

---

## IMPACT OF FLUCTUATING CBN RATE AND BANK RATES IN NIGERIA: A RE-ECHOED CORPORATE CRIME

**Nwanyanwu H. Dennis, PhD**, General Studies, KenPoly, Rivers State, Nigeria

**Tordee, Barikui**, Accountancy Dept. KenPoly, Rivers State, Nigeria.

**Alobari Colins, PhD**, Finance & Banking Dept. KenPoly, River State, Nigeria.

**Emah, Sirah Domle, PhD**, Finance & Banking Dept. KenPoly, Rivers State, Nigeria

### **Abstract:**

*Re-echoed central bank rate and inter-bank rates are some of the essential components of the financial system. They are the main focus of central bank. Monetary policy implementations have significant impact on the economy. Inter-bank funds transactions provide signal of the effects in the open market. For short-term interest rate stability, the operating instrument (monetary policy rate (MPR) instrument serves as an indication for the inter-bank monetary market and other deposit money banks (DMBs) interest rates were examined by this paper. The paper examined the relationship between central Bank of Nigeria's interest rate and money deposit banks interest rates the paper by adopting integration of the series data, unit root test, and Augmented Dickey-Fuller and Philip- Perron tests. For the hypothesis testing, hypothesis evaluation tests was carried out using the ordinary Least Square regression analysis to test the OLS residuals and the regression between  $mpr$ ,  $ir$  and  $X_t$  of stationarity and non-stationarity of the variables to determine long-run relationship between the series of data. The findings indicate that the rates are co-integrated and have a long-run relationship, judging from the significance of the unit root test for the residual and the coefficient of the error correction variable in the error correction model. The paper recommended that CBN should embark on joint harmonization of fiscal and monetary policy. Central Bank should adopt expansionary monetary policy in order to infuse more funds in the economy. And CBN should build an efficient and sustained low interest rate intervention fund to support the real economic sector.*

**Keywords:** Comparative analysis, Fluctuating CBN Rate, Bank Rates Corporate Crime

## **Introduction**

Interest rate is an important determinant of the cost of fund in and economy. The cost of fund in Nigeria starts from the Central Bank Nigeria (CBN rate. This is the rate at which the commercial banks buy the currency from the CBN (Bache & Barnhardsen, 2009). It is also the basis or the determinant for which commercial banks fix the rate they issues out loans to the public. The CBN rate in is in other words called the Monetary Policy Rate (MPR). Commercial Banks must fix above the rate at which they bought in other to remain afloat in business. Because they are commercial in nature, cost of funds is important and as a profit oriented venture, should they buy funds at 22 percent interest, they are by law authorized to sell not below 27 percent (Ahumada, Garcia, Opazo & Selaive, 2009). Interest is vital to the economy as the cost of borrowing funds, the in the deficit economic unit (borrowers) must compensate those in the surplus economic unit (lenders) for saving the funds enough to lend out. Higher interest rate is a limiting factor and a setback to the business of lending. However, the supply of credit is said to make harder the by high interest rate. According to Bernanke and Blinder (1992), "The challenges of monetary authority is the possibility controlling the cost of funds" this is so because every commercial bank which is at point where investors can approach for funds are most times not easily controlled by CBN due to their erratic behavior when it comes to provision of funds to investors. This fluctuation from both CBN and commercial banks has a negative impact on the cost of funds and business operation in the economy.

The CBN fights towards controlling interest rate fluctuations even when it is a major player in the financial sector of every country. It is obvious that CBN is created to stop interest rate changes though secondary, it is out to control inflation, for both economic and financial stability. The end point is because to ensure exchange rate stability and economic stability as ends unto themselves (CBN, 2009). Volatility of interest rate poses a big challenge to the economy as it explains the sensitivity of and response of the investor to borrowing and spending. As individuals assess fund for spending on household properties, investors and companies borrow to for investment while the profits are used for expansion of businesses. The bottom line is that globally, response to loan request is more based on low interest rate. The economic implication is that people respond to rise in interest rate responds by borrowing and spending more but will borrow less and spend less under high interest rate. Volatility of interest rate creates unstable output of products.

Again, interest rate volatility explain higher risk premium on long-term bonds and leads to difficult financial investment decisions by leading to reducing productivity and inefficient economy. Central Bank is in a position to regulate the economic risks through her regular short-term fluctuating Monetary Policy Rates (Sarno L. & Thornton, D., 2002). Before the interest liberalization and financial sector reforms, more specific were the interest Rates in Nigeria. Central Bank of Nigeria statutorily fixed the interest rate make it a fiat decision by CBN. But with the interest rate liberalization and other rates, interest rate became market determined making it indirect way of giving commercial banks the right to fix at will, their lending rates for borrowers. This greatly affected the cost of monetary intermediation. Central Bank is the major player in the financial sector world all over as sole authorized agency by the government. Their decision is binding on amount of credit available, interest rate, output, money supply and inflation. Other functions of the CBN include management of government finances, regulation of the activities of commercial banks and serving as bankers' bank (Omotor, 2007).

Central Bank operates discount lending rates which are rate above their targeted rates which guarantees availability of cash to commercial banks in times of financial crisis and also guarantees overnight inter-bank lending rates which may be equal or less than commercial banks' lending rates. It is the market cost of transfer of funds known as cost of borrowing. This paper attempts to examine impact of fluctuating CBN rate and bank rates in Nigeria as a re-echoed corporate crime in Nigeria. Six sections were structured to achieve this in this paper in the following order: introduction, the theoretical and empirical literature, monetary policy review from 1896, empirical results, conclusion and recommendations.

### **Review of Related Literature**

Literatures abound with literature on interest rate, its impact on the economy and other related issues. These were the works of scholars like; (Macgorain, 2006: Nnanna, 2001: Hartmann, Manna & Manzanara, 2001). Firstly, is the economic level of activities and the future outlook. It expels that the larger the current sales, the futuristic the economy and the greater the enablement to boost productivity. Secondly, the interest rate which is the cost of fund, the higher the interest rate, the more demand for funds is reduced. Individual demand for funds is likely to drop with high interest rate and vice-versa given the state of the economy.

Most of the times as the financial sector and the economy are left to regulate themselves, there are likely to be some major volatilities. Central Bank regulates these volatilities in the economy such as; high and stable real growth, inflationary pressure, high unemployment, instability in the financial market, fluctuating exchange rate and unstable prices in a market-based economy, information on prices of goods and services are provided by the CBN and she ensures that firms have resources allocated to them for productive purposes. Increase in the prices of goods and services is an indication that there is increase in demand for goods and services and there is the need to produce more (Nnanna, 2001). Inflation is a reflection of poor performance of the economy.

