F-statistic)	0.092554		

statistic)	
Durbin-Watson stat	2.289546

*significant at 0.05 level.
Source: Extract from Eviews 9 results

at the first lag period [M2(-1)]. With a coefficient of -0.1968, the result indicate that a unit fall in M2 will lead to about 19% increase in output from PEGAS in Nigeria.
The adjusted coefficient of determination showed that about 72% of changes in output from PEGAS can be explained by monetary policy tools in Nigeria. The F-statistics value of 4.019936 is not statistically significant at 0.0925. This suggests that monetary policy tools have no short run significant effect on output from crude petroleum and natural gas (PEGAS) in Nigeria.

Diagnostic Tests
Multicollinearity Test
Presence of **multicolinearity** is tested using the coefficients of correlation matric presented on

Table 3.
High degree of correlation coefficient above 0.8 indicate possibility of multicolinearity. From Table 3, it is seen that none of the coefficients of explanatory variables is up to 0.8. This shows that there is no multicolinearity in the model.

Table 3:
Test of multicolinearity of the explanatory variables in the model.

	Dependent variable	MPR	TBR	CRR	M2
Dependent variables	1.0000				
MPR	-0.1430	1.0000			
TBR	-0.3975	0.7338	1.0000		
CRR	-0.3787	0.0721	0.4325	1.0000	
M2	0.3564	0.3108	0.0044	-0.3197	1.0000

Source: Extract from Eviews output 2018.

Normality Test
Table 4:
Normality test of the models of the study

Models	**Jarque-Bera statistic**	**P-value**
PEGAS	0.246364	0.8841

Source: Extract from Eviews results

The models are examined for normal distribution. The Jarque-Bera (JB) statistics is used to test for the normality of the models. The null hypothesis is that the model is normally distributed. The decision rule is to reject the null hypothesis if the p.value is less than 0.05 level of significance. The P.values of the JB for PEGAS, is 0.8841. Since the p.value is greater than 0.05, the study thus accept the null hypothesis that the model is normally distributed.

Serial Correlation Test

The presence of serial correlation is tested using the Breusch-Godfrey Serial Correlation LM Test. The null hypothesis is no presence of serial correlation. The decision rule is to reject the null hypothesis if the p.value is less than 0.05 level of significance. From result in Table 5, the p.values of the model is greater than 0.05, and revealed that the model is not serially corrected at 5% level of significance.

Table 5:
Breusch-Godfrey Serial Correlation result of the models

Models	**F-statistic**	**P-value**
PEGAS	0.112294	0.8990

Source: Extract from Eviews

Heteroskedasticity Test

Presence of heteroskedasticity in linear regression analysis, implies that the model coefficients estimated using ordinary least squares (OLS) are biased. This occurs when the variance of errors or the model is not the same for all observations. The null hypothesis is that the residuals are homoscedastic and the alternate hypotheses is that the residuals are heteroscedastic. The decision rule is to reject the null hypothesis if the p.value is less than 0.05 level of significance. From result in Table 6, the p.values of the models are greater than 0.05, revealed that the models do have homoscedastic at 5% level of significance.

Table 6:
Test of homoscedastic of the models

Models	**F-statistic**	**P-value**
PEGAS	0.412832	0.9226

Source: Extract from Eviews

Regression Specification Error Test (RESET Test)

The *Ramsey Reset test* is employed to identify the existence of any significant nonlinear relationships in the developed linear regression model. The null hypothesis is that there is linear relationship in the regression model. The decision rule is to reject the null hypothesis if the p.value is less than 0.05 level of significance. From result in Table 7, the p.values of the models are greater than 0.05, which indicated that the models have linear relationships at 5% level of significance.

Table 7:
Ramsey RESET Test

Models	**F-statistic**	**P-value**
PEGAS	0.905015	0.4116

Source: Extract from Eviews results

Hypotheses Testing

The results from ARDL long run and short run model estimation have been subjected to diagnostic tests and found to be reliable. All the models were found to have normal distribution, lacked muitcolinearity and serial correlation and no model specification errors were found. Following from this, the test of hypothesis were based on the Bound F-statistics test for long run effects and F-statistics for short run effect respectively.

