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Dynamic Relationship between Monetary Policy and Economic Growth

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Abstract

This study investigated the dynamic relationship between monetary policy on economic growth in Nigeria. Data for the study were collected from secondary sources. The variables on which data are collected include; real GDP, Broad money supply (BMS), Cash reserves ratio (CRR), Monetary policy rate (MPR), Liquidity ratio (LQR). The scope of the study covers the period from 1986 to 2017 and were sourced from CBN statistical bulletin. Data are analysed using the descriptive statistics and ordinary least square regression, Johansen cointegration, VECM and granger causality approach. Findings revealed that CRR and BMS have inverse long run relationship with GDP MPR and LQR exert positive long run relationship with GDP. In the short run CRR and MPR had an inverse relationship with GDP at lag while LQR exerts positive relationship with GDP. Using granger causality, RGDP and BMS, MPR, and CRR has no causal relationship between while and NQR exerts significant cause on Real GDP. From the findings, the study recommends that the policy instrument should be a well-coordinated optimal mix of instruments to significantly influence economic stability.

Index terms— monetary policy, real gdp, cointegration, VECM.

1 Introduction

conomic growth is fundamentally believed to be driven by a wide range of factors, mainly by primary factors such as capital accumulation, growth in labor participation, advancement of knowledge, and technological progress (see, relevant literature). Meanwhile, it commonly articulated that other factors, including the policy environment (Smith, 2004). From the Lucas, (1972) view, economic growth is also largely attributed to real shocks that are linked to technological progress and cannot be effectively offset by monetary policy. Contemporary scholar suggest that monetary policy has a limited role in driving economic growth, particularly in the long term (Asongu, 2014). The results of the both theoretical and empirical literature on the role of monetary policy instruments in driving economic growth are not universally generalizable and remain variant, inconsistent, and inconclusive (see, among others, Amarasekara, 2009; **??**ele, 2007;White, 2013). The notion of monetary policy promoting economic growth by maintaining price stability has garnered increasing theoretical and empirical consensus particularly in the short term (Fontana & Palacio-Vera, 2007). The recent practice has shown that central banks have focused on inflation targeting to indirectly spur higher growth rates (Heintz & Ndikumana, 2010). While the literature on the linkage between monetary policy and economic growth through the promotion of price stability is wide ranging, empirical research questions continue to abound (Lacker, 2014;Papademos, 2003). On the one hand, monetary policy yielding low and stable inflation is believed to spur economic growth, mainly in the short term (Fontana & Palacio-Vera, 2007;Papademos, 2003; **??**ilmazkuday, 2013). In another view, poor monetary policies associated with high and volatile inflationary tendencies distort the allocation of productive resources, eventually harming economic growth in the long term (see, among others, **??**arro, 1997;Fischer, 1993;Hossain, 2014). On the other hand, some empirical studies discount the negative relationship between inflation and economic growth (Levine &Renelt, 1992; **??**cCandless & Weber, 1995). Monetary policy actions driving steady and stable inflation tend to

have a depressing effect on economic growth, resulting in a sacrifice ratio (Dornbusch, **??**ischer & Startz,2012). Broadly, countercyclical monetary policy can be counterproductive. Uncertainty about the effect of monetary policy on economic growth, particularly in developing economies, continues to prevail (Berg, Charry, Portillo & Vlcek, 2013). Some studies suggest that a monetary policy impetus to spur growth is likely to be inflationary, having a countervailing effect (Issing, 2001). The recent surge of non-conventional monetary policy in the wake of the global crisis of 2008 highlights the limited role of conventional monetary policy.

A lot of works has been done in the area of monetary policy as it affects economic growth in Nigeria, most of these studies concentrated on how monetary policies as a whole affects economic growth without highlighting the monetary policy instruments and examine the extent to which each actually contributed to the growth in the economy.

However, few works have been done using exchange rate, money supply, interest rate and liquidity rate as proxies for monetary policy of which their empirical findings indicates that exchange rate and money supply has a positive but fairly insignificant impact on economic growth while interest rate and liquidity rate on the other hand had a negative but highly significant impact on GDP.

Nevertheless, not much has been done in trying to investigate Cash Reserve Ratio and Monetary Policy Rate as proxies for monetary policy as they contribute to economic growth in Nigeria. We found a gap in this area and this study intends to fill this knowledge gap.