When the price of every item/good is rising, it is a sign that all is not good in the economy. It becomes the duty of the consumers to decide which item to shift their demand to. Increase in the cost of production of and product also explains a shift in supply or as a result of inflation in the economy (Omotor, 2007). It is important to notice or explain the difference. Where there is efficient management of the economy, it is easier to describe performance of the economy. Stability of price is to reduce inflation jump. Central Bank employs the tools of adjustment in interest rate to moderate inflationary pressures within the business cycles. This is because economic booms are not recessionary. Economic recessions give rise to job layoffs, business failures and lack of incomes and income fluctuations. But adjustment in interest rates may seem a long-run solution but must depend on sustained levels of improvement in technology size of stock of capital and labour force or size of employable population. These factor growths help for output potential (Chuku, 2009).

### **Review of Nigeria's Monetary Policy Review from 1986**

Financial system intervention by the government stifles competition and leads to resource misallocations. The effect of these was the introduction of federal government Structural Adjustment Program (SAP) in 1986. The introduction SAP was to welcome the orientation of reliance on market forces. In this program it was the intention of the government that the country has to fall back on locally produced goods. This was followed by reforms in the financial sector and initiate competition among industries within the country. It was followed

by financial sector liberalization policies on interest rate, monetary policy, administrative policy and management of exchange rate policy which involved liberalization of the financial market and institutional building in the financial sector. According to Yusuf, (2010), the financial sector reform broadly encompassed the following objectives;

- Increase credit competition through the elimination of non-price rationing.
- Capital and money market strengthening through distress resolution and policy measures
- Enhance institutional structure supervision.
- Formal and informal sectors linkages improvement.
- Replacement of direct control regime through the adoption of indirect monetary management and
- Improvement of allocative efficiency through the removal of interest rate control.

There have been monetary policy objective similarities since 1986 especially as it concerns output and employment stimulation, domestic and external stability promotion. Under this economic management philosophy, during SAP era, it was the monetary policy objective to enforce emergency of financial system-orientation in the money market for effective savings efficient resource allocation. Market-base is the framework for open market operations and the discount window operations. Direct control economy substantially requires improvement to legally regulate the macro-economy and its environment.

Excess liquidity management is essential for the economic stability all to control the volume of liquidity in the system involving; ceiling on credit growth reduction in banks, special deposit requirement recall outstanding arrear from bank to CBN, foreign currency collateral abolition for loan in Naira and public sector from banks to CBN withdrawal. In 1990, there was the use of security stabilization in order to increase the excess liquidity sizes in banks and the re-introduction of cash reserves requirement for commercial banks in 1998, 1990, 1992, 1996 and 1999 respectively (Yusuf, (2010).

Fiscal deposit build-up was identified as one of the macroeconomic stability sources and consequent acceptance of the government not to effect reduction in the size of deficits rather to synchronize monetary and fiscal policies through inducement of efficient and flexible credit operations to improve banks regulatory environment (Nwaoba, 2006). At the sometime, targeted were compressed credit allocations of four sectors-specific in 1986 for which include; abolition of mandatory credit allocation mechanism in 1996, parallel treatment of both commercial and merchant banks involved in the same monetary process, advantageous harmonization of conducive operating environment for both merchant and commercial banks, liquidity effect of deficit financing for speedy aggregation of monetary credit in 1998 line with set objectives and preceding fiscal performance. Through weekly CBN foreign exchange outlaws in the exchange market autonomy and to an extent, exerted moderated effect of Open Market Operation (OMO) led to lesser impact on the monetary credit. There was a drop on the inter-bank and saving rate due to a wide gap in the banking spread between landing rate and special deposit.

### **Monetary Policy Rate (MPR) Overview.**

For some period, monetary policy reevaluation and reassessment of helps the CBN to achieve price stability in the economy. Implementation of the monetary policy enables her to adapt to changes in financial and economic environment (Sarno & Thornton, 2002). These are the bases for all the monetary policies since 2006. Stability in both domestic currency values

within the interest-rate as operational target is achievable through the interest rate as determined by the Central bank of Nigeria remains the overall objective using the monetary policy rate (MPR). This serves as transactional indicative rate in the inter-bank money market and other commercial banks' interest rate. The principle behind money supply settlement and banking system is to achieve CBN zero balances functional inter- bank transfer balances. The focus is to endanger both deficits and surpluses in the CBN overdraft account balances with equal banks surpluses. The implication is that there is asymmetric deficit and surpluses treatment when settling accounts to equate cost of surplus funds as overdraft in the CBN.

Lending standing facility is the reason for CBN intervention in the money market to maintain orderliness in the market behaviors through interest volatility alternatives. This entails facility lending standing overnight availability of banks deficits in fixed interest rate using the CBN upper interest rate corridor. It is the readiness of banks to make available any amount at an acceptable lending rate. This allows banks to maintain overnight upper and lower limit corridor inter-bank rate interest rate limit. The monetary policy rate MPR which was set at 10 per cent was based on the inflation rate and outcome of expected rate of 9.0 per cent during the 2006 fiscal year guide to be sure that interest rate maintains positive terms (Yusuf, 2010). The 300 basis points were translated lower limits of 7 percent which represents that rate at which CBN accepts deposits from commercial banks.

The new framework is advantaged through daily operations of the CBN operations daily market and liquidity adequacy provided which enables banks to trade in the inter-bank market rate by maintaining levels between both deposit and lending rates in CBN. Interest rate maintenance significantly helps in volatility reduction in the market when compared to past inter-bank market.

The 2006 monetary policy objectives were being sustained in the stability of prices of non-inflation growth being enunciated in the empowerment of the economic policy. The targeted single digits inflation was targeted to be 8.5 per cent by 2006 same year within the framework of the introduced Economic Empowerment and Development Strategy (NEEDS). Management of the monetary policy framework after 2007 became static for the period as the CBN adopted several policy measures to accommodate monetary aggregate in order to get price stability in the economy and achieve Open Market Operation (OMO) which was one of the tools of managing the liquidity.

By December 2006, available information and data revealed that broad money (M2) has grown up to 11.03 per cent in 2007 and even rose up to 21.3 and 25.31 per cent between September and October respectively. In annual analysis, in September, M2 which is broad money supply grew to 28.44 and 30.25 per cent in September and October 2007 respectively. In November 2007, external reserves recorded US50bn dollars enough to sustain the economy for two tears and one month in the then current exchange rate representing 18.06 per cent increase compared to US42bn Dollars same period. The monetary policy rate (MPR) implementation and its CBN adopted standing facilities while inter-bank volatility and interest rate became moderate hovering around within the monetary policy rate (MPR) within the same year. June 2007 was first recorded the monetary policy rate was downward reviewed to 200 basis points from 10.0 percent down to 8.0 percent which the interest rate width corridor dropped from +/- 300 to +/- 250 basis points.

