



Monetary policy dynamics and stock returns oscillation in Nigeria: Further evidence from cointegrated var

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Abstract

This study further investigated the nexus between monetary policy instruments and stock returns in Nigeria. This is to ascertain the controversial assertion that monetary policy in Nigeria is ineffective as result of no instrument autonomy by Central Bank Nigeria (CBN) and goal determination being heavily interrupted by the political considerations conveyed through the Ministry of Finance, hence stock market remains underdeveloped. To achieve this, the study employed granger causality mechanism and unrestricted Vector Autoregressive method among other macrofinametric tools with a historical data sourced from the apex bank of Nigeria statistical bulletin between the periods 1985 to 2019. The monetary policy instruments employed are; monetary policy rate, cash reserve ratio and liquidity ratio while all share indexes are proxied for stock returns. Empirical results found that stock returns in Nigeria does not respond to monetary policy instrument, rather monetary policy instruments respond to changes in stock returns. It was also disclosed that stock returns reinforces itself, meaning that past performances judged with stock returns predict the future performances of the stock market. The results of the estimates found that all the variables of monetary policy insignificantly impact the stock returns. The salient feature of the variance decomposition results is that the predominant sources of stock return fluctuations are due largely to own shock and little from monetary policy. It was also found that in the long run, monetary policy brings about long term positive and negative shocks in stock returns. As such, the study recommended among others that the Central Bank of Nigeria should be made autonomous to enable the apex body independently regulates and supervises the entire financial system, thereby formulates monetary policies that could among others objectives enhance the performance of the stock market.

Keywords: stock returns, monetary policy, impulse responses, Nigeria

Introduction

In the Nigerian context, the concept of monetary policy is designed to influence the volume, availability and direction of financial resources (money, credits) to achieve desired economic stability. Its targeted aim is to regulate the value, supply and cost of money in line with the expected level of economic activities (Osakwe & Chukwunulu, 2019) ^[15]. Over the years, two issues have been subjects of debate in this regard. First is the effectiveness of each of these policies (monetary and fiscal policy) in the achievement of macroeconomic stability. Meanwhile, Keynesians argued that fiscal policy is more potent than monetary policy (Hawtrey, 1956) ^[8] whereas the monetarists led by Milton Friedman (1968) ^[4] on the other hand believed the other way round. Since monetary policy occupies the key controlling position of all economic activities in the nation, it thus pedals the outflow of money supply, activities of banks as well as other financial sectors in Nigeria. A superior economic stability instrument targeted at controlling and regulating monetary flows in the economy is monetary policy. It is often directed at inflation rate and interest rate to guarantee price stability and reliance on the currency of a reporting nation, which is a deliberate attempt by the central bank of Nigeria. It can either be expansionary or contractionary policy.

Stock market, especially in small economies, plays a vital role in mobilizing economic resources within and from outside the economy to achieve greater and better economic potentials. The

market, therefore, serves as an important conduit through which funds flow from individuals and corporate bodies across the globe. The nexus between monetary policy and capital market is connected through the window of financial system. Capital market, been a component of financial system, plays a lead role in accelerating economic growth through mobilization of resources while, monetary policy been an instrument of stability helps in influencing the overall level of economic activities through its direct control on money supply, credits, and interest rate adjustment (Ananwude, Echekoba, Okaro, & Akuesodo, 2017) ^[1]. Given this interrelationship, it is therefore clear that the overall development of the economy is a function of how well the capital market is developed alongside the monetary policy effectiveness. Performances in the capital market haphazardly reflect the position of an economy such that, fall in the prices of stock could likely bring about economic depression while rising stock price shows possible economic growth. One of the benefits enjoyed by countries with a developed capital market is massive influx of foreign investors and more inflows of portfolio investment which will in turn lead to transfer of human and technological know-how required for accelerating economic development.

The theoretical foundation for the link between monetary policy instruments and stock returns is rooted in the IS-LM hypothesis. The framework explained that stock market operation and

activities cannot be completely independent. This is because change in monetary policy instruments like monetary policy rate, cash reserve ratio and liquidity ratio will reflect on market interest rates instantaneously and forces investors to revalue their equity holdings (Geraldo, 2016)^[6]. Further, money supply level that does not serve as an inducement to inflationary predisposition will eliminate frequent fluctuation in values of shares which unilaterally encourages long term investment in the capital market. From the economic and financial empirical perspective, quite a number of studies have been conducted on the nexus between monetary policy and capital market performance across the globe. Most authors gave in their contribution by concluding that significant relationship exists between monetary policy and capital market performance in Nigeria. Prominent among these authors are Ogbonna & Ejem (2020)^[13], Osakwe & Chukwunulu (2019)^[15], Josiah & Akpoveta (2019)^[9] Monogbe & Okah (2018)^[12], Lawal, Somoe, Babajide & Nwanji (2018)^[10] and Ananwude, Echekoba, Okaro, & Akuesodo, (2017)^[1].

Given all of these key functions of monetary policy, it has been reported that Monetary policy in Nigeria remain ineffective due to lack of instrument autonomy by Central Bank Nigeria (CBN) and goal determination being heavily interrupted by the political considerations conveyed through the Ministry of Finance, hence stock market remains underdeveloped (Osakwe & Chukwunulu, 2019)^[15]. However, becomes pertinent to evaluate the assertion, hence examine the extent to which these monetary policy instrument influence stock market performance in Nigeria.