Against this backdrop, the aim of this paper is to empirically investigate what monetary policy can or cannot do in relation to driving economic growth in Nigeria, in both the short and long terms -a subject that has received very limited attention in scholarly work on Nigeria. This paper also makes an additional contribution by employing the error correction model and Johansen cointegrationin an attempt to establish the effect of monetary policy on economic growth in Nigeria. The rest of the paper is organized as follows: Section 2 gives an overview of monetary policy reform and economic performance in Nigeria, while Section 3 presents the empirical literature review. The empirical model and estimation methods are presented in Section 4. Section 5 presents the summary and conclusion.

2 a) Monetary Policy Transmission

In the view of Toby and Peterside (2014), a monetary policy shift tends to transmit a change for the future in the projected behavior of macroeconomic variables. Fundamentally analyst considerthe response of monetary policy makers as exogenous. As a generally accepted view, money is unbiased in its effects on the economy. Thus, in the classical theory, transmission mechanism reacts directly and indirectly. The direct mechanism is based on the demand for and supply for money, whereas the indirect mechanism has linkage with the banking system and operates through money and interest rate. The Keynesian theory explains that a change in money supply has effects on total expenditure and output level through the changes in interest rate. Hence, the system operates indirectly. The monetarists affirm that although monetary expansions affect output and employment in the short term, interest rate and prices are influenced in the long run (Chaudhry, Qamber, &Farooq, 2012). Monetary Policy Transition Mechanism Interest rate channel (INT) and credit channel (CRDT) are considered in some literature as the key propagation and strengthening mechanisms of monetary policy changes. Both types of transmission channels hold the prediction that any variation in bank lending is dependent on monetary policy actions. In other words, a change in bank lending is predicted to be in response to change in monetary policy stance. Because monetary policy hinges chiefly on the supply of money, it will be remiss and abnormal to ignore the role of banks, especially in the money creation process. Hence, the CRDT perspective portends that monetary policy induces movements in bank lending vis-à-vis changes in bank loan supply, whereas shifts in the demand for a bank loan is explained by the INT (Arnold, Kool, & Raabe, 2006). The Nigerian industrial sector faces insurmountable challenges ranging from infrastructural woes to highly unstable business environment. Also, the cyclical nature of industrial output equally intensifies the need for external financing. Bridging the funding gap depends mainly on both availability and cost of fund, which is largely determined by money supply through monetary policy action. Writing on monetary policy transmission mechanism, Friedman and Schwartz (1963) argue that when the central bank pursues an expansive open market operation, money stock will increase thereby leaving the deposit money banks with fat reserves and enhance their ability to create credit and extend loans and advances, which will increase the money supply. Besides the sale and repurchase of financial instruments like treasury bills to regulate the quantity of money in circulation, the central bank may also decide to use other monetary policy instruments such as rediscount rate or the reserve requirements (liquidity and cash ratio) to achieve the desired economic objectives of output growth, stable price level, and full employment. The industrial sector and other activity sectors stand to benefit from expansionary policy measures (for instance, increase in money supply and reduction of rediscount rate). Although this will promote production through cheaper cost of fund (interest rates), it could turn quite inimical to achieving price stability. On the contrary, a stringent policy, using any appropriate instrument, can help to attain a stable price level but could lead to a recession. Economists established the general relationship between real output and monetary policy transmissions. From the Keynesian point of view, an unrestricted change in money stock influences real output by bringing down the interest rate, which by efficient utilization of capital will stimulate investment and the real output growth (Athukorala, 1998).

3 II. Literature Review

The impact of monetary policy on growth has generated large volume of empirical studies with mixed findings using cross sectional, time series and panel data. Some of these studies are country-specific while others are cross-country. Thus, Empirical literatures in middle-income economies show that monetary policy shocks have little or no effects on economic parameters. (Ganev et al, 2002) studied the effects of monetary shocks in ten Central and Eastern European (CEE) countries and found no evidence that suggests that changes in exchange rates and not interest rates affect output.

In the same vein, (Starr, 2005) using a Structural VAR model with orthogonalized identifications found minimal evidences of real effects of monetary policy in five Commonwealth states. However, the results that were inconsistent with empirical expectations from different data in different countries are what economist now refers to as "puzzles". The puzzles identified in most literature were; the liquidity puzzle, the price puzzle and the exchange rate puzzle. using a simultaneous equation model to test the hypothesis of monetary policy effectiveness in Nigeria found that rather than promoting growth, past domestic monetary policy has been a source of stagnation and persistent inflation in the country. In addition, the impact of monetary policy on growth in Nigeria generated large volumes of empirical studies with mixed findings using cross sectional, time series and panel data.

