

## EFFECT OF MONETARY POLICY INSTRUMENTS ON BANKING SECTOR CREDITS IN NIGERIA

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### Abstract

*The study examined the effect of monetary policy instruments on banking sector credits in Nigeria. The researcher employed three price-based monetary policy tools including monetary policy rate, cash reserve ratio, Treasury bill rate while liquidity ratio was also introduced as a control variable. Data analyses involved Augmented Dicker-Fuller (ADF) unit roots test, Johansson co-integration test, Vector Error Correction model and Impulse Response Function (IRF). The Co-integration result showed that there is long run relationship between monetary policy tools and bank credit such that MPR and LIQ has significant positive long run effects while TBR and CRR had significant negative long run effects on bank credit in Nigeria. The Vector Error Correction Mechanism (ECM) showed that monetary policy in Nigeria is a reliable short term mechanism for controlling the banks in Nigeria vis-à-vis financial intermediation functions. The impulse response function has shown that all the monetary policy variables (MPR, CRR, TBR and LIQ) have negative effects on bank propensity to grant credit in Nigeria. The study generally recommends that price-based monetary policy tools should be used in short term regulation stance of the government.*

### Introduction

Monetary policy has been defined as measures put in place by the Central Bank of any country aimed at regulating the supply, availability, value, cost of credits/money in an economy in order to achieve a desired macro-economic objectives (Imoisi, Olatunji &

Ekpenyong, 2013; Nasko, 2016). Monetary policy definition has continued to be altered to align with contemporary economic challenges. Opinions continue to vary on the most effective instrument for monetary policy implementation. Hai (2011) considers interest rate as most effective monetary

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policy tool, according to him; it is used as an effective tool for regulating the economy, dominating inflation and controlling investment and savings. The intermediaries intermediate between the savers and the borrowers in the activity of intermediation. Basically, financial intermediation is the root institution in the savings-investment process. Ignoring it would seem to be done at the risk of irrelevance (Gorten & Winton, 2002). The financial intermediaries include banks, credit unions, savings and loans associations, insurance, and pension companies. Financial intermediaries are established and managed under the rules and regulations of the Central bank of Nigeria (CBN).

Essentially, the Deposit Money Bank (DMB) is the most important party among financial intermediaries in the intermediation activities. Development of banks and efficient financial inter-mediation contribute to economic growth by channelling savings to high productivities and reduction of liquidity risks (Bencivenga & Smith, 1991). Through intermediation role, the banks generate economic growth, which according to Mckinnon and Shaw (1973); the banks achieve this function by providing needed resources for real investment; they argue that financial repression, indiscriminate distortion of financial prices including interest rates reduces real rate of growth. According to Central Bank of Nigeria (CBN) monetary Policy Review (2012), Monetary Policy Rate (MPR) serve as the benchmark policy rate. Sanusi (2004) stated that the 'direction of interest rate movement shall continue to be influenced by the CBN through adjustments of its Minimum Rediscount Rate' (MRR) or Monetary Policy Rate (MPR). The implication of the assertion by the former CBN governor is that based on the expectations of intermediation dynamics, commercial

banks intermediation activities shall continue to influence decisions on the monetary policy rate.

As noted by Ebiringa (2012), "Variability of interest rates affects decisions about how to save and invest". In acknowledgement of the importance of interest rate in intermediation, Bernanke and Blinder (1992) posits that interest rate amplifies the real effect of monetary policy through changes in the supply of bank credit, and that bank lending works through response of credit aggregates to changes in interest rates and other policy instruments. The target of CBN should therefore be, to at all time, identify the MPR that would effectively moderate the commercial bank lending rate and the rate on deposit in order to be efficient in their intermediation role. Meanwhile, whereas savers would be enticed to save more at high deposit rate, borrowers would be apprehensive at high lending rate, obviously, the extent the bank meets the expectations of both the savers and the borrowers would determine how effective and efficient the banks become in their intermediation roles. According to Ogunbiyi and Ihejirika (2014), in the Nigerian economy, the minimum rediscount rate (MRR) now monetary policy rate (MPR) is the official interest rate of the Central Bank of Nigeria (CBN), which anchors all other interest rates in the money market and the economy. Significantly, the definition of monetary policy either from the view point of monetarist, the Keynesian and the post Keynesian has shown that the CBN can hardly achieve its primary objective for monetary policy without the active involvement of the financial intermediaries, especially, the banks.