The remainder of this study has the following structure: The next section reviews the extant literature on monetary policy-stock returns relationship; theoretically and empirically. Section 3 describes the data, models and methods; section 4 contains empirical analysis and discussion while the study is concluded in section 5.

Literature Review

Theoretical framework

In this study, the theoretical foundation for the link between monetary policy activities and stock returns is rooted in the IS-LM hypothesis. The framework explained that stock market operation and activities cannot be completely independent. This is because change in monetary policy instrument like monetary policy rate, cash reserve ratio and liquidity ratio will reflect on market interest rates instantaneously and forces investors to revalue their equity holdings (Geraldo, 2016)^[6].

This study is also anchored on Efficient Market Hypotheses; which generally assumes that prices of securities in the market fully reflect all available information either in the weak, semi strong and strong form. Fama (1965)^[2] asserts that security prices occur randomly independent of one another. Earning abnormal profit becomes a mirage since all participants in the market are price taker. In the efficient capital market, all are equally exposed to and conditioned by market forces, which invariably have the overwhelming capacity to transmit market trends as well as spillover effects between functional financial markets inclusive of any resulting signaling and predictive effects. Clarke *et al.* (2001) in their study reported that abnormal profit in an efficient market cannot be consistent but rather occasional. This theory which has gained prominent has the capacity to explain the relationship between security market returns and information asymmetric.

Empirical review

The relationship between monetary policy and stock market returns has received plethora of attentions from finance and economic scholars. Such empirical literature reviews have been useful for policy making and has immensely added to the body of knowledge on the subject matter. For instance, Ogbonna and Ejem (2020)^[13] investigated the extent to which monetary policy instrument influence capital market returns using an historical data between the periods 1989 to 2018. The study utilized the autoregressive distributed lag where monetary policy instruments utilized include monetary policy rate, cash reserve ratio, loan to deposit ratio and savings to deposit ratio while all share index was used as measure for stock returns. Findings showed that of all the measure of monetary policies, only monetary policy rate seem to be significant in predicting stock returns in Nigeria in the long run. As such, the study recommended that prompt disclosure of share index will further help in boosting investors' strength and transform operations in the capital market.

Osakwe and Chukwunulu (2019)^[15] examined the relationship between monetary policy and stock returns performance in Nigeria. The study covers the period 1985 to 2015 using an historical data sourced from the Nigerian apex bank. All share index is used as a measure of stock market returns while interest rate, exchange rate and money supply proxied for monetary policy. The study employed regression methods and result provided a justification that money supply and exchange rate jointly influence stock market returns in Nigeria. On this basis, the authors advocated for prompt and adequate availability of information to stock participant as this will help boost trades confidence.

Josiah and Akpoveta (2019)^[9] investigated the nexus between stock return and macroeconomic variables in Nigeria. The intension of the study was to identify which of the macroeconomic variables predicts or reacts to stock market returns in Nigeria. The macroeconomic variables considered were capital surge, inflation, exchange, interest rate and money supply while share index was a measure of stock returns. The study employed granger causality test alongside descriptive statistics. Findings revealed that movement in the macroeconomic indices especially; interest rate, exchange rate and money supply predict returns in the capital market. Hence, it was recommended that financial openness in the financial market is advised as this will help to bring in more investors in the movement of capital project to the economy.

Lawal, Somoe, Babajide and Nwanji (2018)^[10] tried to know if there is existence of long run relationship between stabilization policy and stock performance in Nigeria and to know whether stock returns react more to the monetary policy and it transmitting effect using the EGARCH Methodology. The study, in investigating the nexus between stabilization policy and stock returns using historical data sourced from the apex bank bulletin between the periods 1980 to 2017. Stabilization policy instrument

was decomposed into; government spending, cash reserve ratio, monetary policy rate, liquidity ratio, money supply and money supply. The study concluded that the stabilization policy is a key to stock market performance.

Ananwude, Echekeba, Okaro, and Akuesodo, (2017)^[1] accessed the extent to which capital market performance reacts to monetary policy influx in Nigeria. An historical data that spanned for thirty years where utilized using the ordinary least square. The study reported that monetary policy mechanism does not seem to contribute to performance in the capital market. However, reserve ratio demonstrates a significant nexus and positive contribution to performance of capital market. Hence, the study recommended that the double digit monetary policy rate is a threat to investment in the capital market; thus should be reviewed downward to encourage more investors in the market.

Onyeke (2016)^[14] examined the influence of monetary policy on stock returns using the historical data from the period 2003 to 2014. The study proxied monetary policy instrument using treasury bills, exchange rate, consumer price index, inter-bank rate and open buy-back while all share index was a measure of stock returns. The study employed the structural analysis of VAR alongside the impulse response and decomposition. Finding reveals that none of the proxies of monetary policy was able to predict stock returns in the Nigerian capital market. By implication, it was reported that the government monetary policy has not helped the capital market in a significant manner as no effect is felt. Hence, it was concluded that the misalignment between the stabilization policies could have been the reasons behind insignificant relationship witnessed in the stock market.