Secondly, the MPR in October 2007 witnessed 100 points increase to 1.0 percent from 8.0 percent with the elimination of the interest rate corridor, as the outcome of the problems



emanating from financial situation in the economy. The MPR served as repo rate overnight. Finally, the economy experienced interest rate increase in December 2007 with the MPR staked at 50 points basis showing 9.5 from 9.0 per cent.

### **Productivity Theory of Interest**

This paper is predicated on the Productivity theory of interest propounded by J. B. Clark and F. H. Knight. Further Marshall, J. B. Say, widely publicized by Von-Thunen. As assumed by this theory, based on productivity of capital, with the help of capital goods, the volume of labour productivity is generally bigger compared to the amount it can produce by bits self. This is the reason why they are required by the employers. Most Classical economists were of the view that interest is the reward for capital due to its productive capacity. In order wards, interest is paid due to ability of capital employed in business. As more and more capital resources are employed, the over-all productivity increases. This is a reformed loan able fund theory and incorporation of monetary and non-investment factors. In this theory, savings does not refer to other real theory of interest but unconsumed profit ploughed back into business for the purpose of production. As a reformed classical investment theory, associated with Wickells other Swedish economists and the British economists D. H. Robertson. Theory of Interest is a function of constant level of income relating to constant level of full employment The theory submitted the following assumptions:

1. That economy has her resource employed
2. Integrated is the loan able funds characterized by funds mobility outside the loan able market
3. It is a market for loan able fund.
4. Landers in this market are surplus economic unit while borrowers are deficit economic unit or price takers.
5. The market is a perfect competitive market.
6. There is partial equilibrium approach in the theory.
7. Other factors of other than interest rate are held constant
8. The interaction with other micro-variables is in isolation with interest rate.
9. Money supply (M2) is influenced by monetary authorities.
10. Interest rate is independent of money supply.
11. Money supply is an exogenous variable
12. In the theory, loan able fund and flow of money are stated in flow terms.
13. There is dishoarding in elastic interest rate.
14. Saving is a function of income and not interest rate.

The theory assumed that interest rate is a function of demand for loanable fund. Within the ambit of this theory interest rate is a function of demand and supply of funds in the surplus economic unit. In the Classical interest rate theory, interest rate is seen as a result of income from savings. However, bank credit, disinvestment and dishoarding were considered by the Neo-classical economists. Under the neo-classical theory, available for investment is only savings while the neo-classical theory considers; bank loan, hoarded wealth and disinvestment as other funding sources known as monetary theory of interest rate. They are all considered as monetary theory and real interest theory.

### **Empirical Review**

Pool of literature is filled with studies conducted by scholars in related topics on CBN and bank interest rates in Nigeria; Omotor, 2007: Sarno & Thornton, 2002: Nnanna, 2001: Chuku, 2009). Widening the discussion on this topic is the study conducted by Ibe &

Momodu, (2021) on inter-bank money market and monetary policy operations in post SAPIN Nigeria. The study focused on liquidity and reserve management operations in quoted banks. The paper adopted Johansen's multivariate co-integration technique for the analysis first tested were stationarity of the variables used in the model via the Augmented Dickey – Fuller (ADF) and Phillips - Perron (PP) unit root tests. It was found that there is a significant relationship between monetary policy rate and inter-bank rate. There also existed a positive and insignificant relationship with exchange rate as a result of inflation rate, money supply in the economy and financial market underdevelopment. In another study, Kenechukwu, Okoh, & Ubah, (2021) conducted a research on effectiveness of quantitative monetary policy and employment implementation, its effectiveness in Nigeria, 1986-2018. Focus of the study was on effectiveness of monetary policy. Adopted for analysis was ARDL Auto-regressive Distributed lag models. The study revealed that there was insignificant and positive effect of monetary policy instrument on employment rate in Nigeria. Investigation on CBN Monetary Policy and Inflation Nexus in Nigeria: An empirical approach was conducted by Okotor, (2020). The study focused on stabilization of inflation in Nigeria economy. The paper adopted the ADF test for the stationarity, the Johansen co-integration test and the vector error correction model were utilized in testing the variables. Findings revealed a nexus linking inflation and monetary policy. It was further revealed that there was a significant relationship between exchange rate, monetary policy rate (MPR), treasury bills, liquidity ratio and reserve requirement on inflation.

Toriola, Adebosin, Oyewole & Aberu, (2022) studied the monetary inflation and fiscal spending in Nigeria. The study focused on inflation. As an ex post facto research, the paper adopted Least Squares (LS) technique in the estimation of data. It was revealed that government capital expenditure exerted negative significant effect on capital spending. There was a negative effect of capital expenditure on monetary inflation in the country. There was a significant effect of money supply on monetary inflation. Current expenditure was not found to have significant effect on monetary inflation in Nigeria. Financial development and economic growth nexus in Nigeria: further evidence from long-run estimates was investigated by Osisanwo, (2017). The study focused on economic growth in Nigeria. The study employed unit root and co-integration and ordinary least square estimation technique. The paper discovered that all the indicators used except private sector credit ratio impacted positively on real sector growth while there was negative impact of private sector credit on the real sector growth in Nigeria.

Osemene, Kayode, Olanpeleke and Ibukun, (2019) investigated determinants of foreign direct investment and its causal effect on economic growth in Nigeria with a focus on capital inflows. Co-integration test and vector error correction model was adopted for data analysis. it was found a significant relationship between foreign direct investment and economic growth in Nigeria. There was crowding-out effect of foreign direct investment on domestic firms. It was further discovered that foreign direct investment is positively related to economic growth in Nigeria. Monetary policy impact on interbank market rate: banking industry evidence in Nigeria was examined by Archibong, Nwude and & Nwude, (2022). The study focused on monetary policy implementation. The study took exploration review of previous studies and found that the rate in the market was influenced by factors such as open market operation, monetary policy rate liquidity and reserve requirement.

The question of how monetary policies affect economic growth in Nigeria was investigated by Balogun, (2021). The study focus was on monetary policy tools Auto Regressive Distributed Lag (ARDL) bound test for co-integration were adopted in the analysis. The paper

revealed a strong long-run relationship between real GDP and CRR, MPR and PLR but a negative significant relationship between real DGP and CRR. Uduakobong and Ime, (2017) conducted a study on monetary policy and economic growth in Nigeria. The study focused on supply of money and economic growth in Nigeria. The paper employed Ordinary Least Square (OLS) techniques and the granger causality test in testing the data. It was found that there was a significant relationship between money supply and economic growth.