Theoretical explanations showed that application of monetary policies in an economy would influence bank credits (Gertler & Karadi, 2011). The extent this is done may be limited in the banking sector where the

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banks unlike other non-bank financial institutions can technically create money. Even empirical literatures supports that monetary policy stances is capable of controlling bank credit, yet the extent to which this is true is controversial. While a number of studies found a positive relationship (Akinlo & Owoyemi,2012; Omankhanlen,2014; Matemilola, Bany-Ariffin & Muhtar, 2015), some others posit a negative relationship (Gelos, 2006; Younus&Akhta, 2009; Dancourt, 2012; Azeez & Gamage, 2013). This controversy is even more complicated in Nigeria where some other studies also claimed that the supposed negative effects are not significant in some variables like cash reserve ratio (Bosede, Olusegun & Olubukunola, 2013) and monetary policy rate (Ajayi & Atanda, 2012) and in both (Omankhanlen, Okorie & Taiwo, 2015). For the monetary authority to effectively reposition the Nigerian economy for economic prosperity vis-à-vis credit to productive investment outlets, monetary policy stance need reliable models to capture credit regulation efficiency. Hence this study.

The study had as it's objective to examine the effects of monetary policy Instruments (monetary policy rate, cash reserve ratio, Treasury bill rate and liquidity ratio) on the Banking Sector Credits in Nigeria.

## LITERATURE REVIEW

### Conceptual Framework

**Bank Credit** and deposit collection are the two core intermediation functions of banks. As Nwanyanwu (2010) explained, the banking sector provides credits through its intermediation functions when they are able to mobilise surplus funds from savers who have no immediate needs of such funds and then direct such funds in the form of credit to investors who have productive economic ideas that can create additional wealth but lack the required capital to actualise the

ideas. The propensity to extend loans to borrowers is affected by availability of funds (liquidity), cost of funds which is interest rate that is determined based on the monetary policy rate (MPR), opportunity cost of the liquid funds (Treasury Bill Rate) and statutory cash reserve requirement that ensures bank solvency (Cash Reserve Ratio). All these variables influence both the propensity to lend and cost of lending and is determined by the monetary authorities.

**Monetary policy** can be defined as the conscious action undertaken by the monetary authorities to change or regulate the availability, quantity, cost or direction of credit in any economy in order to attain stated economic objectives (Nzotta, 2004). According to Baumol and Blinder (1982) Monetary Policy refers to actions that the Federal Reserve System takes in order to change the equilibrium of the money market, that is, to alter the money supply, move interest rates, or both. The definitions by Nzotta; Baumol and Blinder are in tandem with the views of both the monetarists who believe in money supply targeting and the Keynesians who advocate interest rate targeting for meaningful economic growth. The manipulation of these variables can be done in two ways namely use of monetary policy tools and monetary policy targets. The monetary policy tools include Cash Reserve Requirement, Monetary policy Rate and Treasury Bills and are deployed directly to influence the direction of the banks as intermediaries. However, monetary policy targets such as money supply, interest rate targeting, inflation targeting and exchange rate targeting are employed as frameworks to achieve set economic objectives. This study adopted the monetary policy tools of the monetary authority. The ideology framed from the conceptual review is that bank credit is influenced by monetary policy instruments such as monetary policy rates, cash

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reserve ratio, treasury bill rate as well as the actual liquidity ratio.

## Theoretical Framework

The study is anchored on the Dynamic Stochastic General Equilibrium (DSGE) model by Gertler and Karadi (2011) and used for monetary policy analysis. In the model, the economy is populated by four types of agents: deposit creating financial intermediaries (banks), non-financial goods producers that demand loans, capital producers, and monopolistically competitive retailers. A central bank conducting monetary policy is the source of monetary disturbances and completes the model. According to the monetary DSGE/ model, an increase in nominal interest rates leads to an adjustment of deposit rates that banks pay to households. This lowers banks' net wealth and according to the balance sheet channel requires deleveraging, resulting in a credit squeeze for the real sector, disinvestment and a fall in output. Increased deposit rates discourage households from current consumption and instead encourage savings.

## Empirical Studies

One of the studies that investigated the monetary policy and bank credit nexus is the work of Omankhanlen (2014) which examines effect of monetary policy on Nigerian Deposit Money Bank System. It employed monetary policy rate, liquidity ratio, cash reserve ratio and average exchange rate as the explanatory variables while total loans and advances was dependent variable. Result from OLS regression technique revealed that monetary policy has significant effect on commercial banks loans and advances during the period under study.