Amassoma, Ditimi, Nwosa, and Olaiya, S. A. (2011) examined the effect of monetary policy on macroeconomic variables in Nigeria for the period 1986 to 2009 by adopting a simplified Ordinary Least Squared technique found that monetary policy had a significant effect on exchange rate and money supply while monetary policy was observed to have an insignificant influence on price instability.

Ajisafe and Folorunso (2002) examined the relative effectiveness of monetary and fiscal policy on economic activity in Nigeria using co-integration and error correction modeling techniques and annual series for the period 1970 to 1998. The study revealed that monetary rather than fiscal policy exerts a greater impact on economic activity in Nigeria and concluded that past emphasis on fiscal measures by the government has led to greater distortion in the Nigerian economy.

Hameed, Khalid and Sabit(2012) in presenting a review on how the decisions of monetary authorities influence macro variables like GDP, money supply, interest rates, exchange rates and inflation using the method of ordinary least square OLS found that tight monetary policy (in term of increase interest rate) had significantly negative impact on output, therefore asserting that increase in money supply has strong positive impact on inflation but affects output negatively. In addition to this exchange rate was found to be negatively related to output.

Chukuigwe and Abili (2008) analyzed the impact of monetary and fiscal policies on non-oil exports in Nigeria from 1974 to 2003. Using Ordinary Least Squares estimation, the study revealed that both interest rate and exchange rate, both proxies for monetary policy negatively affect non-oil exports. Similarly, budget deficits-proxy for fiscal policy also had a negative effect on non-oil exports. He therefore recommended the introduction of new strategies for monetary policy implementations to address this problem.

This leads us to the work by (Kogar, 1995) who examined the relationship between financial innovations and monetary control and conclude that in a changing financial structure, Central Authorities cannot realize an efficient monetary policy without setting new procedures and instruments in the long-term. This is because profitseeking institutions change and create new instruments in order to evade regulations or respond to the current conditions in the economy. The evolution of monetary policy in Nigeria in the past four decades clearly show that though monetary policy management in the country was relatively more successful during the period of financial sector reforms characterized by the use of indirect rather than direct monetary policy tools, nevertheless, the effectiveness of monetary policy has been undermined by factors such as a stronger fiscal dominance, political interference, and the legal environment in which the Central Bank operates.

Busari, Omoke and Adesoye(2002) opined that monetary policy stabilizes the economy better under a flexible exchange rate system than in a fixed exchange rate system which stimulates growth at the initial period but is accompanied by severe depression thereby destabilizing sustainable growth. This basically explains the empirically backed belief that monetary policies are better suited when they are used in targeting inflation rather than in stimulating growth.

Onyeiwu (2012) examines the impact of monetary policy on the Nigerian economy using the Ordinary Least Squares Method (OLS) to analyze data between 1981 and 2008. The result of the analysis shows that monetary policy represented by money supply exerts a positive impact on GDP growth and Balance of Payment but negative impact on rate of inflation. Furthermore, the findings of the study support the money-prices-output hypothesis for Nigerian economy.

Adeolu, Kehindeand Bolarinwa(2012) assessed how fiscal and monetary policies influence economic growth and development in Nigeria. The paper argues that curbing the fiscal indiscipline of Government will take much more than enshrining fiscal policy rules in our statute books. This is because the statute books are replete with dormant rules and regulation. It notes that there exist a mild long-run equilibrium relationship between economic growth and fiscal policy variables in Nigeria. The paper suggest that for any meaningful progress towards fiscal prudence on the part of Government to occur, some powerful pro-stability stakeholders strong enough to challenge government fiscal recklessness will need to emerge.

Owalabi and Adegbite (2014) examined the impact of monetary policy on industrial growth in Nigerian economy using multiple regression analysis. They analyzed the relationship between manufacturing output,

treasury bills, deposit and lending, and rediscount rate and industrial growth, and found that the variables had significant effects on the industrial growth.

Adefeso and Mobolaji (2010), also investigated fiscal -monetary policy and economic growth in Nigeria by employing Jabansen Maximum Likelihood Cointegration procedure. The result shows that there is a long-run relationship between economic growth, degree of openness, government expenditure and broad money supply (M2).

Chukwu **??**2009),analyzed the effect of monetary policy innovations in Nigeria. The study used a Structural Vector Auto-Regression (SVAR) approach to trace the effects monetary policy stocks on output and prices in Nigeria. The study also analyzed three alternative policy instruments, that is, broad money (M2), minimum rediscount rate (MRR), and the real effective exchange rate (REER). The study found evidence that monetary policy innovations have both real and nominal effect on economic parameter depending on the policy variable selected.

