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**The Relationship between Monetary Policy Rate (MPR) and Banking Rates: Evidence from Regression and Multivariate Causality Analysis**

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**Abstract**

*Government in a bid to regulate the affairs of the economy would always use MPR as one of its instruments; which is an interest rate at which CBN lends to commercial banks and other clients. The execution of one of these instruments at time causes others to response either positively or negatively.*

*In order to find out some of these reactions, this research was undertaken to establish the action of the changed in government's Monetary Policy Rate on other instruments like, bank savings rate, Bank lending rate, maximum lending rate and the host of others. For a better and more liability, this research uses both descriptive statistics and econometrics analysis to subject the raw data from secondary source to series of refining like Unit Root Test, Ordinary Least Square Test, Stability Test, and Granger causality test. These tests were conducted, using Granger causality test, to know the direction of their relationships and how they are caused. The finding revealed that almost all the variables, with the exception of bank savings rate, exhibit a strong sign of co-moving in the long run with the tendency of converging. The research revealed that there exist unidirectional causality between monetary policy rate and bank lending rate; bank lending rate and bank savings rate. And there exist a bi-directional causality between monetary policy rate and bank savings rate. The research uses e-view statistics package to analyse the data. The research concludes that the relationships between Monetary policy rate and other monetary rates is determined by what the monetary authority wants to achieve and this indicates the directions of the relationships at times. However, the research suggests that the monetary authority should always try to enforce its policies on the commercial banks rather than using persuasion to achieve the desired goals. There should be continuity in policy of the authority rather than allow it go with each Governor of the authority (CBN).*

**Key words:** Monetary policy rate, Multivariate causality, Relationships, Banking rate

### **Introduction**

One central question of monetary economics is the sensitivity of the economy to policy instruments. One way to quantify this is to examine exogenous policy on the various monetary instruments. Monetary policy relies on two main instruments although they vary in details, the interest at which the Central bank lends to Commercial banks and other clients mainly the government. If the Central bank's policy attracts (low) interest rate on loans to its clients, it will lose control over growth of money supply or else (more typically) it will have to ration allocation of credit at attractive rate (Little, Cooper, Corden and Rajapatirana, 1995). The Central bank can influence the composition of spending by determining which borrowers to favour with relatively low interest rates. Central bank lending has been used to

encourage particular form of investment in the economy (Nnanna, 1998). Short term interest rates are principal indicator of monetary stance in industrialized economies and changes in these rates are used operationally to restrain or to stimulate demand, or at least to signal financial markets what the Central bank thinks about the economy. Interest rate policy in developed countries shows only a pale reflection of the role. Indeed, interest rate policy has been used consciously as a component of development strategy than as a component of stabilization strategy (Nnanna, 2001).

Whether the Central bank can influence aggregate demand and output by changing its lending rates is more complicated and more controversial question. Under some circumstances, when labour, entrepreneurial talent and foreign exchange rate are available, additional lending by Central Bank to its clients encourage by high interest may stifle investment and aggregate output (Akinle & Yinusa, 2007). In most cases, in developing countries such an attempt will end up reallocating spending away from other sources with stipulating total output.

Monetary policy management in Nigeria metamorphosed from an era of administrative control and regulation to a market based mechanism in 1986, which ushered in the policy of liberalization and deregulation of almost all financial matters (Anyanwu, 1998). Prior to the commencement of the liberalization programme in Nigeria, the CBN adopted the direct control of monetary management like the determination of base rate, interest rates; and money supply etc. Like in other less developed countries (LDCS), the motive for this is rooted in the market failure paradigm (Akinlo and Yinusa, 2007). There was the need to channel cheap credit towards the sectors in the economy that are believed to be at the forefront of development. Studies have shown that financial repression promotes inefficiency and wastage of resources, allocation, which led to a re-examination of the basic theoretical background that gave birth to the policy choice of 1986. Under this regime, monetary policy rates are been determined by market forces.

In the contrary, however, the monetary policy committee (MPC) has since then continue to fix the nominal anchor rate that has a lot of bearing on other rates. Accordingly, the monetary policy committee in conjunction with effective management of monetary variables managed the monetary variables and its efficient allocation; usually define the rate of interest upon which other rates will be based hence, the fixing of the Minimum rediscount rate (MRR).