Ajayi and Atanda (2012) examined the effect of monetary policy instruments on banks performance within 1980 to 2008, using the Engle-granger two step

cointegration approach. The explanatory variables included monetary policy rate, cash reserves ratio, liquidity ratio, inflation and exchange rate and the dependent variables was bank total loan. The result showed that monetary policy rate and exchange rate had positive effect but only monetary policy rate was significant on banks total credit. However, cash reserves ratio exert significant negative effect on banks total credit. The study conclude that some monetary policy instruments are more effective than others.

Matemilola, Bany-Arifin and Muhtar (2015) examined the impact of monetary policy on bank lending rate in South Africa. The study regressed lending rates (BLR) on money market rate (MMR) using the cointegration and error correction mechanism. The asymmetric error correction results show that bank lending rate responds faster to a decrease in the money market rate. The study thus posits that monetary policy has positive effect on the financial intermediation of banks.

Ndugbu and Okeke (2015) examined the effect of monetary policy on the performance of deposit money banks in Nigeria using 1993-2013. The study employed banks deposit as the dependent variable and host of lending rate, liquidity ratio, deposit rate and cash reserve ratio as the explanatory variables. The results from Ordinary Least Square and co integration revealed that amongst all the monetary policy variables, only bank deposit rate has significant relationship through inverse relationship.

Omankhanlen, Okorie and Taiwo (2015) investigated the effects monetary policy has on loan risk exposure in Nigeria Commercial Banks. The ordinary least square multivariate regression perspective within the confinement of a vector error correction model (VECM) framework was used for analyses. The level of

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loan risk exposure of banks was the dependent variable, while liquidity ratio, cash reserve ratio, monetary policy rate, and average exchange rate were independent variables. The results showed that monetary policy has long run significant effect on bank loan risk exposure in Nigeria. Further results revealed that liquidity ratio and exchange rate has significant effects while cash reserve rate and monetary policy rate do not have significant effect on loan risk exposure of banks.

Ekpong, Udude and Uwalaka (2015) investigated the effect of monetary policy on banking sector performance in Nigeria using bank's deposit liabilities as proxy for bank performance covering 36 years from 1970 to 2006. The explanatory variables of monetary policy were Exchange Rate (EXR), Deposit Rate (DR) and Minimum Discount Rate (MDR). Results showed that overall; monetary policy has a significant effect on the banks deposit liabilities.. It therefore posit that monetary policy plays a vital role in determining the volume of bank's deposit liabilities in Nigeria.

Sheyin (2015) examined the impact of deposit money banks' investment on treasury Bills and the impact thereof on the amount of credit extended by these banks to the private sector in Nigeria. The study estimated a model which suggests that supply of loans and advances by DMBs was a function of Total deposit, Treasury Bills, FGN Bonds, interbank rates, and the Yield spread between Loans and Treasury Bills. A Vector Error Correction (VEC) technique was used to estimate the model using quarterly data for the period of 2003-2013. The study concludes that demand for government's deficit financing instruments reduced financial intermediation in Nigeria but the effect runs more through FGN Bonds than through Treasury Bills. Gelos (2006) examined the determinants of bank interest margins in that region using bank- and

country level data from 85 countries, including 14 Latin American economies. The study was analysed using correlations, charts and cross-country regression. The results suggest that Latin America has higher interest rates, less efficient banks, and larger reserve requirements than other regions and that these factors have a significant impact on spreads. However, Latin American countries do not differ markedly from their peers in other aspects that are found important in determining the cost of financial intermediation, such as inflation and bank profit taxation.

Younus and Akhta (2009) examined the significance of monetary policy instrument in Bangladesh using Cash Reserve Requirement, statutory liquidity requirement, inflation, open market operation, and Bank rate as the variables of monetary policy and bank credit as the dependent variable. The descriptive techniques like trend analysis and summary statistics were employed for data analyses. The study found that reduction in Cash Reserve Requirement produced positive impact on bank credit and investment.

Using OLS regression techniques, Bosedo, Olusegun and Olubukunola (2013) investigated the relationships of monetary policy variables such as cash reserve requirement, lending rate and inflation rate on bank efficiency in Nigeria from 1977 to 2010. The study employed OLS for data analyses. The results indicated that cash reserve ratio had negative insignificant effect on total loans.