### Methodology

The objective here is to estimate the re-echoed corporate crime in fluctuating impact of CBN rate in the Banking sector in Nigeria as envisaged in the postulated theory. The expectation is to the deposit money banks, signal the monetary policy rate credit operation in such a way that the interest rate will be seen by the monetary authority as an investment stimulant and a monetary policy easy assessment of funds by Deposit Money Banks (DMB) using the discount windows by the central Bank of Nigeria (CBN) with intention to reduce lending of the commercial banks. With the un-establish able relationship of cause and effect, MPR changes are in vain as there would be credit market operating outside the CBN influencing factors.

However, where there are no cause and effect in a relationship, it means no transmission of the monetary policy effect to other sectors of the economy. Again, due to non-sophistication in the financial market, it is the consideration of this paper to views it necessary to examine the impact of fluctuating CBN and Bank rate on the cost of funds in the economy. in a simple relationship form, we have;

$$irt = \beta_0 + \beta_1 mprt + \beta_t X_t + et. \quad (1)$$

where

- $Irt$  = inter-bank rate
- $Mprt$  = monetary policy rate
- $X_t$  = monetary operations
- $Et$  = error term assumed to be white noise

These variables are theoretically adjudged to be capable of influencing the dependent variable.

Judging from the available time series data, economic variables it is assumed that the data and variables are stationary and integrated in the model strategies. To be free from spurious result challenges, it is important to conduct a test on the existing unit-root. Here, we adopt series of tests such as the common Augmented Dickey-Fuller and Philip- Perron tests. On integration of the series data, should the  $ir$  and  $mpr$  relate closely and deviate from one another sporadically, their presence is evaluated to determine long-run relationship between the series of data. This hypothesis evaluation tests the OLS residuals and the regression between  $mpr$ ,  $ir$  and  $X_t$  to determine stationarity or non-stationarity of the variables. Here, result of the unit-root residuals are as follows;

$$et = -irt - \beta_0 - \beta_1 mprt, - \beta_t X_t \text{ -----} (2)$$

in the form;

$$\Delta et = \lambda_1 et-1 + \lambda_2 \Delta et-I \text{ -----} (3)$$

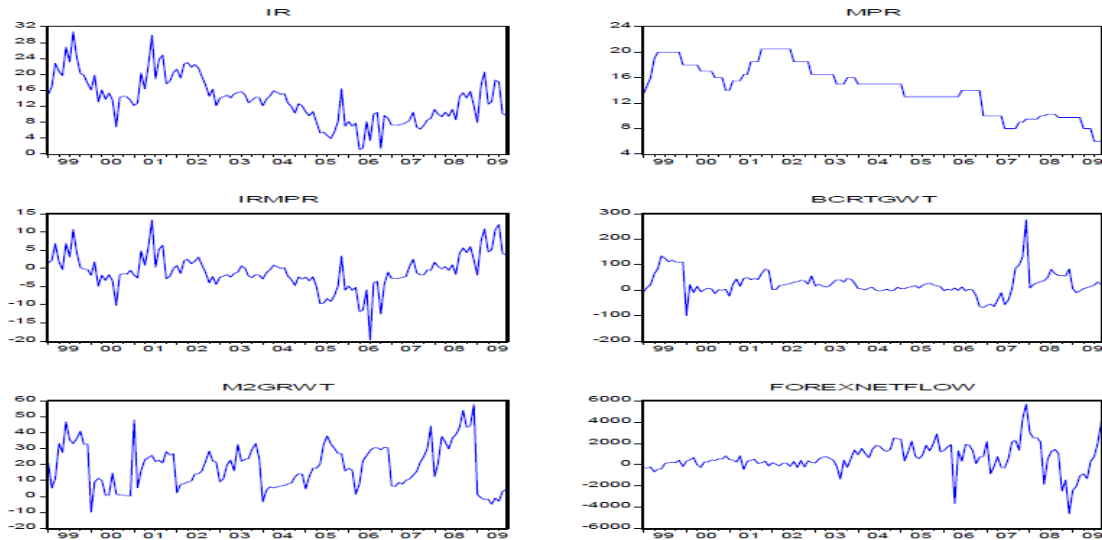
It should be known that the lagged  $\Delta et-1$ , is auto-correlated while the lagged terms may exceed one variables ( $\Delta et-i$ ) the length of the lag protected by criterion Akaike information



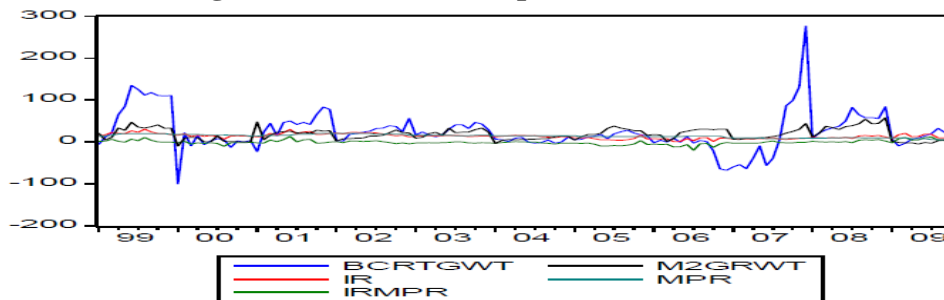
**Results and Discussion**

Data employed for this research were gotten from CBN, financial times, bank analysis system, and financial review, CBN statistical bulletin and monthly time series data 1999 – 2009 (Balogun, 2021).