Galebotswe and Tlhalefang (2017)^[5] using the Botswana economy as a study examined monetary policy and its influence on stock returns. Historical data was generated from the Botswana stock market while the structural analysis of vector auto regression and impulse response was utilized. The study found that monetary policy instrument does not exert significant influence on stock returns in Botswana. This implies that the government policy is not proactive and potent enough to influence activities of the stock market in Botswana. The study thus concluded that the non-alignment between the government stabilization policies could be the reason behind the non-significant influence of monetary policy on stock returns in Botswana.

Methodology

In order to actualize the objective of this study, expo factor causal comparative research design is employed using historical data

from the apex bank of Nigeria statistical bulletin between the periods 1986 to 2019 for monetary policy instruments proxied by cash reserve ratio, liquidity ratio, and monetary policy rate while share index is used as a proxy for stock return. All variables will be converted and measure in ratio to ensure uniformity in scaling. This study adopts among others, descriptive statistics, Error Correction Mechanism (ECM) and Vector Autoregressive (VAR) model. This is because the study is both analytical and empirical in nature and utilizes secondary data. The choice of this design is to enable uniformity of measurement.

Model estimation

Following the classical linear regression model assumption, the researchers formulate the model in the functional form first

$$ASI = f(MPR, CRR, LQR) \quad (1)$$

Incorporating constant and error term the above model is transform into an econometrics form thus

$$ASI = a_0 + a_1MPR + a_2CRR + a_3LQR + Z_t \quad (2)$$

Since this study set out to investigate the causal relationship between monetary policy and stock returns in Nigeria, the causality model is thus introduced thus

$$ASI_t = \alpha_{01} + \alpha_{11}ASI_{t-1} + \alpha_{21}MPR_{t-1} + \alpha_{31}CRR_{t-1} + \alpha_{41}LQR_{t-1} + U_{t1} \quad (3)$$

$$MPR_t = \beta_{02} + \beta_{12}ASI_{t-1} + \beta_{22}MPR_{t-1} + \beta_{32}CRR_{t-1} + \beta_{42}LQR_{t-1} + U_{t2} \quad (4)$$

$$CRR_t = \gamma_{03} + \gamma_{13}ASI_{t-1} + \gamma_{23}MPR_{t-1} + \gamma_{33}CRR_{t-1} + \gamma_{43}LQR_{t-1} + U_{t3} \quad (5)$$

$$LQR_t = z_{04} + z_{14}ASI_{t-1} + z_{24}MPR_{t-1} + z_{34}CRR_{t-1} + z_{44}LQR_{t-1} + U_{t4} \quad (6)$$

On a priori, a direct level of response is expected between the explained and explanatory variables accordingly. Theoretically, the following expectation is hypothesis

$$b_1, b_2 > 0 \quad b_3 > 0$$

Where, ASI = All share index, MPR = Monetary policy rate, CRR = Cash reserve ratio, LQR = Liquidity ratio

Presentation of Result and Discussion

Trend analysis of data

The description of the model specified commences with trend analysis of data; a time series plot of the data shown in figure I below. The figures below showed that all the variables (ASI, MPR, CRR and LQR) recorded period of peaks and trough as well exhibited undulating movement, except ASI that started with an upward movement, though not smooth, suggesting non-stationarity of the variables as expected.