In a study from Kenya, Maigua and Muoni (2016) employed cash reserve requirement, inflation rates, discount rates, and exchange rate to determine the influence of monetary policy on performance of banks. Multiple regression technique was employed on a sample of 26 out of 43 commercial banks operating in Kenya. The result revealed that cash reserve

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requirement ratio had negative influence on bank performance. Thus the study posited that higher levels of reserve requirement ratio result in lower bank performance in Kenya.

Dancourt (2012) documented that reserve requirement has significant negative relationship with the lending disposition of banks to firm. The findings in his work on Banking Credit, Policy Interest Rate and Reserve Requirements in Peru using dynamic panel data techniques reported that the reserve requirement has a negative impact on the growth rate of bank loans to large firms and SMEs.

Akinlo and Owoyemi (2012) examined the determinants of interest rate spreads in Nigeria using a panel of 12 commercial banks for the period 1986-2007. The study employed three estimation models, namely, pooled OLS, fixed-effects and random effects. The results showed that cash reserve requirements, average loans to average total deposits, remuneration to total assets and gross domestic product have positive effect on interest rate spreads. However, non-interest income to average total assets, treasury certificate and development stocks have negative relationship with interest rate spreads. In general, the findings that suggest a reduction in cash reserve ratio, high bank overhead costs amongst others will help to moderate the high interest rate spreads in Nigeria.

In Sri Lankan, Azeez and Gamage (2013) investigated the impact of bank specific, industry specific and macro-economic variables on net interest margin of Sri Lankan commercial banks over the period of 1999-2011. The macroeconomic variable of monetary policy included in the study are inflation, T-Bill rate, statutory reserve requirement and GDP growth. The OLS regression was used for data analyses. The result showed that statutory reserve requirement are

negatively influencing factors on net interest margin in Sri Lanka.

## Gap in Literature

The major gap that this study aims to fill is that most of the studies in Nigeria employ the price-based monetary policy tools. Since monetary policy rate is the main determinant of interest rate, it is pertinent to find out how effective these price-based tools can be in controlling financial intermediation of banks with regards to credits.

## METHODOLOGY

The study adopted the ex-post facto research design in that the data were generated from highly reputed official sources and the researcher do not intend to alter the nature of the data so obtained. The data were from secondary sources. The variables are in ratio included the bank credits, monetary policy rate, liquidity rate, lending, deposit and cash reserve ratio. The data covered a time frame from 1986 to 2016. These data were obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin publications.

## Model Specification

The model is developed with the view that extend of credit of Deposit Money Banks is a function of monetary policy. This implies that: Bank Credit = f(Monetary policy variables).

Inline with the works of Sheyin (2015), Omankhanlen, Okorie and Taiwo (2015) and Omankhanlen (2014), bank credit served as the dependent variable of this study. However, monetary policies are captured by the price-based monetary policy tools including Minimum Rediscount Rate (MRR/MPR), Cash Reserve Ratio (CRR) and Treasury Bills Rate (TBR) (Geiger, 2008). The price based components of monetary policy was modified to include liquidity ratio in this study, thus the model is:

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$$BC = f(\text{MPR}, \text{CRR}, \text{TBR}, \text{LIQ})$$

This can be rewritten as:

$$\text{LogBC} = \alpha_0 + \beta_1\text{MPR} + \beta_2\text{CRR} + \beta_3\text{TBR} + \beta_4\text{LIQ} + \mu$$

Where:

LogBC= Log of total bank credit to the economy representing financial intermediation as the dependent variable

MPR = Monetary policy rate.

CRR = Cash reserve ratio.

TBR = Treasury Bill Rate.

LIQ = Average liquidity ratio of the deposit money banks.

$\alpha_0$  is the constant while  $\beta_{1-4}$  are the coefficient of the independent variables and  $\mu$  is error term.

## Apriori Expectations

**Table 1:** Test of Stationarity of the variables

Variables	At Level		At First Difference		Conclusion
	t-Statistic	Prob.*	t-Statistic	Prob.*	
LogBC	0.479747	0.9831	-3.445677	0.0187	1(1)
MPR	-3.019699	0.0444	-	-	1(0)
CRR	-1.662206	0.4362	-4.265321	0.0031	1(1)
TBR	-3.147807	0.0336	-	-	1(0)
LIQ	-3.244233	0.0271	-	-	1(0)

## Johansen Co-integration Test

Having established that the variables are stationary, cointegration analyses was employed to test for long run relationship among the variables in the model. The result is shown on Table 2. The probability values showed that both Trace Statistics and Maximum Eigenvalue statistics are significant at “NONE”. This indicate that at least one cointegrating equation exist for the model. Therefore the study conclude that there is a long run relationship between monetary policy tools and bank credit of the Deposit Money Banks in Nigeria. This implies that monetary policy has controlled propensity of banks to extent credit in the long run.