Micheal and Ebibai (2014) examined the impact of monetary policy on selected macroeconomic variables such as gross domestic product, inflation and balance of payment in Nigeria using OLS regression analysis. The result shows that the provision of investment friendly environment in Nigeria will increase the growth rate of GDP.

Akujobi (2012) investigated the impact of monetary policy instrument on economic development of Nigeria using multiple regression technique and found that treasury bill, minimum rediscount rate and liquidity rate have significant impact on economic development of Nigeria.

Okwo, Eze and Nwoha, (2012) examined the effect of monetary policy outcomes on macroeconomic stability in Nigeria. The study analyzed gross domestic product, credit to the private sector, net credit to the government and inflation using OLS technique. None of the variables were significant, which suggested that monetary policy as a policy option may have been inactive in influencing price stability.

Okoro (2013) examined the impact of monetary policy on Nigeria economic growth by testing the influence of interest rate, inflation, exchange rate, money supply and credit on GDP. Augumente Dickey Fuller (ADF) test, Philips-Perron Unit Test. Co-integration test and Error Correction Model (ECM) techniques were employed. The results show the existence of long-run equilibrium relationship between monetary policy instruments and economic growth.

Nwokoet al. (2016) examined the extent to which the Central Bank of Nigeria Monetary Policies could effectively be used to promote economic growth, covering the period of 1990-2011. The influence of money supply, average price, interest rate and labour force were tested on Gross Domestic Product using the multiple regression models as the main statistical tool of analysis. Studies show that CBN Monetary Policy measures are effective in regulating both the monetary and real sector aggregates such as employment, prices, level of output and the rate of economic growth. Empirical findings from this study indicate that average price and labour force have significant influence on Gross Domestic Product while money supply was not significant. Interest rate was negative and statistically significant. It was therefore, recommended that Central Bank Monetary Policy could be an effective tool to encourage investment, reduce unemployment, reduce lending rate and stabilize the economy of Nigeria.

Udude, (2014) examined the impact of monetary policy on the growth of Nigeria economy between the period of 1981 and 2012 with the objective of finding out the impact of various monetary policy instruments (money supply, interest rate, exchange rate and liquidity ratio) in enhancing economic growth of the country within the period considered. To identify the stationarity characteristics of the data employed in the empirical investigation, various advanced econometric techniques like Augmented Dickey Fuller Unit Root Test, Johansen Cointegration Test and Vector Error Correction Mechanism (VECM) was employed and the following information surfaced: None of the variables was stationary at level meaning they all have unit roots. But all the variables became stationary after first difference with the exclusion of money supply. However, all the variables became stationary after second difference. Hence they were integrated of order two. The cointegration result indicated that there was a long run relationship among the variable with two cointegrating vectors. The result of the vector error correction mechanism (VECM) test indicates 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 did not impact significantly on economic growth of Nigeria within the period under review and that the inability of monetary policies to effectively maximize its policy objective most times is as a result of the shortcomings of the policy instruments used in Nigeria as such limits its contribution to growth.

Ayodeji and Oluwele(2018) analyzed the impact of monetary policy on economic growth in Nigeria by developing a model that is able to investigate how monetary policy of the government has affected economic growth through the use of multi-variable regression analysis. They proxied the variables of monetary policy instruments to include: Money Supply (MS), Exchange Rate (ER), Interest Rate (IR), and Liquidity Ratio (LR). Economic growth was represented by Gross Domestic Product (income) at constant prices. Unit root test was conducted and all their estimating variables were stationary at first difference except the component of interest rate which shows that their model interpretation would not be spurious and a true representation of the relationships that exists between the explained and explanatory variables. Error Correction Model was introduced in their estimation in order to have a parsimonious model. From their result, two variables (money supply and exchange rate) had a positive but fairly insignificant impact on economic growth. Measures of interest

rate and liquidity ratio on the other hand, had a negative but highly significant impact on economic growth. In addition, Engle-Granger co-integration test was done and showed the existence of a long run relationship between monetary policy and economic growth in Nigeria. Granger causality test was done on their variables and the results showed the existence of a uni-directional causality between money supply and economic growth, economic growth granger causing liquidity ratio and exchange rates while a bidirectional causality exists between interest and economic growth.

4 III.

5 Research Methodology

Okpara (2014) ascertain that, the core of any research lies on its methodology since the acceptability and the reliability of the findings depends on the appropriateness of the specified and the analytical tools employed. When models are wrongly or even rightly specified with inappropriate method applied to their analysis, the consequence will be "Spuriosity" of results and hence misleading conclusions. a) Sources and Method of Data Collection Secondary data will be used for the analysis of this work because of its empirical nature. Based on this, data will be sourced from the Central bank of Nigeria (CBN) Statistical Bulletin-2017 edition, within the period of 1986-2016 (31years).