Minimum Rediscount Rate (MRR) by way of history has a strong correlation with banking rates, even though the interest policy has always been to support the credit guidelines with the framework of the monetary policy aimed at reflecting the economy (Ndekwa, 1991). In 1988, the CBN Minimum Rediscount rate MRR was reduced by 2.25 percent from 15.0 percent to 12.7 percent (op cit.). Given the interest rate structure, this was to give banks the signal to reduce their rate of interest on loan as well as on their time and savings deposits. By the second amendment circular No. 23 of 1989, the MRR was raised by 0.5 percent point from 12.75 percent in 1989 to 13.25 percent. This increase in MRR was to signal upward adjustment of interest on loan, deposit and Government Issue of Treasury bills and Treasury Certificate (Nnanna, Englama & Odoko, 2004). The general interest rate structure has always witnessed a parallel growth rate given the nominal anchor (MRR), thus, showing a great deal of relationship between them as a result of the lowering of MRR. When this happened, other interest rates dropped. In 1988, the Treasury bill proportionately dropped from 14.00 percent to 11.25 percent. In a similar way, bank prime lending rate dropped from maximum level of 22.50 percent to 19.25 percent respectively.

Nigeria transitioned from the regime of minimum rediscount rate (MRR) to monetary policy rate (MPR) in December, 5<sup>th</sup> 2006. In it, the Monetary Policy rates (MPR) under the short term interest rate regime was to serve as the nominal anchor for all other rates (Fadun, 2011). Accordingly, the MPR serves as an indicative rate for transactions in the inter-bank money market as well as other deposits and bank interest rate.

Technically speaking, the transition makes no difference either in conceptual perspective or its implication on the other rates; this is a matter of semantics, although the rationale seems not to be fundamental. According to Fadun (2011), the main operating principle guiding the new policy is to control the supply of settlement balances of banks and motivate the banking system to target zero balance at the Central Bank through an active inter-bank trading or transfer of balance.

Romer and Romer (2000) offer one potential explanation for the strong positive response of long term rates to policy innovations. As the Federal Reserve unexpectedly tightens policy inflation, expectations are revised upwards, leading to a stronger response of long rates under symmetric information.

Using a simple macro model, according to Spensson (1977), Ellingsen and Soderstrom (2001) opine that the yield curve response to monetary policy innovations depends crucially on the interpretation of bond market participant to the reason behind the policy move.

If the policy motive is interpreted and revealed information about the state of the economy (endogenous policy), interest rates of all maturities move in the same direction as the policy interest rates. If on the other hand, bond market participants view the policy move as driven by changes in the central bank's preference ("exogenous policy), long run and short term rates move in the opposite directions. Their empirical results thus give strong support for the theoretical predictions that after policy moves classified as endogenous, interest rates of all maturities tend to move in the same direction, but after moves classified as exogenous, long and short-term rates moves classified as exogenous, long and short-term rates move in opposite direction, here the role of information and expectation is very crucial – Nigeria's information system and expectation is still at the fragile level due largely to institutional constrain.

The question to ponder here in this study is, why is it that the Commercial Bank rate is highly sensitive to the Central Bank monetary policy rate (MRR)? What direction of influence does the policy runs? And does any relationship exist between the policy rates with other rates?

The purpose of this article is principally to investigate the nature of relationship between the monetary policy rates (MPR) with other banking rates, to be able to understand the direction of the relationship which will be of importance for policy making. The remaining work is structured as follows, Section II is Data and Methodology, Section III presents and discusses the result while Section IV conclusions and provides policy recommendation made.

### **Data Sources and Methodology**

The study used secondary data collected from the various publications of Central Bank of Nigeria, ranging from 1986-2010. The methodology for this work is in two parts, we employed both descriptive and econometrics analysis. In the descriptive, attempt was made to present the features of the data in terms of the distribution. Therefore, a combined graph is presented to show their trend and also a correlation matrix to show the relationship amongst series. The second part of the methodology uses econometrics

approach of the Ordinary Least Squares (OLS) corroborated by Granger causality and stability graph.