Null hypothesis: Monetary policy tools have no significant effect on the crude petroleum and natural gas sector output in Nigeria

The F-statistics for Bound test (1.8824) is within lower (2.86) and upper (4.01) critical bounds values indicating no long run effect, while F-statistics for short run ARDL model is 4.019936 with p.value of 0.0925. Since the p.value is greater than 0.05, the study cannot reject the null hypothesis in the short run that "Monetary policy tools have no significant effect on the crude petroleum and natural gas output". The null hypothesis is not rejected both in the long and short run, thus the study posits that monetary policy tools have no significant effect on the crude petroleum and natural gas output, both in the long and short run.

Discussion of Findings

The study has shown that monetary policy tools have no significant effect on the crude petroleum and natural gas output, both in the long and short run. This connotes that monetary policy has not been effective policy tools that can largely influence the crude petroleum and natural gas sector output for economic sustainability in Nigeria. This study supported those of Okulegu, Onwe and Okoro (2013) and Udude (2014) which posits that monetary policy and money supply does not significantly influence output in Nigeria. This negates the theoretical propositions of the Irving Fishers' quantity theory of money that money should drive the economy. The crude petroleum and natural gas sector does not respond to this theory. Nigerian economy is largely dependent on oil sector, and grossly financed by foreign investors. Money supply determined by the CBN may not directly influence inflows of foreign investment for the oil sector in Nigeria and as such may not influence crude petroleum and natural gas output in the Nigerian economy directly. On the other hand, since the M2 in PEGAS model has a significant short run effect on PEGAS output, this is in line with the Keynesian view that there is an indirect link between monetary policy and aggregate output.

Conclusion

The study thus concludes that monetary policy may not been an effective long run and short run policy instrument that can directly influence the Crude Petroleum and Natural Gas sector output in Nigeria.

Recommendation

The study recommends that the CBN use expansionary monetary policy that can increase money supply to the PEGAS to boost output indirectly, since among the variables of monetary policy tools in PEGAS model, only money supply (M2) has a significant short run effect at 0.05 level at the first lag period [M2(-1)]

References

Adigwe, P. K., Echekoba, F. N. & Onyeagba, B. C. (2015). Monetary policy and economic growth in Nigeria: A critical Evaluation. IOSR Journal of Business and Management, 17 (2), 110119.

Ahmad, D., Afzal, M. & Ghani, U. (2016). Impact of monetary policy on economic growth empirical evidence of Pakistan. International Journal of Applied Economic Studies, 4(6), 1 – 9.

Alavinasab, S. M. (2016). Monetary policy and economic growth. International Journal of Economics, Commerce and Management. Retrievedfrom http://ijecm.co.uk/wpcontent/uploads/2016/03/4315.pdf.

Apinran, M. O. (2016).Potency of monetary policy instruments on economic growth of Nigeria. Eastern Mediterranean University, Gazimağusa, North Cyprus. Retrieved from http://irep.emu.edu.tr:8080/jspui/bitstream/11129/2925/1/ApinranMartins%20 Olugbenga.pdf.

CBN (2017). CBN Statistical Bulletin, (online copy). Vol. 28 December 2017. Retrieved on 15 August, 2018, from:

Shttp://www.cenbank.org/OUT/2018/PUBLICATIONS/STATISTICALBULLETINS/2017/IND EX.HTML

CBN (2018). Monetary Policy Instruments used by the CBN. Educational. Retrieved fromhttps://www.cbn.gov.ng/Out/EduSeries/Monetary%20Policy%20Instruments%20 use d%20by%20the%20CBN.pdf.

Chipote, P. & Makhetha-Kosi, P. (2014). Impact of Monetary Policy on Economic Growth: A Case Study of South Africa. Mediterranean Journal of Social Sciences, 5(15), 76 – 84.

Daferighe, E. E., Emah, J. A., Offiong P. E.(2017) Oil and Gas Reserves and Economic Growth in Nigeria(1981 – 2015): Matters Arising. American Journal of Environmental and Resource Economics; 2(2): 90-95 Retrieved from:

http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.531.822&rep=rep1&type=pdf

Dickey, D. A. & Fuller, W. A. (1979) Distribution of the estimators for autoregressive time series with a unit root. Journal of the American Statistical Association, 74, 427-431.