6 b) Specification of Model

This study will be based on monetary policy variables and its impact on the Gross Domestic Product (GDP) and how it affects the economy of Nigeria at large. To indulge in empirical analysis between the monetary policy and economic growth in Nigeria; Real Gross Domestic Product (RGDP) will be used as endogenous variable while; Cash Reserve Ratio (CRR), Monetary Policy Rate (MPR), Broad Money Supply (BMS) and Liquidity Ratio (LR) will be used as the exogenous variables.

Having highlighted on these variables, our complete macroeconomic model for the determination of long-run impact of monetary policy on economic growth are stated first; in its implicit non stochastic form as shown below: RGDP = f (CRR, MPR, BMS, LR) Where; RGDP = Real Gross Domestic Product CRR = Cash Reserve Ratio MPR = Monetary Policy Rate BMS = Broad Money Supply LR = Liquidity Ratio A critical evaluation of this system of equation will help us draw conclusion on the long run impact of monetary policy instruments on economic growth. However, the co-integration approach will be employed to find out the impact monetary policy variables on the macroeconomic growth indicator. We will therefore, specify this model in its explicit stochastic form as follows: Stationary series constantly return to a given value and no matter the starting point, in long-run, it is expected to attain that value. The next set of analysis is to determine the co-integrating relationships that span the variables in the model RGDP: CRR, MPR, BMS and LR. This is to test whether they are integrated of a particular order. In other words, we test whether the dependent variable and the monetary policy variables have long run relationship, that is, whether they are cointegrated.

Maddala, (1998) expound that, if cointegration is established, it suggests the presence of causality between monetary policy and the dependent variable at least in one direction. Furthermore, we'll estimate the specified macroeconomic model and access the contribution of the monetary policy variables in explaining the macroeconomic growth indicator in Nigeria.

Engle, (1999) and Granger, (1988) maintains that, the presence of co-integration forms the basis for error correction model (ECM) specification. The error correction model is designed to capture the short run deviations that might have occurred in estimating the long run co-integration equation. Thus, the above model will be re-specified in their explicit stochastic vector error correction model (VECM) forms as follows: The Granger Causality Test will be applied to investigate whether a significant long-run relationship exists between monetary policy variables and real GDP. Finally,diagnostic test. These data cover the period 1986 -2016. The study used two groups of variables. The leading economic indicator as dependent variables measured by: GDP = Growth rate of the Real Gross Domestic Product, expressed in billions of Naira as a measurement of internal stability. And monetary policy proxies as independent variables measured by: BMS = Broad Money Supply, expressed in billions of Naira as a measurement of money supply (money stock). CRR = Cash Reserve Ratio, expressed in percentage as a measurement of quantity based nominal anchor (monetary aggregates). LQR = Liquidity Ratio, expressed in percentage as a measurement of quantity based nominal anchor (monetary aggregates). MPR = Monetary Policy Rate, expressed in percentage as a measurement of cost of lending rate to commercial banks. It is a penalty rate and often times the anchor of bank lending rate.? (RGDP) = b 0 + b 1 ? (CRR t-1) +b 2 ?(MPR t-1)+ b 3 ? (BMS t-1) + b 4 ? (LR t-

7 b) Presentation and Interpretation of Empirical results

Here we present results of empirical analyses of the study. Unit root was first conducted, followed by regression, Johansen co integration, Granger causality test, and lastly, diagnostic test. In this section, we present the empirical results on the long run and causality effects of monetary policy on the Nigerian economy. Test for the stationarity of the variables are presented in tables 4.4 below:

8 i. Unit Root Test (ADF Tests)

The results presented in Table 4 below clearly indicate that all series exhibit unit root property using both ADF test statistics. Thus, according to the ADF tests, all the five variables of (LOG(GDP)), D(LOG(BMS)), D(LOG(CRR)), D(LOG(LQR)) and D(LOG(MPR)) were non-stationary at their levels but became stationary after the first differencing. Hence the series are all integrated series of order I (1) and therefore showed that all the variables are stationary (no unit root) at first difference using 5 per cent level of significance (? = 0.05). This is because their respective ADF test statistics value is greater than Mckinnon critical value at 5% and at absolute term. The results implied that all series has to be differenced once in our model in order to avoid spurious results. Based on the results obtained, it is concluded that the results for ADF tests are satisfying the initial assumption for co-integration analysis. Subsequently it is well again to confirm cointegration test under Johansen approach for explaining long-run associations among five variables under study. ii.