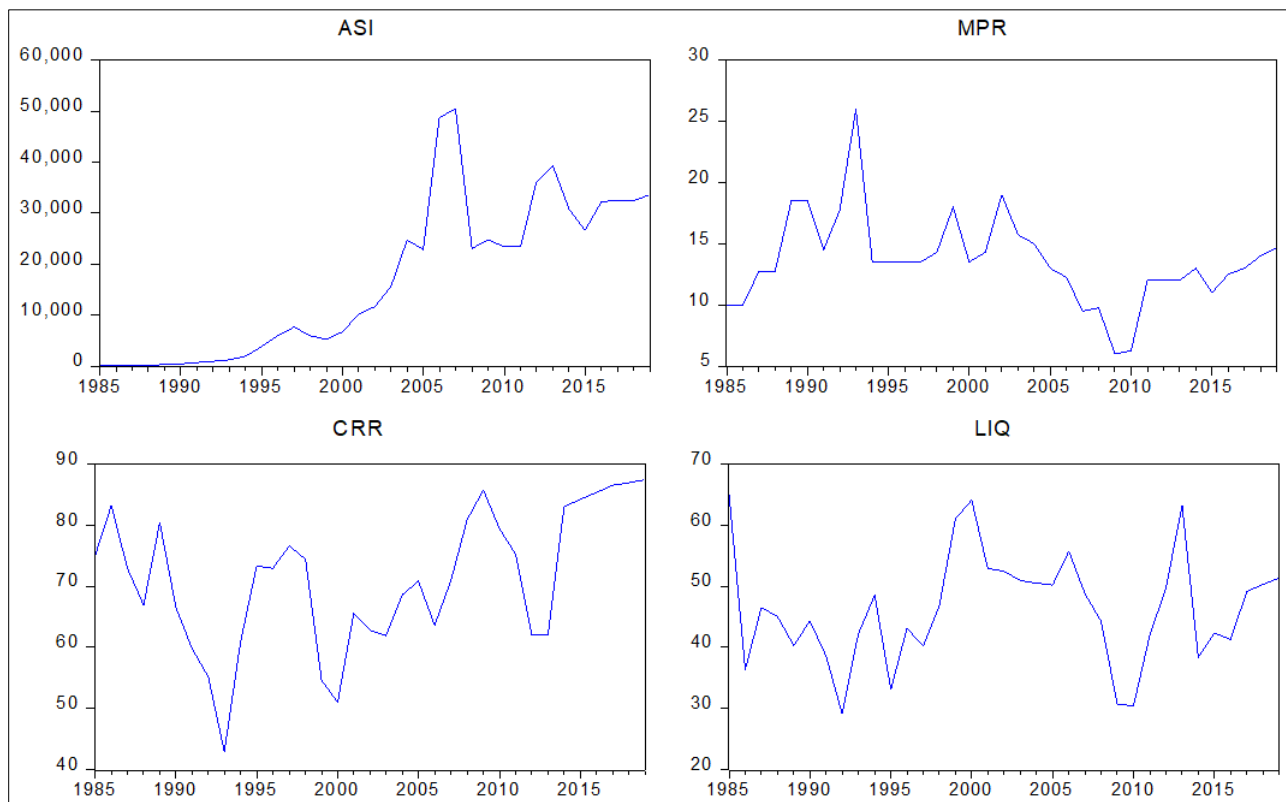


Fig 1: Trend Analysis of ASI, MPR, CRR and LQR

Description of variables

The figures in Table 1 below depicts summary of statistics that show the distributional characteristics of all the data. The variables ASI, MPR, CRR and LQR recorded standard deviation as follows; 15393.56, 3.704808, 11.33673 and 9.106571 respectively, suggesting a moderate variation from the mean. ASI, CRR and LQR came with Kurtosis lower than 3 indicating platykurtic distributions while MPR has Kurtosis greater than 3, suggesting a leptokurtic distribution. ASI, MPR, and LQR have skewness coefficients of 0.515556, 0.820335 and 0.180776 respectively, suggesting positive skewed distribution whereas CRR has a negative skewness coefficient of -0.392053. ASI, CRR and LQR recorded probability values of Jarque-Bera as follows; 0.248883, 0.530802 and 0.872343 respectively, which are insignificant at 5% suggesting normal distribution, while, MPR recorded 0.002134 probability value of Jarque-Bera; significant at 5%, a sufficient evidence of abnormal distribution.

Table 1: Descriptive Statistics for ASI, MPR, CRR and LQR

	ASI	MPR	CRR	LIQ
Mean	16691.89	13.58771	71.11714	46.24270
Median	11631.87	13.50000	72.90000	46.50000
Maximum	50424.70	26.00000	87.40000	65.00000
Minimum	117.2833	6.000000	42.90000	29.10000
Std. Dev.	15393.56	3.704808	11.33673	9.106571
Skewness	0.515556	0.820335	-0.392053	0.180776
Kurtosis	2.081221	5.396280	2.496219	2.762134
Jarque-Bera	2.781546	12.29952	1.266732	0.273146
Probability	0.248883	0.002134	0.530802	0.872343
Sum	584216.3	475.5700	2489.100	1618.494
Sum Sq. Dev.	8.06E+09	466.6704	4369.730	2819.608
Observations	35	35	35	35

Authors' computation output using E-view 10.

Global utility examination and determination

In analysis of this nature, precisely the macroeconomic analysis, determination of global utility or usefulness of the specified models gives a researcher (s) confidence to making inference that can be referred for policy making. To achieve this, the researchers employed correlation matrix and Ordinary Least Square (OLS) as shown below;

Multicollinearity test

Correlation matrix of the variables revealed Table 2 below showed that correlations between ASI, MPR, CRR and LQR range from -0.409827 to 0.329439, indication that the variables are not linearly correlated. Therefore, the researchers have reasonable evidence to adduce absence of multicollinearity in the model.

Table 2: Correlation Matrix

	ASI	MPR	CRR	LIQ
ASI	1.000000	-0.409827	0.329439	0.175699
MPR	-0.409827	1.000000	-0.571387	0.120545
CRR	0.329439	-0.571387	1.000000	-0.320749
LQR	0.175699	0.120545	-0.320749	1.000000

Authors' computation output using E-view 10.

Ordinary least square (OLS) method

Ordinary Least Square (OLS) estimation showed in Table 3 revealed the relationship between stock returns and monetary policy as engaged in this study. As shown in the table 3 below, all other indicators are normal as expected, except Durbin-Watson statistics that has 0.495176, indicating presence of autocorrelation. This made the model to be unreliable and cannot be employed for further analysis and policy formulation.

Table 3: Ordinary Least Square (OLS) method

Dependent Variable: ASI				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	-1253.820	786.0042	-1.595182	0.1208
CRR	340.6126	269.2148	1.265207	0.2152
LQR	494.4934	277.0667	1.784745	0.0841
C	-13361.66	32492.34	-0.411225	0.6837
R-squared	0.257707	Mean dependent var		16691.89
Adjusted R-squared	0.185872	S.D. dependent var		15393.56
S.E. of regression	13889.46	Akaike info criterion		22.02286
Sum squared resid	5.98E+09	Schwarz criterion		22.20061
Log likelihood	-381.4000	Hannan-Quinn criter.		22.08422
F-statistic	3.587489	Durbin-Watson stat		0.495176
Prob(F-statistic)	0.024624			

Authors' computation output using E-view 10.

Sequel to the above findings, the researchers proceeded to testing the stationarity of the variables; a veritable procedure in macroeconomic time series analysis to ascertain a suitable technique for estimating the model. Here, the researchers employed Augmented Dickey Fuller (ADF) unit root test as depicted below in table 4.