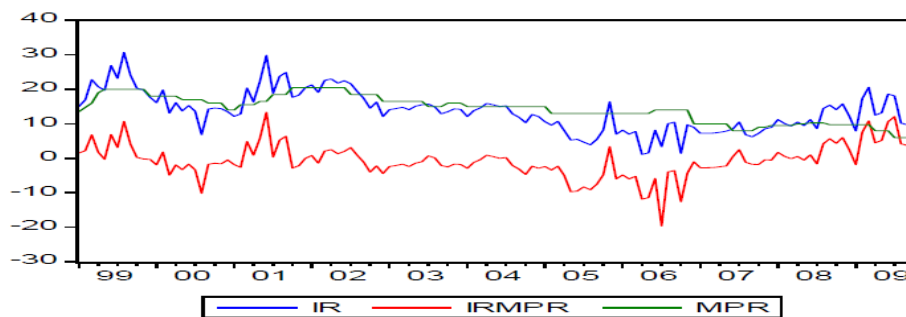
**Fig. 1: Line graphs of regression variables**



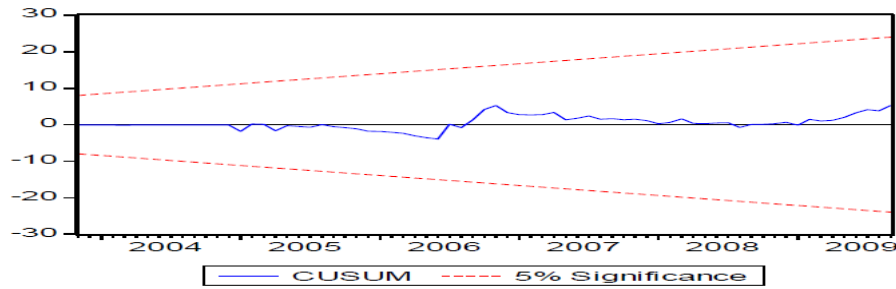
**Fig. 2: Correlation of Explanation Variables**



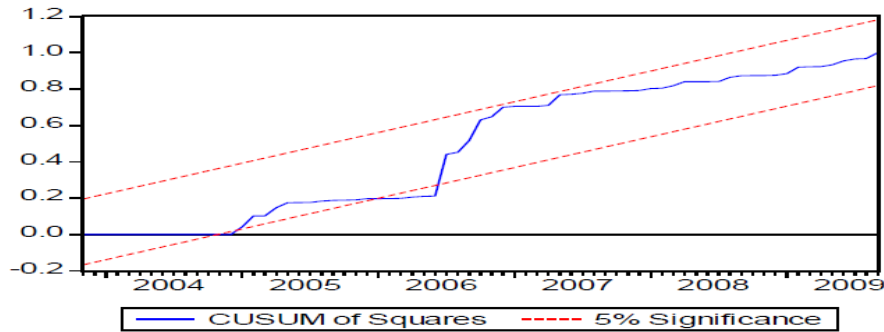
**Fig. 3: Nigeria Inter-bank rate – Monetary Policy Rate Relationship and Spread**



**Fig. 4: CUSUM test on the Parsimonious Model**



**Fig. 5: CUSUM of Square test on the Parsimonious model**



The variables statistics summary adopted in the paper as shown in table 1 below revealed a positive correlation of the variables. From the period studied, the *ir* was next to *mpr*, but not as expected mostly between 1999 and 2001, 2005 and 2006, which is within the 2<sup>nd</sup> half of 2008 to middle of 2009 as shown in figure 2 above. The periods experienced great fluctuations within the range of +/- 10 – 15 point bases. On this note, CBN success in managing the short-term interest rates close to *mpr*, with *mpr* variation and financial fragility that resulted to consolidation of banks in Nigeria has been important but for most of the period 1999, 2001 and mid 2008 to 2009 the period inter-bank became more of *mpr* within the period sampled when the *ir* got below the *mpr* reflecting that the inter-bank market fund and liquidity within the period.

**Table 1 Summary Statistics**

	IR	IR-MPR	MPR	M2GRWT	FOREXNETFLOW	BCRIGWT
Mean	12.62315	-0610277	13.26015	17.67012	502.3436	14.57253
Median	12.70000	-1.200000	14.00000	16.70000	337.2000	15.70000
Maximum	20.61000	12.23000	10.40000	46.70000	4585.400	265.3000
Minimum	1.120000	-18.52000	5.000000	-8.760000	-3532700	-88.70000
Std. Deviation	4.714001	3.750181	2.754820	12.81318	1237.532	35.18184
Skewness	0.212085	-0.134122	0.206341	0.231306	-0.103257	1.314555
Kurtosis	2.875175	4.032682	2.040861	1.424217	5.140823	8.281387
Jarque- Bera	1.234321	11.80363	3.688736	3.571221	46.28016	152.2323
Probability	0.214284	0.000011	0.080614	0.147611	0.000000	0.000000
Sum	1771.610	-81.82000	1742.640	1311.540	66734.55	2173.180
Sum sq.Dev	3217.112	2012.437	1812.012	23717.03	2.22E+07	162112.2
Observations	129	129	129	129	129	129

For the spread, there was variables heterogeneity considerably over time. For instance, deviation average between 1999 and mid 2001 and mid 2001 recorded 1000bpd with only about 500 bps from mid 2001 to mid 2005

**Table 2 Correlation Matrix**

	IR	IR-MPR	MPR	M2GRWT	FONREXINFLOW	BCRTGWT
IR	1	07.31815	0.512423	0.012241	-0.151166	0.221770
IR-MPR	0.631815	1	-0.045827	-0.018122	-0.0164882	0.150817
MPR	0.512423	-0.045827	1	0.024173	-0.1736073	0.173114
M2GRWT	0.012254	-0.018122	0.024173	1	0.0025855	0.450478
FOREXNTFLOW	-0.151166	-0.165882	-0.173607	0.002585	1	0.101219
BCRTGWT	0.221770	0.150817	0.173114	0.450478	0.101218	1

**Table 3: Augmented Dickey-Fuller and Phillips-Perron Root Test Result**

	BCRTGWT	FOREXNTFLOW	IR	IR-MPR	M2GRWT	MPR
ADF statistic	-3.055	-5.327	-12.0087	-14.251	-4.102	-10141
Phillip-Perron statistic	-4.471	-4.512	-16.543	-21.533	-4.258	-11.132
Order of Integration	1(0)	1(0)	1(1)	1(1)	1(0)	1(1)

MacKinnon (1996) Critical Values: 10% = -2.579; 5% = -2.884; 1% = -3.482

Revealed in table 3 the Unit test on the order of dependent and independent variables integration based on Phillip-Person (PP) and Augmented Dickey Fuller (ADF) classes of Unit root test. Both PP, ADF and null hypothesis are variables of interest that are non-stationary and ascertain to the number of times the variables are required to be different to get to stationary. Also as revealed in table 3 the PP and ADF tests strongly support the hypothesis which showed that banking sector growth banking sector credit system (BCRTGWT), flow of net foreign exchange (FOREXNTFLOW) and broad money supply growth (M2GRWT) are stationary at levels while inter-bank Rate IR, monetary Policy rate (MPR) and the IR-MPR spread are stationary initially when judged differently and judged by the Mckinnon critical of hypothesis values rejection and hypothesis Unit root