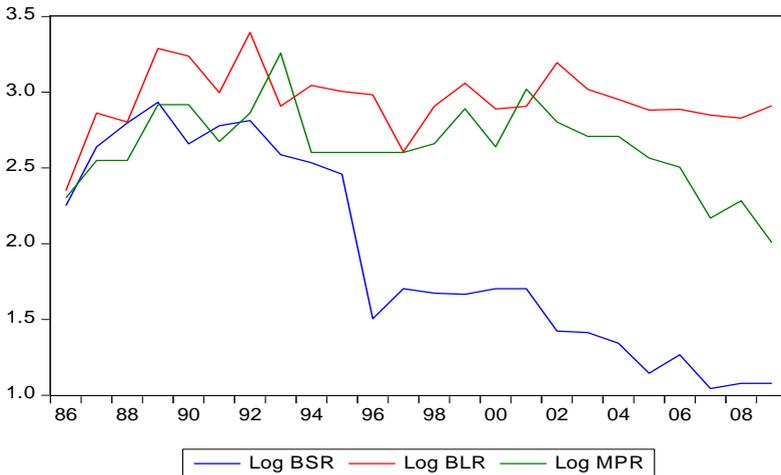
**Table 1 Discriptive Statistics on MPR, BLR, AND BSR**

	<b>BSR</b>	<b>BLR</b>	<b>MPR</b>
Mean	8.435000	19.48583	14.54792
Median	5.490000	18.34000	13.75000
Maximum	18.80000	29.80000	26.00000
Minimum	2.840000	10.50000	7.440000
Std. Dev.	5.430422	4.069820	4.002606
Skewness	0.553139	0.540408	0.779189
Kurtosis	1.703813	3.976307	4.215272
Jarque-Bera	2.903950	2.121338	3.905425
Probability	0.234107	0.346224	0.141889
Sum	202.4400	467.6600	349.1500
Sum Sq. Dev.	678.2582	380.9590	368.4796
Observations	24	24	24

*Source: Authors' computation.*

Table 1 provides a self explanatory descriptive statistics analysis done with the aid of e-views econometrics software. BSR has a mean of 8.435, and a standard deviation of 5.430. BLR has a mean of 19.485, and a standard deviation of 4.069. And MPR has a mean of 14.547 and a standard deviation of 4.002.. The value of median, skewness, kurtosis, Jarque-bera, and Probabilities are within the given range.

**Figure 1: Line Graph**



**Correlation Matrix**

	LOG (MPR)	LOG (BSR)	LOG (BLR)
LOG(MPR)	1.000000		
LOG(BSR)	0.461941	1.000000	
LOG(BLR)	0.492891	0.274454	1.000000

**The Structural Model**

The monetary variables and their notation to be included in the model are:

- (i) Monetary Policy Rate, (MPR)
- (ii) Bank Lending Rate (BLR)
- (iii) Bank Savings Rate (BSR)

The monetary Policy Rate (MPR) serves as the dependent variable, while Bank Lending Rate (BLR) and Bank Savings Rate (BSR) are the explanatory variables.

The implicit function is stated as:

$$MPR = f(BLR, BSR) \text{-----} 1$$

The explicit function becomes:

$$MPR = \beta_0 + \beta_1 BLR + \beta_2 BSR + \mu_1 \text{_____} 2$$

Equation (2) is further transformed into a logarithm form to take care of differential effect of the data.

$$LMPR = \beta_0 + \beta_1 LBLR + \beta_2 LBSR + \mu_1 \text{_____} 3$$

The theoretical expectation of this parameters are that  $\beta_1 > 0$ ,  $\beta_2 < 0$  which means ( $\beta_1 =$  Positive,  $\beta_2 =$  Negative).

### Estimation Techniques

The estimation technique for our parameters is the Ordinary Least Square (OLS) which will be preceded by the pre-test that is deciding on the appropriate Lag length and conducting the Unit Root Test.

### Unit Root Test

The macroeconomic variables are seldom stationary; we can induce stationarity by performing the unit root test. The result of this exercise using ADF test is presented in table 2 below.

For the Lag length, we were guided by final predictor error (FPE), Akaike information criterion (AIC), Schwarz Bayesian criterion (SBC), and Hannan-Quinn information criterion (HIC) respectively. The appropriate Lag length was estimated to be four (4).