Stationarity/unit root test

Stationarity is statistical proven procedure in macroeconomic time series to ascertain a suitable method for data analysis. Table 4 below depicts the stationary test for both level and first difference data. This is in line with the proposition of Gujarati &

Porter (2009) that time series data are prone to stationarity problems and in order to avoid having non-sense result, subjecting time series data to stationarity test is appropriate. Hence, augmented unit root test is employed in this study.

Result presented in table 4 below provided evidences of stationarity in the order of I (1) integration.

This is justified on the premises that the ADF statistic values are greater than their corresponding critical values at all level.

Hence, stationarity is ascertained. These therefore suggest that the data set is reliable for further empirical analysis. Therefore, the researchers proceed to co-integration test accordingly.

Table 4: Presentation of Unit Root Test

Variable	ADF Test Statistics	Critical Value (5%)	Order of Integration	Test Equation specification
D(ASI)	-4.622355	-3.670170	I(1)	Intercept
		-2.963972		
		-2.621007		
D(MPR)	-7.339508	-3.646342	I(1)	Intercept
		-2.954021		
		-2.615817		
D(CRR)	-3.834144	-3.679322	I(1)	Intercept
		-2.967767		
		-2.622989		
D(LQR)	-7.954818	-3.646342	I(1)	Intercept
		-2.954021		
		-2.615817		

Source: Extraction from E-views 10

Having confirmed the existence of stationary among the data series, the researchers proceeded to test if there is existence of long run association among the series. This will be done using the johanson co-integration test. Result presented in table 5 below provided us with an evidence to assert absence of co-integration

among the studied variables. This is identified from the trace statistic coefficient which is less than the critical value alongside the insignificant P-value. To this end, the researchers conclude that long run relationship does not exist among the studied variables.

Table 5: Presentation of Co-Integration Test Result

Series: ASI MPR CRR LIQ				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.536071	62.27256	69.81889	0.1723
At most 1	0.420500	36.92776	47.85613	0.3509
At most 2	0.319536	18.92329	29.79707	0.4985
At most 3	0.170574	6.218930	15.49471	0.6696

Trace test indicates no cointegration at the 0.05 level

Source: Extraction from E-views

Due to the absence of long run relationship among the series, the researchers proceeded to test the short run correlation using the Error Correction Mechanism (ECM) model and thereafter, employed vector auto regressive estimate (VAR).

Contemporaneous relationship between ASI, MPR, CRR and LQR

From the unsatisfactory global utility with OLS, the researchers moved ahead to determine the relationship between stock returns and monetary policy variables with Error Correction Mechanism (ECM) and vector auto regressive estimate (VAR).

Error correction mechanism (ECM)

The cointegration test result provides for short run fluctuations, which suggested no long run relationship existing between the dependent and independent variables. Therefore, the researchers apply error correction model to examine the interplay of the long run and short term fluctuations in the model using the general specific approach.

From Table 6 below, it showed that ASI reinforces itself, meaning that past performances judged with ASI predicts the future performances of ASI. The results of the estimates found that all the variables of monetary policy (MPR, CRR and LQR) insignificantly impact the stock returns proxied by ASI. It was also found that the independent variables (MPR, CRR and LQR) jointly explained 21.5% of total variation in the dependent variable (ASI). That shows that monetary policy variables are not enough to explain the variations in the stock returns (ASI). It is also good to know that presence of autocorrelation issue should not be bordered in this model with Durbin-Watson Statistic of 1.934870. ECM is correctly signed and significant at 5% significant level.

Table 6 Parsimonious ECM

Dependent Variable: D(LNASI)				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNASI(-1))	1.468492	0.438681	3.347516	0.0027
LNMPR(-1)	-0.035444	0.035369	-1.002131	0.3263
D(LNMPR(-2))	0.153468	0.246603	0.622327	0.5396
D(LNCRR(-1))	0.638264	0.438664	1.455017	0.1586
D(LNCRR(-2))	0.838763	0.471479	1.779004	0.0879
D(LNLQR(-1))	0.376362	0.332061	1.133413	0.2682
D(LNLQR(-2))	0.165082	0.311209	0.530453	0.6007
ECM(-1)	-1.539311	0.510875	-3.013088	0.0060
R-squared	0.392430	Mean dependent var		0.164010
Adjusted R-squared	0.215222	S.D. dependent var		0.305806
S.E. of regression	0.270906	Akaike info criterion		0.438229
Sum squared resid	1.761363	Schwarz criterion		0.804663
Log likelihood	0.988337	Hannan-Quinn criter.		0.559691
Durbin-Watson stat	1.934870			

Direction of causality between ASI, MPR, CRR and LQR

Result on table 7 showed the existence of uni-directional relationship between ASI and MPR. This thus suggested that stock returns in Nigeria does not respond to monetary policy instrument, rather monetary policy instrument respond to change in stock returns.

This implies that movement in the stock return predict monetary policy instrument in Nigeria. No causal relationship was established between ASI, CRR and LQR at 5% significance level.

Table 7: Presentation of Granger Causality Test.