**Table 2:** Test of Long run relationship between financial intermediation and monetary policy

Generally all the price-based tools (MPR, CRR, TBR, LIQ ) have positive effects on total bank credit (BC).

## ANALYSIS OF DATA

### Unit Root Test

Since it has been known that time series variables are usually unstable and, econometric analyses demand that the stochastic fluctuations introduced by time be controlled so as to generate a robust regressional results. The Augmented Dicker Fuller test for presence of Unit Root was employed. The result shown for Level and First Differenced data are shown on Table 1. The results showed that MPR, TBR and LIQ are stationary at level while LogBC and CRR are stationary at first difference. Thus the variables are suitable for regression analyses.

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Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.718320	76.23344	69.81889	0.0140
At most 1	0.444332	39.49092	47.85613	0.2412
At most 2	0.321179	22.45096	29.79707	0.2741
At most 3	0.272676	11.21643	15.49471	0.1985
At most 4	0.066104	1.983326	3.841466	0.1590

Trace test indicates 1 cointegrating eqn(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 No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.718320	36.74253	33.87687	0.0221
At most 1	0.444332	17.03995	27.58434	0.5765
At most 2	0.321179	11.23453	21.13162	0.6239
At most 3	0.272676	9.233108	14.26460	0.2673
At most 4	0.066104	1.983326	3.841466	0.1590

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Having observed a long run relationship, a normalized long-run coefficients based on Johansen test is therefore analysed. It is a customary practice to report the normalized cointegrating coefficients in Johansen test with respect to the variable of interest when long-run relationship is confirmed. The results of the normalized coefficients are reported in table 3 below. The results show the long-run impact of the explanatory variables (monetary policy tools) on bank credit in Nigeria.

**Table 3 Normalized Long-Run Coefficient Based on Johansen Test**

Dependent Variable: LogBC				
MPR	CRR	TBR	LIQ	C
0.874391**	-0.348389**	-0.566774**	0.021258**	-6.047813
(0.11011)	(0.06394)	(0.10104)	(0.03256)	
[ 7.94140]	[-5.44847]	[-5.60964]	[ 0.65280]	

Source: Author's Compilation Using E-views 8 Output

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**Note:**Standard errors in ( ) and t- statistic in [ ].\*\* implies significant at %% level.

The coefficients of Monetary Policy Rate (MPR), and Liquidity Ratio (LIQ) have long-run positive effect on bank credit in Nigeria such that increase in MPR and LIQ by one percent (1%) would lead to an increase in bank credit by about 87.4% and 2.1% respectively in the long-run.

On the other hand, the coefficients of cash Reserve Ratio and Treasury Bill Rate has a long run negative effect on bank credit in Nigeria such that an increase in by one percent (1%) would lead to decrease in bank credit by about 34.8% and 56.7% respectively in the long-run.

The level of significance of the above observed effects are tested using the t-statistics in table 3. The a priori is that the coefficient of the error term should be negative and range between zero and one in absolute term (Ogundipe&Oluwatobi, 2014). The results showed that MPR and LIQ have long-run positive significant effect on bank credit while TBR and CRR have long – run significant negative effect on bank credit in Nigeria.

Having observed that long run relationship exist and strength of such relationships, the Error Correction Model (ECM) was used to reconcile the short-run dynamics with long-run disequilibrium of the variables. The Error Correction Model results are presented in table 4 below.

## VECTOR ERROR CORRECTION

Since the results above reveal the existence of co-integration among the variables of the models, error correction models (ECM) are required to determine the short run dynamism of the relationships. The a priori is that the coefficient of the error term should be negative and range between zero and one in absolute term (Ogundipe & Oluwatobi, 2014). The error-

correction term represents the speed of adjustment to equilibrium trends.

The values in bracket are the standard errors while the values in parentheses are the t-statistics (see Tables 4). The  $ECM_{t-1}$  is the coefficients of the lag dependent variables in their first difference. The decision rule is to accept as statistically significant, when the t-statistics is greater than 2.0. This criterion is described as rule of the thumb in Onuorah and Akujuobi (2012).