Fasanya, I. O., Onakoya, A. O. B. & Agboluaje, M. A. (2013). Does monetary policy influence economic growth in Nigeria? Asian Economic and Financial Review, 3(5), 635-646. Gbadebo, O.A.O. (2008) Crude Oil and the Nigerian Economic Performance. Retrieved from:https://www.researchgate.net/profile/Gbadebo_Odularu2/publication/228627 07 3_Crude_

Oil_and_the_Nigerian_Economic_Performance/links/555af97f08ae980ca611967b/Crud e-Oil- and-the-Nigerian-Economic-Performance.pdf

Gbosi, A. N. (2002). Financial sector instability and challenges to Nigeria's monetary authorities. African Heritage Publishers, Port Harcourt.

Geiger, M. (2008). Instruments of monetary policy in china and their effectiveness: 1994–2006. Discussion Papers No. 187. United Nations Conferences on Trade and Development.

Gujarati, D. N. (2003). Basic Economics. New York: TafaMeGrew Hill Companies.

Harris, R. and Sollis, R. (2003), "Applied Time Series Modelling and Forecasting", West Sussex: Wiley.

Ibeabuchi S.N. (2007). Overview of monetary policy in Nigeria. CBN Economic and Financial Review, 45(4), 15-37.

Imoisi A. I, Olatunji L. M. & Ekpenyong, B. I (2013). Monetary policy and its implications for balance of payments stability in Nigeria: 1980-2010. International Journal of Economics and Finance, 5 (3), 196-204

Jhingan, M. (2004). Money, banking, international trade and public finance (7th ed.). New Delhi, India: Vrinda Publications ltd.

Jhingan, M. L. (2005). Macroeconomics theory, 10th Edition, Vrinda Publication Ltd, New-Delhi.

Jones, C. (2002). Introduction to economic growth. 2nd Ed. www.norton co. New York

Nasko, A. M. (2016).Impact of Monetary Policy on the Economy of Nigeria. Pyrex Journal of Business and Finance Management Research, 2 (10) 163-179.

Okulegu, B. E., Onwe, G. O. & Okoro, F. T. (2013). Monetary policy instruments and economic growth: evidence from Nigeria. International Journal of Social Sciences and Humanities Reviews, 4(3), 1 – 15.

Omini, E. E, Ogbeba, E.P, & Okoi, O. (2017). Monetary policy shocks and industrial output in Nigeria. British Journal of Economics, Management & Trade Article no. BJT.30459, 16 (2), 1–13.

Omotor, D. G. (2007). Monetary policy and economic growth: Theoretical and conceptual issues, CBN Economic and Financial Review, 45(4), 39-67.

Ononugbo, M. C. (2012). Monetary Policy in Developing Countries: The Case of Nigeria.
Published PhD thesis of the University of Leeds, Leeds University Business School.
Retrieved from http://etheses.whiterose.ac.uk/3663/1/Dissertation.pdf.

Pesaran, M. H. & Shin, Y. (1999). "An Autoregressive Distributed Lag Modeling Approach to Cointegration Analysis", in Storm, S. (Ed), "Econometrics and Economic Theory in the 20th Century", The Ragnar Frish Centennial Symposium, Cambridge University Press.

Pesaran, M. H., Shin, Y. & Smith, R. J. (2001). Bound testing approaches to the analysis of level relationships. Journal of Applied Econometrics, 16: 289-326.

Ranjit (2006). Multicollinearity: causes, effects and remedies. Retrieved from:
http://www.iasri.res.in/seminar/AS-299/ebooks%5C2005-2006%5CMsc%5Ctrim
2%5C3.%20Multicollinearity-%20Causes,Effects%20and%20Remedies-Ranjit.pdf

Srithilat, K. & Sun, G. (2017). The impact of monetary policy on economic development:
Evidence from Lao PDR. Global Journal of Human Social Science,XVII(II-1), 8-15.

Udude, C. C. (2014). Monetary policy and economic growth of Nigeria (1981-2012). Journal of Policy and Development Studies, 9(1), 234 – 247.

Upadhyaya, S. (2013). Composite measure of industrial performance for cross-country analysis. UN Industrial Development Organization (UNIDO), Vienna. Retrieved from https://unstats.un.org/unsd/ccsa/isi/2013/Paper-UNIDO.pdf.