Pairwise Granger Causality Tests			
Null Hypothesis:	Obs	F-Statistic	Prob.
MPR does not Granger Cause ASI	31	0.15072	0.9607
ASI does not Granger Cause MPR		3.23891	0.0312
CRR does not Granger Cause ASI	31	0.28756	0.8829
ASI does not Granger Cause CRR		2.28230	0.0928
LQR does not Granger Cause ASI	31	0.56386	0.6914
ASI does not Granger Cause LQR		0.54966	0.7012

Source: Extraction from E-views

Since this topic is dynamic in nature and the variables are stationary at same level, the researchers decided to make complete entrance into vector autoregressive (VAR) estimation.

VAR estimation

The researchers then proceeded to validating the findings by employing Vector Autoregressive (VAR) Model. Starting from VAR lag length selection, this is to enable the researchers to make use of appropriate lag in the VAR estimations.

The VAR lag order selection criteria on table 8 below showed that lag length of 1 is selected at 5% level based on sequential modified LR test statistic, Final prediction error (FPE), Akaike information criterion (AIC), and Hannan-Quinn information criterion (HQ).

Table 8: VAR Lag Order Selection

VAR Lag Order Selection Criteria						
Endogenous variables: ASI MPR CRR LQR						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-680.5192	NA	1.22e+13	41.48601	41.66740	41.54704
1	-634.9720	77.29214*	2.06e+12*	39.69527*	40.60225*	40.00044*
2	-626.5141	12.30234	3.41e+12	40.15237	41.78493	40.70168

Source: Authors' computation with E-view 10

Residual diagnostic test

In furtherance of the global utility examination of the specified model, it is exposed to four more diagnostic tests; VAR Residual Serial Correlation LM, VAR Residual Heteroscedasticity, Inverse roots of Autoregressive Characteristic Polynomial and Normality.

In Table 9 below, VAR Residual Serial Correlation LM Tests P-value of 0.6552; which an indication of rejection of the null hypothesis, hence evidence no serial correlation.

Table 9: VAR Residual Serial Correlation LM Tests

VAR Residual Serial Correlation LM Tests						
Lag	LRE* stat	df	Prob.	Rao F-stat	Df	Prob.
1	13.30792	16	0.6501	0.822459	(16, 52.6)	0.6552

Authors' computation output using E-view 10

Table 10 below shows that Chi-sq is 159.9340 with P-value of 0.4866. This is sufficient evidence suggesting of homoscedasticity the model.

Table 10: VAR Residual Heteroscedasticity Test

VAR Residual Heteroskedasticity Tests (Levels and Squares)		
Joint test:		
Chi-sq	Df	Prob.
159.9340	160	0.4866

Authors' computation output using E-view 10

Stability check

To examine the stability of the estimated VAR (1) model, the researchers plot the inverted roots in relation to unit circle. It is statistically known that the estimated VAR model is stable if all the inverted points are inside the unit circle.

Then as shown in figure 2 below; the inverse roots of the characteristics AR polynomial, indicating that all roots fall or lie within the unit imaginary circle (modulus), showing that VAR (1) model is stable.

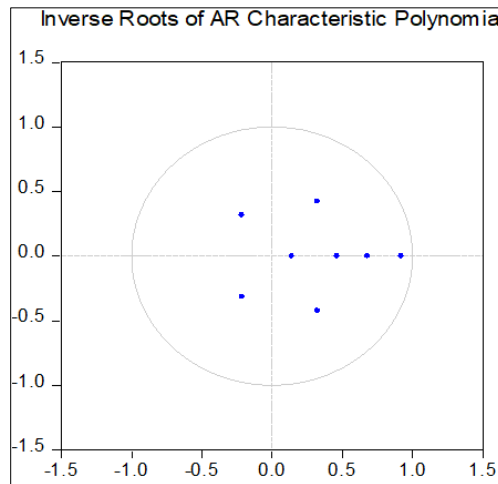


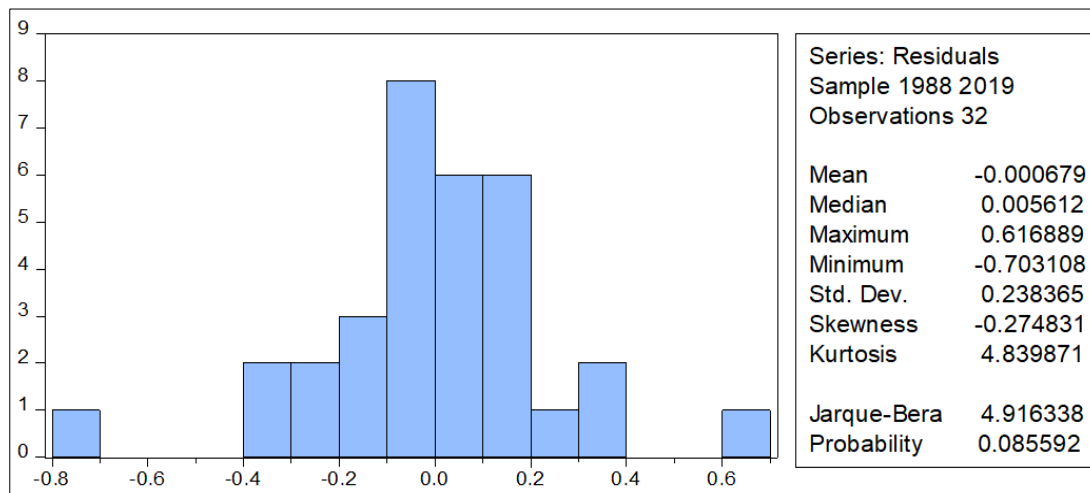
Fig 2: Graphical representation of inverse roots of AR characteristic polynomial

Normal distribution test

From Table 11 below, it is seen that Jarque-Bera Statistic is 4.916338 with P- value of 0.085592, confirming normal

distribution. It can also be observed that the difference between the minimum and maximum value is high, suggesting presence of financial risk in the Nigerian stock exchange.