**Table 4:** Short-run Vector Error Correction (VEC)

Error Correction:	D(LOGBC)	D(MPR)	D(CRR)	D(TBR)	D(LIQ)
CointEq1	-0.182088 (0.07552) [-2.41129]	-1.311655 (0.46028) [-2.84967]	-0.819934 (0.31899) [-2.57042]	-0.749042 (0.61138) [-1.22516]	-1.495684 (1.20625) [-1.23995]

Table 4 was used to examine the short run dynamism of the financial intermediation on monetary policy variables. The VECM test indicate that the model has negative sign; also the magnitude of the error correction term coefficient lies between zero and one. This indicates about 18.2% (-0.182088) short run disequilibrium adjustment to long run equilibrium each year. The significance of the error correction term (-2.41129) shows that the speed of adjustment to equilibrium path is high. The result thus indicates that monetary policy has significant short run effect on bank credit in Nigeria.

## Impulse Response Function

In order to understand the dynamics of responses, the impulse response functions (IRFs) is used in a vector autoregressive (VAR) framework. While the impulse response functions track the responsiveness of the regressands in the VAR to shocks to each of the other variables. More specifically, the impulse responses tell us how bank credit respond (negatively or positively) to shocks in the monetary policy variables. Figure 1

aim to interpret the relationship between bank credit and monetary policy in terms of the response to shocks occasioned by change in monetary policy.

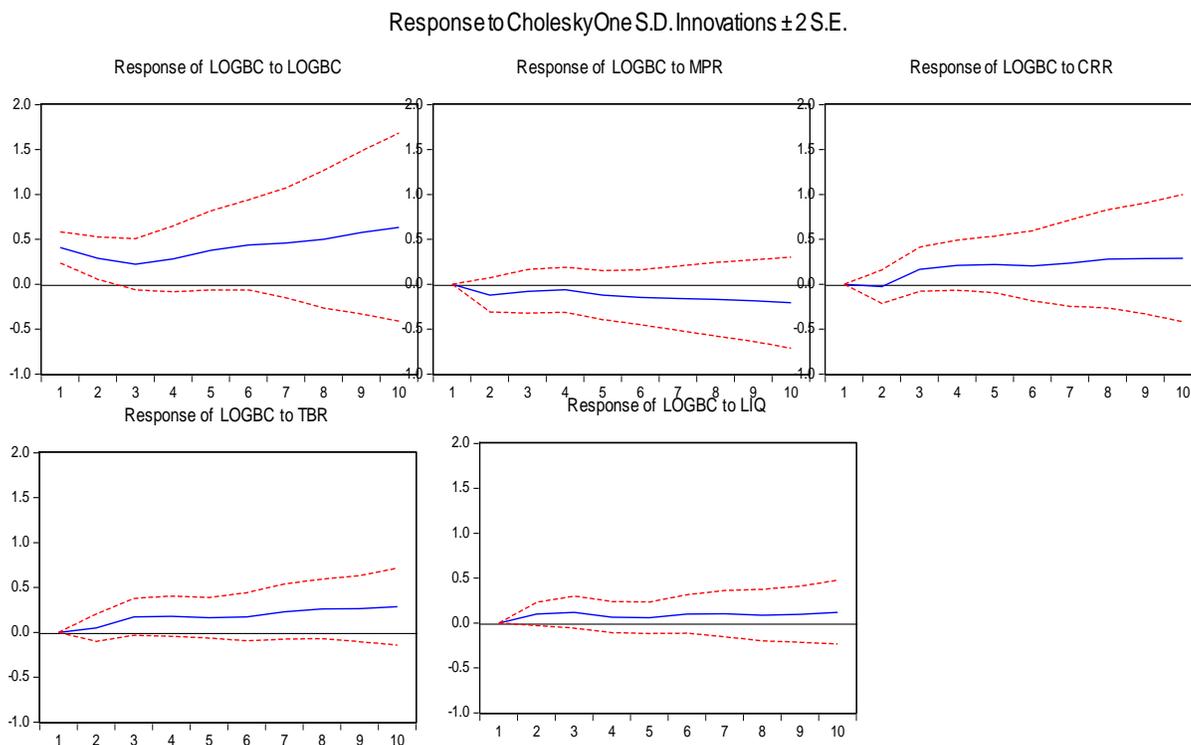


Figure 1: Impulse response function of the variables showing the extent to which the role of bank credit response to monetary policy.