Table 2: Lag Length Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-161.8045	NA	2884.391	16.48045	16.62981	16.50961
1	-138.3832	37.47410*	693.0364	15.03832	15.63576	15.15494
2	-129.0651	12.11346	724.5456	15.00651	16.05203	15.21061
3	-112.3510	16.71416	410.4700	14.23510	15.72870	14.52666
4	-92.87304	13.63456	227.1169*	13.18730*	15.12898*	13.56634*

\* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike info. criterion

SC: Schwarz info. criterion

HQ: Hannan-Quinn information criterion

To obtain satisfactory econometrics results with respect to economic and statistical assumptions, it is important to have knowledge about the trend behaviour of the economic variables that are modelled, in doing this; we employed Augmented Dickey Fuller test or ADF test. The ADF is used to test for the existence of unit root and determines the order of integration. Before the unit root test result, we first present the descriptive statistics in table 3 below

Table 3: ADF Unit Root Test

Series	Type of Test	Critical Value			Order of Integration
		1%	5%	10%	
	ADF				
MPR	-6.457	-3.769	-3.004	-2.642	I(1)**
BLR	-4.463	-3.752	-2.998	-2.638	I(O)**
BSR	-5.181	-3.769	-3.004	-2.642	I(1)**

Source: Authors Computation with e-views 7.0

\*\* (5% level of significance)

Based on the result obtained above, Monetary Policy Rate (MPR), and Bank Savings Rate (BSR) are stationary at first difference, while the Banking Lending Rate (BLR) achieved stationarity at level. On account of the result above, we are expected to conduct a co-integration test between the non-stationary variable (MPR and BSR). However, the result of the co-integration showed that there is no co-integrating vector, (see appendix...) which then calls for a Var test. But this can not be done because of the small sample size of our data, in its place; however, we resorted to OLS and ECM to determine the long run and short run adjustment mechanism.

**Presentation of Results and Discussion**

OLS and ECM Results

Table 4: Ordinary Least Square Results

Dependent Variable (MPR)

EXPLANATORY VARIABLES	COEFFICIENT	STD ERROR	T=STATISTIC	PROB VAL.
BANK LENDING RATE(BLR)	0.5137	0.6706	2.1780	0.040
BANK SAVINGS RATE(BSR)	0.4656	0.0745	1.9434	0.0655
ECM (-1)	-0.736010	0.235710	-3.122519	0.0056
CONSTANT	0.8477	0.6706	1.2640	0.2200

R-squared:	0.358	Mean dependent var:	2.641
Adjusted R-squared:	0.297	S.D dependent var:	0.275
S.E of regression:	0.230	Akaike info criterion:	0.019
Sum of square resid:	1.116	Schwarz criterion:	0.167
Log likelihood:	2.276	Hannan quinn criterion	0.059
Durbin watson stat:	1.41	F-statistic:	5.863
		Prob (f-stat.):	0.009

Source: Authors' computation

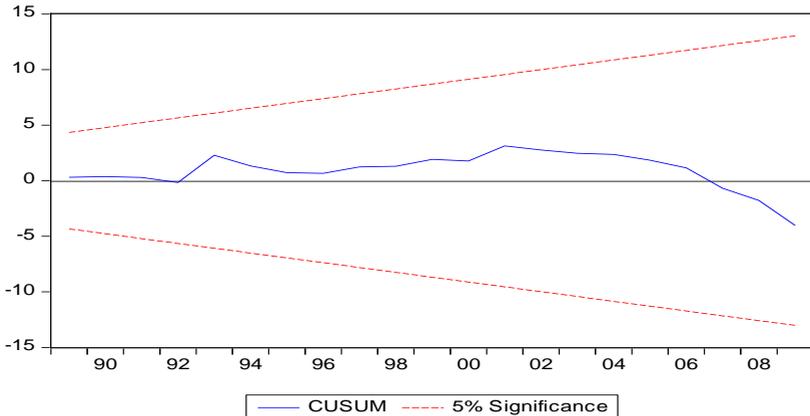


Figure 2: Stability Test for the Relationship between MPR, BLR, BSR

### **Interpretation and Discussion of Results**

The main philosophy behind Central Bank of Nigeria (CBN) Monetary Policy Rate fixing, is to regulate particularly lending rate to achieve, at least a single digit rate, in addition to stimulating trading in the inter-bank money and to influence the level and direction of all other interest rates in the money market (Fadare 2010). Arising from the result above, both bank lending rates (BLR), and bank savings rate (BSR) are positively related to the Monetary Policy Rate(MPR) and are also statistically significant at 1% and 5% level respectively. The adjustment to the short run as a result of any distortion will rapidly be restored at the speed of 73%. By implication, MPR has a significant influence on the working of the economy. This is because given the increase in bank lending rate (BLR), is capable of discouraging private investment. Once the aspect of interest sensitive investment is played down; output will automatically dropped in line with the acceleration principle. Given this scenario, industries will be compelled to close down their businesses, and workers are laid off.