9 Lag

10 Johansen's Co integration Test Results

The co integration result presented in Table 4.6 indicated that at McKinnon-Haug-Michelis 5% significance level of the Trace and suggests that the incorporated time series variables are co integrated at the fourth hypothesized co integration equations order i.e. r = 4 for linear deterministic trend model with intercept (i.e. the hypothesis of no co-integration among the variables can be rejected for Nigeria).

This implies that there exists at least one co integrating equations among the incorporated series in the estimated VAR system. The results shows that both 4.5: VAR Lag Order Selection Criteria Endogenous variables: LGDP LCRR LMPR LBMS LNQR the test statistics is more than its critical value while r ? 1,which indicates there exists a long-run association among the variables. Since the variables are co integrated, it is concluded that there exists a long-run equilibrium relationship between the variables. The co-integrating equation is chosen based on log likelihood ratio. If the log likelihood ratio is positively signed, we chose the equation with the lowest log likelihood ratio. If negatively signed, we chose the highest log likelihood ratio at absolute term. From the Johansen co-integration normalized cointegrating result, integrating equations are positively signed. Therefore, the lowest log likelihood ratio of 27.123 is chosen and the corresponding co-integration equation is given in **??**able Source: Author's estimation using E view 10 From the cointegrating equation, if all independent variables are held constant, GDP will reduce by 6.739 units in the long run. CRR and BMS show an inverse long run relationship with GDP. A unit increase in CRR and BMS will cause a decrease in GDP in the long run by 0.42895 and 0.77592 units respectively. MPR and NQR show positive in the long run relationship with GDP. A unit increase in MPR and NQR will cause a rise in GDP in the long run by 0.46402 and 0.77611. All the variables conform to the a priori expectation in the long run. Moreso, the error correction term is -0.7981, and t-statistics(-5.5688). Since the coefficient of the error term is negative and significant, it means that (1). There is a long run causality running from explanatory variables to the dependent variable. (2) There is speed of adjustment towards long run equilibrium. That is the speed of adjustment of about 79.98%. However, to test whether there is short run equilibrium, we estimate it using the VEC Granger Causality/Block Exogeneity Wald Tests.

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Volume XIX Issue II Version I The shortrun result implies that a unit decrease in CRR will lead to about 0.0904(at lag 1) and increases in GDP, also a unit decease in MPR will lead to about 0.2548(at lag1) increases in GDP. A unit decrease in BMS will lead to about 0.2446(lag1)increase in GDP while a unit rise in NQR will lead to about 0.5259 (lag1) increases in GDP. The coefficient of determination is about 64.73 which mean that about 64% of the total variation in GDP is explained by the explanatory variables.

v.

12 Granger Casualty Test

The Granger-casualty test is conducted to investigate whether a significant long-run relationship exists between monetary policy variables and real GDP. In table 8 below, we presented the Granger causality relationship between economic growth indicator and the monetary policy variables. In the result the null rejected if p-value is significant at 5%, therefore, the first column of table 9 presents the null hypothesis, while columns 3 and 4 presents the chi-square statistic and p-value on the results respectively. Figure1: Roots of the AR

The result of the inverse root stability test for the panel vector error correction model in figure **??** above indicates that the model is dynamically stable. This can be seen as all the dots are inside the circled boundary V.

13 Summary and Conclusion

This study investigated the dynamic relationship between monetary policy on economic growth in Nigeria. Data for the study were collected from secondary sources. The variables on which data are collected include; real GDP,

Broad money supply (BMS), Cash reserves ratio (CRR), Monetary policy rate (MPR), Liquidity ratio (LQR).The scope of the study covers the period from 1986 to 2017 and were sourced from CBN statistical bulletin. Data are analysed using the descriptive statistics and ordinary least square regression, Johansen cointegration, VECM and granger causality approach. Findings revealed that CRR and BMS have inverse long run relationship with GDP MPR and LQR exert positive long run relationship with GDP. In the short run CRR and MPR had an inverse relationship with GDP at lag while LQR exerts positive relationship with GDP. Using granger causality, RGDP and BMS, MPR, and CRR has no causal relationship between while and NQR exerts significant cause on Real GDP. From the findings, the study recommends that the policy instrument should be a well-coordinated optimal mix of instruments to significantly influence economic stability.