The graph of the Impulse Response Function (IRFs) has three main outputs: the expected level of the shock in a given period surrounded by a 95% Confidence Interval (a low estimate and a high estimate). And, all those also generate the IRF graphs. When all the graphs are above on the positive plane, it implies that the shocks received positive response while it becomes negative when the graph cross to the negative plane. In Figure 1, the response of monetary policy variables shocks to the financial intermediation indicator is shown. The graph shows that financial intermediation

responded negatively to monetary policy shocks up to the 6th period, when it assumes a positive response. The implication is that monetary policies had adverse influence on the activities in the bank in its financial intermediation role for about six (6) years before adjustments to macroeconomic realities positioned stock market participants to benefit from increased bank capital in Nigeria

### Discussion of Findings

This study have shown that there is a long run relationship between monetary policy tools and bank

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credit of the Deposit Money Banks in Nigeria. This implies that monetary policy has controlled propensity of banks to extent credit in the long run.

Coefficients of Monetary Policy Rate (MPR), and Liquidity Ratio (LIQ) have long-run positive effects on bank credit in Nigeria such that increase in MPR and LIQ by one percent (1%) would lead to an increase in bank credit by about 87.4% and 2.1% respectively in the long-run. It indicates that MPR and LIQ have long-run positive significant effects on bank credits in Nigeria. This supports empirical studies of Omankhanlen, Okorie and Taiwo (2015); and Matemilola, Bany-Ariffin and Muhtar (2015).

On the other hand, the coefficients of cash Reserve Ratio (CRR) and Treasury Bill Rate (TBR) have long run negative effect on bank credit in Nigeria such that an increase by one percent (1%) would lead to decrease in bank credit by about 34.8% and 56.7% respectively in the long-run. This implies that CRR and TBR have long-run significant negative effects on bank credits in Nigeria. Younus and Akhta (2009); and Sheyin (2015) supported the findings on CRR and TBR respectively.

When testing the short run dynamism of bank credit intermediation on monetary policy variables, the VECM test indicate that the model has negative sign; also the magnitude of the error correction term coefficient lies between zero and one. This indicates about 18.2% (-0.182088) short run disequilibrium adjustment to long run equilibrium each year. The significance of the error correction term (-2.41129) shows that the speed of adjustment to equilibrium path is high. The result thus indicates that monetary policy has significant short run effect on bank credit in Nigeria.

The impulse response function has shown that all the monetary policy variables (MPR, CRR, TBR and LIQ)

have negative effects on bank credit roles, suggesting that a raise in any of these monetary policy tools slows down the propensity of banks to grant credit and vice versa. This is in line with the theoretical proposition by Gertner & Karadi (2011) in the DSGE model.

## SUMMARY AND CONCLUSIONS

The study aimed to examine the effect of monetary policy on bank credit in Nigeria. The study employed ex-post facto research design, with secondary data of 1986-2016 sourced from CBN Statistical Bulletin. The data were subjected to Augmented Dickey-Fuller (ADF) stationarity test. It adopted the VAR based on cointegration, error correction and impulse response function. The results have shown that there is long run relationship between monetary policy tools and bank credit such that MPR and LIQ have significant positive long run effects while TBR and CRR had a significant negative long run effects on bank credit in Nigeria. . The Vector Error Correction Mechanism (ECM) showed that monetary policy in Nigeria is a reliable short term mechanism for controlling banks credits in Nigeria. The impulse response function indicate that all the monetary policy variables (MPR, CRR, TBR and LIQ) have negative effects on bank credit roles in Nigeria. The study thus concluded that the monetary authority have consistently controlled the level of bank credit of the Money Deposit Banks in Nigeria using the price-based monetary policy. Monetary policy have become veritable short-run tool to sustaining the credits intermediation function of the banks in Nigeria.

## Recommendations

The study generally recommended that price-based monetary policy tools should be used in short term regulation stance of the government. The monetary authority need to be very careful in the selection of the price-based instruments in its monetary policy

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formulation and implementation. This will ensure that desired macro-economic objectives are realized.

**Contribution to Knowledge** Most of the previous studies used market based monetary policy tools, monetary policy targets or a combination of monetary policy tools and targets. This study identified the three price-based monetary policies and controlled them for bank liquidity with the aim to understanding their effects on bank credit. Most of the previous studies only examined relationships, but this study found out how bank credit responds to monetary policy and the time frame of such response.

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