Table 11: Normal Distribution Test



Authors' computation output using E-view 10

The researchers then proceed to checking the responses of stock returns to the shocks from monetary policy variables.

Impulse response of ASI, to its own shock and shocks from MPR, CRR and LQR

As seen from the previous analysis, all the monetary policy variables (MPR, CRR and LQR) contemporaneously and intertemporally do not jointly cause or relate stock returns, hence need to examine the shocks or innovations of ASI from itself and from MPR, CRR and LQR. Again, examine the dynamic impacts or shocks of monetary policy variations on stock returns. This is achieved with impulse responses and variance decomposition as

depicted in figures below From Figure 3 below, in the all the periods, shocks in the respective measures of monetary policy instruments significantly cause shock in stock market returns. From period 2 a similar trends occur for 2 variables (CRR and LQR) as measures of monetary policy instruments negatively transmit shocks to all share index, whereas MPR positively transmit positive shock from period 1 to the 10th period. This implies that in the long run, monetary policy brings about long term positive and negative shocks in stock returns. Again, it was revealed that ASI responded positively to own shock from first period to the last period, confirming that ASI is autoregressive.

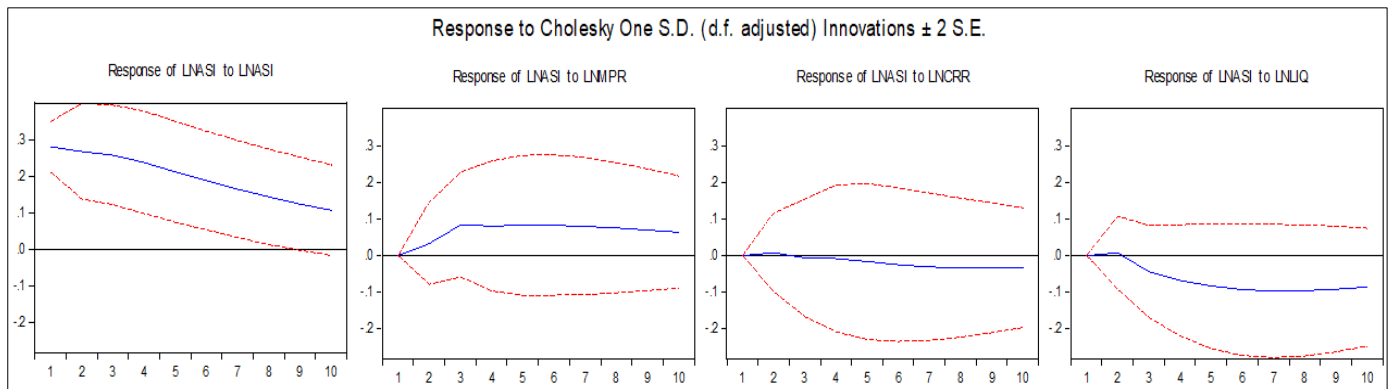


Fig 3: Graph depicting responses of ASI to shocks

The researchers proceed to Variance Decomposition as shown in Table 13 below;

ASI own shocks and shocks from MPR, CRR and LQR-variance decomposition

From figure 4 below, own shock caused 100 percent variations in the first period and diminished slightly to 90.67%. That suggests

that own shock exerted huge influence in the cause of variation on stocks returns, still validating that ASI reinforces itself. MPR started from 0% in the first period and revolved around the threshold with an insignificant rise to 0.21% in the tenth period. The same trend is seen for CRR and LQR, though with slight difference with 6.78% in the tenth period for CRR and 2.3% for LQR in the tenth period as well.

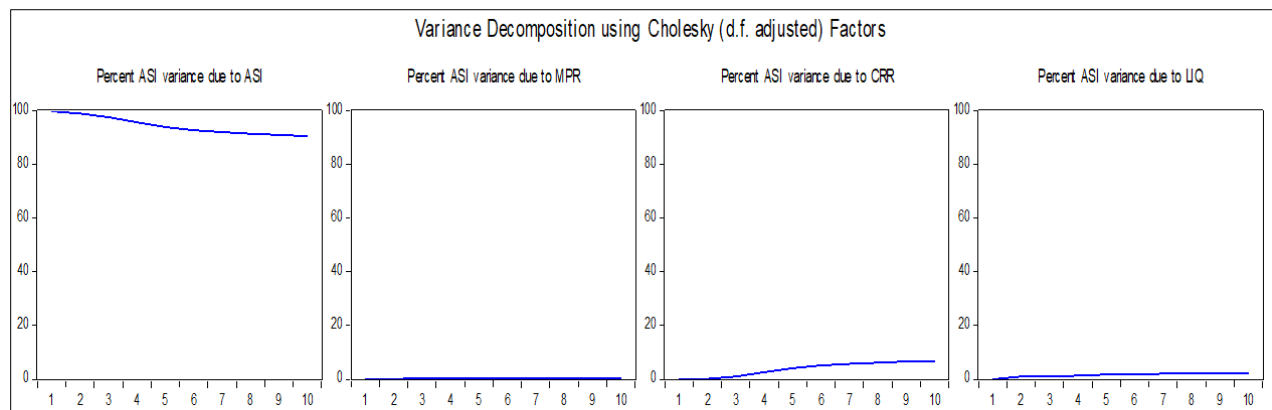


Fig 4: Graph depicting variance decomposition

Finally, the researchers proceeded to know if deviations in the current period can be corrected in the next period and also the speed of adjustment using Vector Error Correction Estimates as shown in Table 14 below;