**Table 4: Static Regression Model**

Dependent Variable: IR				
Model: Least Squares				
Sample: 1999M01 2009M09				
Including Observations: 129				
Variable	Coefficient	Std Error	t-Statistics	Prob.
IRMPR	0.820785	0.015052	46.84810	0.0000
MPR	0.875883	0.018227	40.02828	0.0000
M2GRWT	0.003521	0.005237	0.618607	0.3560
FORENETFLOW	-1.50E-04	4.46E-04	-0.176603	0.6630
BCRTGWT	0.000301	0.201606	0.31875	0.5570
C	1.123320	1.211616	0.318765	0.5570
R-Square	0.871070	Mean dependent var	12.62315	
Adjusted R—Square	0.871241	S.D dependent var	4.715001	
S E of Regression	0.683081	Akaike info criterion	2.322151	
Sum Square Resid	66.45153	Schwartz criterion	2.444164	
Log likelihood	-1402283	F-statistic	1.237.160	
Durbin-Watson Stat.	1.823105	Prob(F-statistic)	0.000000	

Due to the reveal of the unit test showing BCRTGWT. FOREXNTLOW and M2GRWT are showed 1(0), while IR, MPR and IR-MPR are (1), we further confirm the possible co-integration equations number, unrestricted rank test result showed in table 4 which revealed 4 integrated equations with Max-eigenvalue test showing 3 co-integrating equations at 5 per cent levels, beginning from the Johansen multivariate test result, the co-integration equations normalized.

$$ir = + 0.98irmpr + 0.98mpr + 0.03m2grwt - 0.00013forexnetflow - 0.0092bcrtgwt, \dots (4)$$

On that note, all the coefficients are significant as a result of their respective values and standard errors, except for the BCRTGWT variables, adjusted equation coefficients for other variables showed insignificant.

**Table 5: Unit Root test for the Residuals**

Null Hypothesis: RESID) has no unit root			
Exogenous: Control			
Long length:o (Automatic based on SIC.			
MAXIAG=12			
		t-Statistic	Prob*.
Augmented Dickey-Fuller test statistic		-10.75151	0.0000
Test critical values:	1 % level	-2.371024	
	5% level	-2.773108	
	10% level	-2.467773	

\*Mackinnon 1996) one-sided p-values

### A long-run Static Regression Model and Co-integration Test

After ascertaining the level of stationary of the variables and possible con-integration equation, we then tested for possible co-integration among the variables through the adoption of the Granger and Engle two –step method of stationarity test of generated residuals by running static regression levels of the model. After establishing the co-integration and the residuals stationary were found as shown in table 4, the static regression model result, the result in table 5 then revealed the co-integration test result. Having shown the PP and ADF critical values, the con-integration regression model are considered to be con-integrated at levels. Therefore, growth in monetary rate, growth in broad money supply, growth in banking system credit and foreign exchange net flow are all con-integrated with inter-bank rate. Invariably, this result rejects the residuals unit root null hypothesis thereby confirming the variables long-run relationship among the variables. Identifying the non-stationary behavior of the *IR* and its co-integration with *mpr* and *Xt* in the most natural approach, it becomes an error correction model (ECM) with the *mpr* as the long term anchor. This method is not common in the literature. It has been adopted by scholars. Chuku, (2009) and Balogun, (2021) respectively. The error correction model has the following formula:

$$\Delta irt = \theta 1 \Delta (irt - mp rt)_{t-i} + \theta 2 \Delta mp rt_{t-i} + \theta 3 \Delta irt_{t-i} + \lambda \Delta X_{t-i} + \square ECM_{t-1} + U_t \dots \dots (5)$$

In a situation where *ir* becomes the inter-bank rate, *mpr* the monetary policy rate, *Xa* vector of other explanatory variables, the first operating difference is  $\Delta$ .  $\theta 1$  is the parameter rate at which *ir* becomes the deviations from *mpr* that closed each other. The other explanatory variable involved *X*, as in several monetary operations variables, deposit money bank credit growth (to account for the inter-bank market liquidity effect), monetary bank credit growth or to account for non-disciplinary injection and funds drainage through open market operations and flow of net exchange rate (to account for the effect of foreign currency supply and demand in the inter-bank fund market).

**Table 6: Over Parameterized Error Correction Model**

Dependent Variable: D(IR2)					
Method: Least Squares					
Sample (adjusted): 1999M06M09					
Included observations: 124 after adjustments					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
D(IRMPR.2)	0.778740	0.012031	27.51681	0.0000	
D(IRMPR(-).2)	-0.004212	0.023215	-0.144068	0.7661	
D(IRMPR(-2).2)	-0.186236	0.061565	-2.642203	0.0060	
D(IRMPR(-3).2)	-0.108717	0.054566	-1.672461	0.0664	
D(M2GRWT.2)	-0.109716	0.056515	2.785677	0.0035	
D(M2GRWT(-1).2)	-0.178124	0.135184	-1.282543	0.1877	
D(IRMPR(-2).2)	-0.060471	0.118226	-0.481338	0.0000	
D(MPR(-3).2)	0.081271	0.122613	0.580752	0.3812	
D(IR(-2).2)	-0.178124	0.135284	-1.282543	0.1877	
D(IR(-3).2)	-0.060471	0.118226	-0.481228	0.4445	
D(MPR.2)	0.013601	0.006831	1.761012	0.0561	
D(M2GRWT(-1).2)	0.001512	0.011227	0.123244	0.7751	
D(M2GRWT(-2).2)	0.014017	0.010814	1.264863	0.1718	
D(M2GRWT(-3).2)	0.0002401	0.007038	0.210737	0.6455	
D(FOREXNETFLOW.2)	1.91E-05	5.66E-05	-0.158525	0.6783	
D(FOREXNETFLOW(-1).2)	-1.51E-04	8.46E-04	-0.158525	0.7545	
D(FOREXNETFLOW(-2).2)	0.000128	8.61E-04	1.314213	0.1461	
D(FOREXNETFLOW(-3).2)	-0.000125	6.81E-04	-1.614312	0.0146	
D(BCRTGWT.2)	-0.001011	0.002243	-0.743326	0.2838	
D(BCRTGWT(-1).2)	-0.002230	-0.002213	-1.006700	0.2152	
D(BCRTGWT(-2).2)	0.000128	0.00215	2.85203	0.2348	
D(BCRTGWT(-3).2)	0.000795	6.82E-04	-1.614312	0.6146	
RESIDO1(-1)	-1.464116	0.121162	-11.81611	0.0000	
C	-0.008362	0.071026	-0.114358	0.8072	
R-Squared	0.871135	Mean dependent var		0.003728	
Adjusted R-Square	0.861123	S.D. dependent var		5.155313	
S.E of regression	0.807584	Akaike info criterion		2.717361	
Sum square resid	81.46163	Schwarz criterion		2.253122	
Log likelihood	-140.6281	F-statistic		227.6232	
Durban-Watson stat.	1.810632	Prob.(F-statistic)		0.000000	

Results of the analysis in table 6 above revealed a parameterized model with over three periods lagged variables. This estimations are in agrees with Engle and Granger, (1987). Elementary diagnostic tests of the model performed well. In the determination of coefficient, the DW and the F statistics, individual variables, with some found to have significant effect or contribution on the regression model thereby causing the estimation of more parsimonious model. This table 7 result is preferred to that of table 6 since it has more robust significant regressors, lower Schwarz (SC) criterion. The result also reports a better and well-defined error correction term, ECM-1, which is significant and carries the expected sign. The error correction term indicates a feedback of 159 percent of the previous month's disequilibrium from the long-run regressors on the regressand (inter-bank rate).