On whole, the performance of the regression result as indicated by the adjusted R-square is 30% meaning that the variation in our dependent variable is explained by the variations in the explanatory variables. The perceived low adjusted R-square might be as a result of the non-inclusion of other determinants that could explain the dependent variable. Even though, the value of our adjusted R-square is low, our F-statistics shows that our parameters are jointly significant.

Judging from figure B above, the model is stabled over time. The cumulative sum (cusum) line hovers between the 5% level bound.

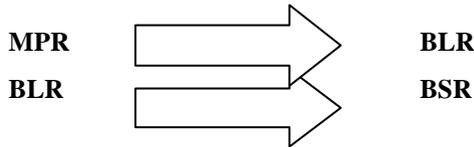
Table 5: Pairwise Granger Causality Tests between MPR, BLR, AND BSR

Null Hypothesis:	Obs	F-Statistic	Prob.
BSR does not Granger Cause BLR	20	2.81935	0.0781
BLR does not Granger Cause BSR		1.16896	0.3763
MPR does not Granger Cause BLR	20	4.11908	0.0280
BLR does not Granger Cause MPR		1.46811	0.2771

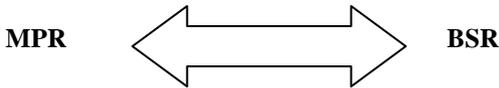
MPR does not Granger Cause BSR	20	3.01354	0.0662
BSR does not Granger Cause MPR		2.78603	0.0803

**Source: Author's Computation**

In the feedback result, there is a unidirectional causality between MPR and BLR; **BSR** and BLR. While bi-directional causality exists between MPR and BSR. This show that the result so obtained conform to the a priori expectation, since MPR originate from the Monetary Authority, Bank lending rate will always take a queue. On the side of MPR and BSR, the regulatory policy could emanate from either side. This means that the Central Bank of Nigeria (CBN) could either increase her MPR which could have negative effect on the Savings community or the savings community could have low savings habit as a result of low interest rate which will also send signal to the monetary authority to respond. This relationship can be illustrated as below;



This is the case of uni-directional causality between the two variables. Furthermore, there exists a bidirectional causality between monetary policy rate (MPR) and bank lending rate (BSR), also illustrated as



**Summary, Conclusion and Recommendations**

**Summary**

This research embarked on finding the relationship that exists between the Monetary Policy Rate and other rates in the economy and how this policy can affect the working of the economy. The research employed the various statistical tools; like the Descriptive Statistics, Unit Root Test, Ordinary Least Square (OLS), Stability Test, and Granger Causality Test respectively.

These tests were able to point out the existing relationship as being interpreted above.

### **Conclusion**

In view of the study, the relationship between Monetary Policy Rate and Banking rate exist as it where, but more of a co-moving relationship. This research found a unidirectional causality between monetary policy rate and Bank Lending rate and bidirectional causality between the policy and banking savings rate and others.

We can, therefore, say that the authority's pronouncement indicates the direction of causality between its policy and other monetary indicators in the economy, particularly in the monetary sector, and that will have an implication for the real sector.

### **Recommendations**

The Monetary Authority (CBN), should as a matter of policy enforce the Monetary Policy on the Commercial Banks rather than using persuasion which must of the Commercial Banks will ignore.

There should be consistency in the policies of the Regulatory Authority rather than allowing policies to go with each of the CBN Governor. However, laudable policies should be seen to have continued even with the exit of the Governor.

The regulatory authority should reconsider her stance on the rate on savings, such that saving culture should be encouraged in the banking sector rather allow "Wander Banks" to withdraw cash from the banking sector to the non-bank public.

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