Error correction and long run causality test

Having established that the variables are cointegrated, there is likelihood of adjustment from short run to long run equilibrium. That is to say that errors encountered in the short run can be corrected or adjusted in the long run. To achieve the consistency, the researchers estimated the model with Vector Error Correction Estimates as shown below;

The analysis in table 12 below showed that error correction equation (CointEq1) has coefficient of -0.063377 and t-statistic of -3.20450. That means error correction parameter is negative and significant, satisfying the apriori expectation (condition), hence, significant. This shows that adjustments and correction of errors and distortions that existed in the short run could be corrected in the long run. Therefore the variables are confirmed to be cointegrated, whereas the speed of adjustment is seen to be at the rate of 6.33% per annum. That means that 6.33% of the

error that happened in the short run could be corrected in the long run.

Table 12: Vector Error Correction Estimates

Error Correction:	D(LNASI)	D(LNMPR)	D(LNCRR)	D(LNLQR)
CointEq1	-0.063377 (0.01978)	0.011815 (0.01762)	-0.006748 (0.00965)	0.022653 (0.01148)
	[-3.20450]	[0.67042]	[-0.69910]	[1.97291]

Source: Authors' computation with E-view 10

Short run causality test

To examine the short run causality implications of the variables, the researchers adopted VEC Granger Causality/Block Exogeneity Wald Test as depicted below.

Table 13 below reveals that Chi-square statistic revealed insignificant p-values for all the, monetary policy variables (MPR, CRR and LQR), indicating that they are not significant, suggesting MPR, CRR and LQR do not cause ASI in the short run. All monetary policy instruments (MPR, CRR and LQR) jointly do not cause stock returns (ASI).

Table 13: VEC Granger Causality/Block Exogeneity Wald Test

VAR Granger Causality/Block Exogeneity Wald Tests			
Dependent variable: LNASI			
Excluded	Chi-sq	Df	Prob.
LNMPR	1.262849	2	0.5318
LNCRR	0.469020	2	0.7910
LNLQR	1.711316	2	0.4250
All	4.807129	6	0.5688

Discussion of Findings Conclusion and Recommendation.

Findings from this study revealed that long run relationship does not seem to exist among the employed variables. Further, it was found that stock returns in Nigeria does not respond to monetary policy instrument, rather monetary policy instrument respond to change in stock returns. This implies that movement in the stock return predict monetary policy instrument in Nigeria. the empirical results also disclosed that, that stock returns reinforces itself, meaning that past performances judged with stock returns predict the future performances in the stock market. The results of the estimates found that all the variables of monetary policy insignificantly impact the stock returns, contradicting the result of Ogbonna & Ejem (2020) ^[13] whose study showed that monetary policy rate is a significant predictor of stock returns in the Nigerian capital market, also Ananwude, Echekeba, Okaro, & Akuesodo, (2017) ^[1] that double digit monetary policy rate is a threat to investment in the capital market. This finding affirms the report that Monetary policy in Nigeria remain ineffective due to lack of instrument autonomy by Central Bank Nigeria (CBN) and goal determination being heavily interrupted by the political considerations conveyed through the Ministry of Finance, hence stock market remains underdeveloped (Osakwe & Chukwunulu, 2019) ^[15]. These results corroborate the findings of Onyeke (2016) ^[14], that none of the proxies of monetary policy was able to predict stock returns in the Nigerian capital market. By implication, it was reported that the government monetary policy has not helped the capital market in a significant manner as no effect is felt. It also agrees with the result of Galebotswe and Tlhalefang (2017) ^[5] that monetary policy instrument does not exert significant influence on stock returns in Botswana. This implies that the government policy is not proactive and potent enough to influence activities of the stock market in Botswana. Furthermore, the salient feature of the variance decomposition results is that the predominant sources of stock return fluctuations are due largely to own shock and monetary policy. It was also found that in the long run, monetary policy brings about long term positive and negative shocks in stock returns. That is, inbuilt shocks and shocks transmitting from monetary policy largely cause volatility in stock returns in Nigeria.

In the light of these findings, the researchers are of the opinion that the following should be done; that the Central Bank of Nigeria should be made autonomous to enable the apex body independently regulates and supervises the entire financial system, thereby formulates monetary policies that could among others objectives enhance the performance of the stock market. Again, since the result suggested that change in stock returns affect monetary policy instrument, it is recommended that Nigerian capital market should be adequately regulated to accommodate more foreign investor, participant and global competitors as this will further help develop the market and thus transmitted to economic stability in the long run. Furthermore,

having established the existence of inverse relationship between monetary policy rate and stock returns, it is suggested that double digit monetary policy rate should be reviewed downward and make it single as this will help the government in actualizing their economic stabilization policy.

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