However, the result is in contrast with the findings of Okwo and Nwoha (2010) who found that there exist an insignificant relationship between monetary policy, gross domestic product, credit to private sector and inflation in Nigeria. The results confirm the weakness of key variables -broad money supply, and monetary policy rate in driving economic activities in Nigeria and highlights that cash reserve ratio and liquidity ratio is impacting positively on economic growth as result. Supporting Papademos (2003), the best contribution that monetary policy can make to sustainable growth is to maintain price stability. Because liquidity ratio and cash reserve ratio are fundamentally a monetary phenomenon, monetary policy is the only tool that can effectively maintain economic growth in the long run. The use of monetary policy instruments for economic stabilization may be important but there are several reasons for being cautious in assigning such a role to monetary policy.These ranges from time-lags (uncertainty regarding the timing and magnitude of its effects) to the length of transmissions and poor policy implementation. With the Nigerian government working hand in hand with Central Bank of Nigeria (CBN), monetary policy can be adjusted accordingly when the effects of money supply on economic growth is not apparent.

While monetary authorities can and do pursue one target to the exclusive of others, most monetary policy generally works with a mix of targets, keeping an eye on real gdp and other macroeconomic indicators at the same time. Nigeria's exporting activities can be further boosted by policies aimed at achieving and maintaining a stable competitive growth. The research observed that it is not always good to increase money supply at a rate that is not proportionate to national production with resultant inflation and low level of investment. The depreciation of a Nigerian currency causes harm to the Nigerian economy. Usually, when the local currency gets depreciated, the exports become cheap and imports become expensive. There is a dire need for policy makers to focus on policies that will strengthen the macroeconomic structure and boost the economic performance of Nigeria by ensuring effective control of the quantity of money in supply at any given time.

Putting the results from the models together, the results reveal that changes in monetary policy, the main variable being liquidity ratio and cash reserve ratio, are a very significant determinant of economic activity in Nigeria. The main policy implication emerging from these finding is that policy makers must emphasize the importance of effective control of liquidity ratio and cash Results showed that there is no causal relationship between RGDP and BMS, MPR, and CRR since the probability is more than 0.05 and that changes in the NQR granger-cause only of the variables Real GDP. This means that this variable is affected by changes in the liquidity ratio in the short run. This is informed by an chi-sq-statistics of 12.364 and p-values of 0.004. reserve ratio at any given time as a key determinant for macroeconomic policy formulations. It can be seen that monetary policy plays a significant role in the well-being of an economy through its stabilizing role.

Based on the findings made in the course of this study, particularly the results of the regression models, it is clear that the development of the Nigerian economy is highly dependent on the provision of the right environment for investment, which will in no doubt encourage economic growth and development. The following recommendations are hereby made:

1. A flexible monetary policy by the monetary authority that will help sustain price stability and economic growth in the country. 2. Policy instrument should be a well-coordinated optimal mix of instruments to significantly influence economic stability.

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Variables	LAG SCI	1st difference	1%	5%	Order of integration	Remarks
CRR	0	-6.270723	-4.30982	-3.57424	1(1)	stationary
MPR	0	-6.137492	-4.30982	-3.57424	1(1)	stationary
BMS	0	-3.804591	-4.30982	-3.57424	1(1)	stationary
LIQ	0	-6.095327	-4.30982	-3.57424	1(1)	stationary
RGDP	0	-5.604149	-4.30982	-3.57424	1(1)	stationary
				Source: Author's estimation using E-view 10		

Figure 1: Table 4 .

4

LOG (LQR), LOG (MPR)

Series: LGDP LCRR LMPR LBMS LNQR
Lags interval (in first differences): 1 to 1

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.649577	78.22862	69.81889	0.0091
At most 1	0.524332	47.81883	47.85613	0.0504
At most 2	0.397829	26.27084	29.79707	0.1208
At most 3	0.244217	11.56165	15.49471	0.1792
At most 4	0.111906	3.44164	3.841466	0.0636

Trace test indicates 1 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized N o. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.649577	30.40979	33.87687	0.1227
At most 1	0.524332	21.54799	27.58434	0.2445
At most 2	0.397829	1 4.70918	21.13162	0.3098
At most 3	0.244217	8.120014	14.2646	0.3666
At most 4	0.111906	3.44164	3.841466	0.0636

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

[Note: Source: Author's estimation using E -view 10]

Figure 2: Table 4 .