### Diagnostic Tests

Robustness of the model is confirmed through diagnostic test as shown in table 8 results. Normality of residual of the Jarque-Bera test assumption was not violated, hence a valid interference. It was revealed that the process is normal. Again, serial correlation LM of the B-



G test indicated acceptance of first order autocorrelation of the null hypothesis of the error term. There was also heteroscedasticity of the white test. Going by the Ramsey Reset test, specification error also suggested acceptance of the additive model test based on F-statistics and a P-value of 0.032330. There was a robust model policy as revealed by the analysis result. Model test of structural stability was carried out through SUSUM Square test and the adoption of cumulative sum (CUSUM). This is necessitated by the fact that the model stability determines the how variables behavior are forecasted in the model. As shown in figure 4, the plot suggests the models are correctly stable as specified in the structural stability, since CUSUM lies within 5 percent significant level. The CUSUM squares test in figure 5 equally reflects structural stability. Specifically from 2006 when monetary policy rate instrument was instituted by CBN. This indicated a moderation of the inter-bank volatility rate

Also, the result in table 6 showed a parameterized model with lagged variables in three consecutive periods estimated in line with Granger and Engle (1987). In terms of elementary diagnostics test, the model reflected good performance. The coefficient of determination of DW and F statistics on the other hand are of individual variables, any way, most were found insignificant effect in terms of contribution to the regression medal, thereby giving rise to more parsimonious model estimation as shown in the result in table 7.

**Table 7: Parsimonious Regression Model**

Dependent variable: D(IR.2)				
Method: Least Squares				
Sample (adjusted): 1999M06 2009M09				
Included Observations: 124 after adjustments				
Variable	Coefficients	Std. Error	t-Statistic	Prob.
D(IRMPR.2)	0.783163	0.012316	55.48317	0.0000
D(IRMPR(-2).2)	-0.156651	0.060363	-2.212586	0.0011
D(IRMPR(-3).2)	-0.061477	0.036175	-1.415870	0.1211
D(IR(-2).2)	0.156415	0.045443	2.851028	0.0026
D(IR(-3).2)	0.156415	0.041817	1.451444	0.1113
D(MPR.2)	0.763270	0.070545	10.73081	0.0000
DMPR(-2).2)	-0.141212	0.074411	-2.371511	0.0134
D(M2GRWT.2)	0.013271	0.003418	2.138318	0.0014
D(M2GRWT(-2).2)	0.010281	0.003418	2.188536	0.0122
D(FOREXNETFLOW(-2).2)	0.000124	5.22E-04	2.056432	0.0016
D(FOREXNETFLOW(-3).2)	-0.00114	6.011E-4	-2.046151	0.0320
RESIDO1(-1)	-1.477040	0.121246	-12.00000	0.0000
C	-0.011845	0.067640	-0.141714	0.7685
R-Squared	0.871422	Mean dependent var		0.003728
Adjusted R-Squared	0.878426	S.D. dependent var		5.115313
S. E. of Regression	0.766266	Akaike info criterion		2.561774
Sum Squared Resid	74.14105	Schwarz criterion		2.857450
Log likelihood	-141.6178	F-statistic		381.5427
Durbin-Watson Stat.	1.818124	Prob(F-statistic)		0.000000

### Summary of Results

Among the most important components of financial system are the inter-bank markets. They considered famous in the CBN focus, implementation of monetary policy are said to have significant effect on the entire economy. Inter-bank transactions fund market provides signal of what is obtainable in the open market credit. In this paper, our preoccupation is the examination of possible co-integrating relationship between market rate inter-bank fund and monetary policy rate, the anchor or pivot for the monetary policy rate, the *mpr* cannot be taken as the determinant of the inter-bank rate. In essence, other monetary variables are considered in examining the inter-bank rate behavior. This paper provides a parsimonious determination inter-bank fund rate using monthly data.

At the heart of monetary policy lies the inter-bank rate. Estimation results revealed a significance of the *mpr* in the inter-bank equation. Monetary policy rate result and co-integration of inter-bank rates in Nigeria has its economic implications. The effect is that when monetary policy is implemented by CBN there will also be a change in inter-bank rate to ensure a transmission of the monetary policy on the rest of the economy. The spread of the variables produces strong positive coefficient as an indication of *ir-mpr* rise and inter-bank intermediation cost, to show market operations aversive and market disposition risk.

Also, there is a significant growth in money supply for both lagged periods, the expected sign in the current period was not found when the two periods were lagged but the sign reflected in the current period when they were lagged. But when lagged in three periods, then the coefficient conformed to the a priori expectation, but when the variables growth were measured in the foreign exchange netflow and credit, it was found to be significant and showed expected signs. Overall, the model revealed a robustness up to 98 percent in the inter-bank rate behavior, it showed free serial correlation and low SC and AIC

### **Conclusion and Recommendations**

Conclusively, preliminary results essentially revealed that in this paper, inter-bank market is accounted for such as issues relating to reserve alteration in maintenance reserve period and funds market in the banking sector reform exercise. Intervention of the CBN through REPO, inter-bank behavior on the financial market spread and impact of lending relationships and liquidity hoarding effects in the inter-bank market on flow of funds, and the inter-bank rate among other effects. Our attention is drawn to pro-activeness of the financial policies such that strengthen the role of *mpr* particularly, and, in general, influence the movement of other explanatory variables in the model and other promising areas concern in future studies.

### **Recommendations**

For the re-echoed impact of CBN rate and bank rate not to be felt in the economy, the following recommendations federal government and the CBN management team have to apply the following recommendations;

1. It is pertinent that central bank of Nigeria should embark on joint harmonization of fiscal and monetary policy.
2. Central Bank should adopt expansionary monetary policy in order to infuse more funds in the economy.
3. Equally Central Bank should build an efficient and sustained low interest rate intervention fund to support the real sector, especially small and medium enterprises. Government should try to operate a single exchange rate unlike multiple exchange rates it operates within the period of the study.