Appendix 1:
Gross Domestic Product And Pegas Sector Of The Nigerian Economy

SN	Year	PEGAS (N'Billion)	GDP (N'Billion)	SN	Year	PEGAS (N'Billion)	GDP (N'Billion)
1	1986	5.5	134.60	19	2004	2,460.6	11,411.07
2	1987	15.5	193.13	20	2005	3,281.5	14,610.88
3	1988	17.3	263.29	21	2006	4,045.0	18,564.59
4	1989	44.3	382.26	22	2007	4,363.6	20,657.32
5	1990	58.1	472.65	23	2008	5,270.0	24,296.33
6	1991	67.5	545.67	24	2009	4,297.1	24,794.24
7	1992	143.0	875.34	25	2010	8,402.7	54,612.26
8	1993	140.3	1,089.68	26	2011	11,039.4	62,980.40
9	1994	126.9	1,399.70	27	2012	11,315.03	71,713.94
10	1995	444.0	2,907.36	28	2013	10,296.33	80,092.56
11	1996	670.7	4,032.30	29	2014	9616.49	89,043.62
12	1997	619.2	4,189.25	30	2015	5990.42	94,144.96
13	1998	426.8	3,989.45	31	2016	5367.32	101,489.49
14	1999	593.4	4,679.21	32	2017	5367.32	113,711.63
15	2000	1,266.7	6,713.57				
16	2001	966.8	6,895.20				
17	2002	1,042.0	7,795.76				
18	2003	1,588.1	9,913.52				

Source: CBN Statistical Bulletin, 2017

Appendix 2:
Proportion Of Gross Domestic Product From Crude Petroleum And Natural Gas(Pegas) Sector Of The Nigerian Economy

SN	Year	PEGAS (%)		SN	Year	PEGAS (%)	
1	1986	4.12		19	2004	21.56	
2	1987	8.02		20	2005	22.46	
3	1988	6.57		21	2006	21.79	
4	1989	11.60		22	2007	21.12	
5	1990	12.28		23	2008	21.69	
6	1991	12.37		24	2009	17.33	
7	1992	16.33		25	2010	15.39	
8	1993	12.87		26	2011	17.53	
9	1994	9.07		27	2012	15.78	
10	1995	15.27		28	2013	12.86	
11	1996	16.63		29	2014	10.80	
12	1997	14.78		30	2015	6.36	
13	1998	10.70		31	2016	5.29	
14	1999	12.68		32	2017	4.72	
15	2000	18.87					
16	2001	14.02					
17	2002	13.37					
18	2003	16.02					

Source: Computed from Appendix 1

Appendix 3:
Data For Selected Monetary Policy Variables In Nigeria

SN	Year	MRR/MPR	CRR	Maximum TBR	M2 Growth Rate
1	1986	10.00	2.00	8.50	4.23
2	1987	12.75	2.00	11.75	22.92
3	1988	12.75	2.50	11.75	34.99
4	1989	18.50	3.00	17.50	3.54
5	1990	18.50	3.00	17.50	45.92
6	1991	15.50	3.50	15.00	27.43
7	1992	17.50	4.00	21.00	47.53

8	1993	26.00	4.00	26.90	53.76
9	1994	13.50	4.00	12.50	34.5
10	1995	13.50	5.00	12.50	19.41
11	1996	13.50	5.00	12.25	16.18
12	1997	13.50	6.00	12.00	16.04
13	1998	13.50	8.00	12.95	22.32
14	1999	18.00	9.80	17.00	33.12
15	2000	14.00	10.80	12.00	48.07
16	2001	20.50	10.60	12.95	27
17	2002	16.50	10.00	18.88	21.55
18	2003	15.00	8.60	15.02	24.11
19	2004	15.00	9.70	14.21	14.02
20	2005	13.00	4.20	7.00	24.35
21	2006	10.00	5.00	8.80	43.09
22	2007	9.50	3.00	6.91	44.24
23	2008	9.75	3.00	4.50	57.78
24	2009	6.00	1.25	6.13	17.6
25	2010	6.25	1.00	10.25	6.91
26	2011	12.00	8.00	16.75	15.43
27	2012	12.00	12.00	17.20	16.39
28	2013	12.00	12.00	13.34	1.32
29	2014	13.00	16.30	15.99	7.2
30	2015	11.00	24.00	15.9	5.9
31	2016	14.00	22.50	20.11	18.45
32	2017	14.0	22.50	20.11	18.45

Source: CBN Statistical Bulletin, 2017