CointegratingEq:	LGDP(-1)	LCRR(-1)	LMPR(-1)	LBMS(-1)	LNQR(-1)	C
CointEq1	1	-0.42895	0.46402	-0.77592	0.776111	-6.739651
SE		(0.10232)	(0.26497)	(0.036)	(0.21259)	
t-statistics		[-4.19231]	[1.75124]	[-21.5544]	[3.65073]	

Figure 3:

4

Figure 4: Table 4 .

4

Error Correction:	D(LGDP)	D(LCRR)	D(LMPR)	D(LBMS)	D(LNQR)
CointEq1	-0.798183	0.546142	0.101263	0.044503	-0.156803
	(0.14333)	(0.51422)	(0.24523)	(0.11115)	(0.20198)
	[-5.56883]	[1.06208]	[0.41293]	[0.40038]	[-0.77631]
D(LGDP(-1))	0.354855	1.039288	0.289302	-0.021119	0.300401
	(0.14838)	(0.53233)	(0.25387)	(0.11507)	(0.20910)
	[2.39157]	[1.95235]	[1.13958]	[-0.18354]	[1.43667]
D(LCRR(-1))	-0.090434	-0.005103	0.202746	-0.027255	-0.026244
	(0.06642)	(0.23828)	(0.11363)	(0.05151)	(0.09359)
	[-2.36165]	[-0.02142]	[1.78421]	[-0.52917]	[-0.28040]
D(LMPR(-1))	-0.254888	-0.069148	-0.371890	-0.012098	0.404128
	(0.13347)	(0.47885)	(0.22836)	(0.10351)	(0.18809)
	[-1.90968]	[-0.14440]	[-1.62850]	[-0.11688]	[2.14859]
D(LBMS(-1))	-0.244643	-0.735171	-0.419021	0.485569	-0.639587
	(0.25660)	(0.92060)	(0.43903)	(0.19900)	(0.36161)
	[-0.95339]	[-0.79858]	[-0.95441]	[2.44010]	[-1.76873]
D(LNQR(-1))	0.525935	-0.067247	-0.278695	0.088227	-0.207650
	(0.14957)	(0.53660)	(0.25590)	(0.11599)	(0.21077)
	[3.51635]	[-0.12532]	[-1.08906]	[0.76064]	[-0.98518]
C	0.200600	0.037575	0.019736	0.122350	0.086570
	(0.06601)	(0.23683)	(0.11294)	(0.05119)	(0.09302)
	[3.03886]	[0.15866]	[0.17475]	[2.39001]	[0.93061]
R-squared	0.647394	0.312248	0.228494	0.262509	0.357804
Adj. R-squared	0.551228	0.124679	0.018083	0.061376	0.182660
Sum sq. resids	0.426194	5.485678	1.247628	0.256315	0.846377
S.E. equation	0.139185	0.499349	0.238139	0.107938	0.196142
F-statistic	6.732089	1.664712	1.085944	1.305149	2.042912
Log likelihood	20.04304	-17.00447	4.468533	27.41610	10.09503
Akaike AIC	-0.899520	1.655481	0.174584	-1.408007	-0.213451
Schwarz SC	-0.569483	1.985517	0.504621	-1.077970	0.116586
Mean dependent	0.214847	0.090983	9.43E-05	0.227703	0.001986
S.D. dependent	0.207769	0.533728	0.240322	0.111411	0.216955
Determinant resid covariance (dof adj.)		5.33E-08			
Determinant resid covariance		1.34E-08			
Log likelihood		57.12312			
Akaike information criterion		-1.180905			
Schwarz criterion		0.705020			
Number of coefficients		40			

Standard errors in ( ) & t-statistics in [ ]
Source: Author's estimation using E-view 10

Figure 5: Table 4 .

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Dynamic Relationship between Monetary Policy and Economic Growth

	hypothesis of no granger causal relation is only
	Dependent variable: D(LGDP)
Excluded	Chi-sq
D(LCRR)	1.854079
D(LMPR) D(LBMS) D(LNQR)	3.646893
	0.908961
	12.36475
All	18.24306 Dependent variable: D(LCRR)

Excluded D(LGDP) D(LMPR) D(LBMS) D(LNQR) All Dependent variable: D(LMPR) Chi-sq 3.811659 0.0

D(LCRR) D(LBMS) 3.183406

0.910908

D(LNQR) All Dependent variable: D(LBMS) 1.186047 5.600122 Excluded Chi-sq D(LGDP) 0.033685 D(LC

D(LCRR) 0.078626

D(LMPR) 4.616434

D(LBMS) 3.128405

All 11.26518

[Note: Source: Researcher's compilation from E-view Note:Source: Author's computation using EViews]

Figure 6: Table 9 :

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