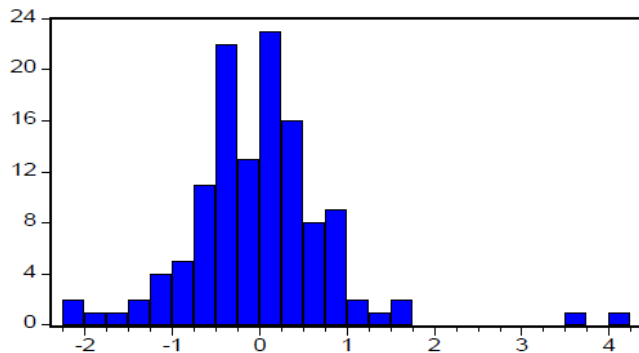
## References

- Ahumada, L. A, A. Garcia, L. Opazo & Selaive, J. (2009). Interbank rate and the liquidity market. *Central Bank of Chile, Working Papers No. 516*. April.
- Archibong, E. U., 1, Nwude. C. A. & Nwude, E. C. (2022). The impact of monetary policy on interbank market rate: evidence from the Nigerian banking industry. *Social Science Journal for Advanced Research*, 2(4), 31 – 41. DOI: 10.54741/ssjar.2.4.5
- Balogun, A. A. (2021). Does monetary policy affect economic growth in Nigeria? *Journal of Finance and Contemporary Issue*, 1(1), 92-102
- Bache I. W. & Barnhardsen, T. (2009). Relationship between key rates and money market rates.
- Bache I. W. and T. Barnhardsen (2009). Relationship between key rates and money market rates“. *Economic Commentaries*, No. 2. Norges Bank.
- Bernanke B. & Blinder, A. (1992). Federal funds rates and the channels of monetary transmission. *American Economic Review*, No. 82., „Federal Funds Rates and the Channels of Monetary Transmission“. *American Economic Review*, No. 82. *Economic Commentaries*, No. 2.
- CBN (2009). Central bank of Nigeria, Abuja. Norges bank. *Statistical Bulletin: Special Edition*.
- Chuku A. C. (2009). Measuring the effects of monetary policy innovations in Nigeria: a structural vector autoregressive (SVAR) approach. *African Journal of Accounting, Economics, Finance and Banking Research*. 5(5), 112 – 129.
- Goodfriend M. & McCallum, B. T. (2007). Banking and Interest Rates in Monetary Policy Analysis: A Quantitative Exploration. Paper Presented at the *Carnegie-Rochester Conference*. Pittsburgh, Pennsylvania.
- Hartmann P. M. Manna & Manzanares A. (2001). The Microstructure of the Euro Money Market, *European Central Bank, Working Paper*. No. 80, October.
- Ibe, R. C & Momodu, A, (2021). Monetary policy and interbank money market operations: post-SAP econometric investigation of the Nigerian evidence. *International Journal of Finance and Economics*.9(3), 45 – 61.
- Kenechukwu, C, Okoh, E. & Ubah, C, (2021). Effectiveness of quantitative monetary policy implementation in the success of full employment in Nigeria: 1986-2018. *Asian Journal of Economics Business and Accounting*, 3(1), 78 – 93. DOI:10.9734/ajeba/2021/v21i430370
- Macgorain S. (2006) Achieving Overnight Rate Stability in a Reserve Averaging Framework.“ Manuscript presented at the *Conference on Microstructure of Financial and Money Markets*, Paris, June 6–7.
- Nwaoba P. I. (2006). Cost of funds determination by banks in Nigeria. *Economic and Financial Review*, Central Bank of Nigeria. Vol.44 ( 3) 29-62.
- Nnanna, O. J. (2001). Monetary policy framework in Africa: The Nigerian experience. A Paper Presented at the 2001 South African Reserve Bank Conference.

- Omotor D. G. (2007). Monetary policy and economic growth: Theoretical and Conceptual Issues, *Economic and Financial Review*, Central Bank of Nigeria. 45 (4) 39-67.
- Sarno L. & Thornton, D., (2002). The dynamic relationship between the federal funds rate and the treasury bill rate: An Empirical Investigation. *Working Paper*, 2000-032C. Federal Reserve Bank of St. Louis.
- Osemene, O. F., Kayode, K. D, Olanpeleke, I. D. & Ibukun, D. (2019). Determinants of foreign direct investment and its causal effect on economic growth in Nigeria. *International Journal of Business Management*. 8(1), 39 – 53.
- Osisanwo, B. G. (2017). Financial development and economic growth nexus in Nigeria: further evidence from long-run estimates. *Economica*, 13(3), 16 – 33.
- Okotor, T. W, (2020). CBN Monetary Policy and Inflation Nexus in Nigeria: An empirical approach *Munich Personal RePEc Archive*. 7(3)12 – 43.
- Toriola, A. K, Adebosin, W. G., Oyewole, A. S. & Aberu, F, (2022). Monetary inflation and fiscal spending in Nigeria. *Journal of Public Administration, Finance and Law Issue*. 7(2), 56 –72. DOI.org/10.47743/jopaf1-2022-23-21
- Uduakobong S. I. & Ime, B. S. (2017). Monetary policy and economic growth in Nigeria: evidence from Nigeria. *Advances in Social Sciences Research Journal*, 4(6), 41-59. DoI:10.14738/assrj.46.2806.
- Yusuf, D. B. (2010). The Nigeria inter-bank and monetary policy rates nexus: any discernable long-run relationship? *Central Bank of Nigeria Economic and Financial Review*. 48(2).

**Appendices**

**Table 8: Results for Diagnostic Tests**



**A J-B test for normality**

Series Residuals	
Sample 1999M06	
2009M09	
Observation 124	
Mean	5.18E-16
Median	0.011450
Maximum	3.012682
Minimum	-2.073375
Std. Deviation	0.7214.20
Skewness	1.168468
Kurtosis	8.182143
Jarqu-Bera	121.0126
Probability	0.000000

**Appendix 2**

**B. Breusch-Godfrey Serial Correlation LM Test:**

F-statistic	3.445665	Probability	0.011624
Obs. R-Square	8.456635	Probability	0.007253

**C. White Heteroskedasticity Test:**

F-Statistic	13.15216	Probability	0.000000
Obs. R-Square	85.17225	Probability	0.000000

**D. Ramsey RESET Test:**

F-Statistic	2.437434	Probability	0.032330
Log Likelihood ratio	11.27332	Probability	0.012436