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SENSITIVITY OF STOCK MARKET TO MONETARY POLICY COMMUNICATIONS: 2010-2019

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Abstract

In recent times, Central Banks across the globe are attaching great importance to monetary policy making by committees. The decisions of the MPC are expected to influence stock prices and other financial variables through the policy instruments and communication channel. This study therefore, investigated the sensitivity of stock prices to MPC communications from 1st January, 2010 to 24th March, 2019. Series of test were conducted and the EGARCH was chosen as the appropriate technique in which dummy variable was used to capture the meetings days in the variance equation. Data of monetary policy were sourced from CBN website and that of daily stock price were sourced from asset management website. The result shows that both the MPC meetings and history of the stock markets (previous prices) have statistically significant and economically relevant reacts on stock prices; therefore, the study recommends that the meeting should be sustained.

Keywords: MPC, EGARCH, Stock Market, ASI

Introduction

The monetary policy is one of the precautionary measures conducted by Monetary Policy Committee (MPC) to reduce volatility in asset prices in order to bring stability in an economy. Although, Monetary Policy Committee (MPC) is not aiming at stabilizing the stock prices, this is because the volatility in asset prices generates profits. But the MPC is only checking whether the stock prices are overvalued or otherwise, in order to intervene to avoid asset crises which lead to financial and/or economic crisis (Shawky, 2012). In Nigeria, the credibility of monetary policy making have being raising by the formal constitution of Monetary Policy Committee (MPC) in 2010 as the sole authority for taking monetary policy decision that can potentially increase the reaction of the stock prices to monetary policy decisions. The committee meets in every two months unless if there is an emergency issue, the committee review both international and domestic economic environment and make decision that impact on the economy in the future. The committee sends signals to general public at the end of the meeting with the aim of coordinating market agents' expectations.

Due to banking consolidation as well as capital account liberalization, foreign institutional investors who are more sophisticated and more sensitive to opportunities for profits have been investing in the NSE. These investors, therefore, search for and obtain current information on a number of macroeconomic determinants of stocks they invest in, including the policy environment. Given the effect of monetary policy on the profitability of companies and, hence their share price movement, the influx of these more sophisticated investors is likely to make stock price more sensitive to monetary policy decisions. Raising the credibility of monetary policy making in Nigeria indeed, by the formal constitution of MPC in 2010 as the sole authority for taking monetary policy decision can potentially increase the sensitivity of the stock prices to monetary policy decisions.

Efficient Market Hypothesis (EMH) gives us the reason why stock market investors would seek for an appropriately respond to information from the MPC meetings. This is because the theory suggests that market participant would always incorporate all relevant information in, including that from MPC before reacting to the market. Furthermore, the MPC communicate its policy decisions to the

general public by providing information about its views on domestic and international economic outlook, hence lead to move in the future Monetary Policy Rate (MPR) and policy rule. By doing this, it might reduce noise in the financial market and coordinate market agents' expectations about the economic environment and the path of monetary policy, thereby move stock prices (and financial markets indicators) in the desired direction. Finally, the work of Sanusi (2011 a and b) established that CBN Communication is potentially viable tool of monetary policy design and implementation in Nigeria. Hence, it may be sensitive by investors in the financial markets including that of stock. Therefore, this paper is aimed to assess the investors' respond to the MPC communications. The variables of interest are the stock prices proxy by All Share Index (ASI), Monetary Policy Rate (MPR), Cash Reserve Requirement (CRR) both public and private sector.

The rest of this paper is organized as follows: section two contains the empirical literature review, section three discuss the theoretical framework, while section four contains the methodology. In section five, empirical results and discussions, finally section six contains conclusion and recommendations were presented.

Literature Review

In order to investigate the effects of general elections on stock returns and volatility around the election periods at the Nigerian Stock Exchange (NSE) market, Aliyu (2019) employed event study methodology that and the result revealed that bad news produces more volatility on stock returns than good news. Jeribi, Fakhfekh, and Jarboui (2015) examined the impact of political uncertainty from the Tunisian revolution on volatility of major sectorial stock indices in the Tunisian Stock Exchange (TSE), they employed Fractionally Integrated Exponential Generalized Autoregressive Conditional Heteroscedasticity model (FIEGARCH), and the result reveal a low leverage effect on all indices for the reviewed period. Ahmed (2017) investigates the impact of political events on Egyptian equity market behaviour in terms of returns and volatility using an event study approach and a univariate VAR-EGARCH model. He found out that political event such a military coup influence the equity market. These studies looked at political environment while this study focuses on policy environment. This study differed from the works of Jeribi, Fakhfekh, and Jarboui (2015); Ahmed (2017); and Aliyu (2019) that examined the policy environment, because the study looked at the policy environment.

Stephanos and Costas (2014) investigated the effect of MPC meetings on UK interest rate risk of banks and insurance companies used of GARCH-M methodology. The results showed that before the independency of the apex monetary body of England, there is significant effect of change of interest rate on the returns of banks and insurance companies. But the results also indicated co-existed with significant effects on the short-term interest rate risk which banks and life insurance companies faced when the apex monetary body granted the independency. Also, Tsai (2013) conducted a research on the effect of monetary policy on stock returns from 1999 to 2007, he find out that stock returns respond significantly to surprise monetary policy shocks based on the informative FOMC statements there is some evidence that stock returns respond to surprise monetary policy shocks based on uninformative statements.

Papadamou and Siriopoulos (2014) conducted a research on the effect of interest rate risk and the creation of the monetary policy committee on stocks in the UK, using GARCH-M technique and find out that the central bank has a significant information advantage over the public about the current and future state of the economy and hence significantly affected the stock returns of these companies. Similar work was conducted by Ricci (2015) in Europe, he assessed the impact of monetary policy announcements on the stock price of large ECB, during the financial crisis, he employed event study and find out that the banks were more sensitive to non-conventional measures than to interest rate decisions, and that the same type of intervention may have a different impact, finally he find out that banks with weaker balance sheets and operating with high-risk were more sensitive to monetary policy interventions.

Ajie and Nenbee (2010) investigate the relationship between monetary policy and stock prices in the NSE, they employ co-integration and Error correction modeling (ECM), and their findings revealed that monetary policy is significantly influencing stock prices in the NSE. Abaenewe and Ndugbu (2012) investigated the effect of monetary policy development on equity prices in the Nigerian stock exchange Market using annual data from 1985 to 2010. He used ordinary least square regression (OLS); the study revealed that monetary policy has not made significant influence over the prices of ordinary equities in Nigeria. Osisanwo and Atanda (2012) determinants of stock market returns in Nigeria using ordinary least square, and fund out that interest rate, previous stock return levels, money supply and exchange rate are the main determinants of stock returns in Nigeria.

While Chinshak (2012) examined the impact of firm performance on stock prices of selected companies in Nigeria, he employed panel co-

integration and penal regression as the analytical tools, he found out that general reserve, net asset and net profit have some signal on the behavior of stock prices but cannot serve as determinants to stock behavior. The result also showed that there is positive relationship between general reserve and stock prices while negative relationship between net profit and stock prices.

Furthermore, Adaramola (2011) investigate the impact of macroeconomic indicators on stock prices in Nigeria, he uses money supply, interest rate, exchange rate, inflation rate, oil price and gross domestic product as Nigerian macroeconomic variables and selected stock prices of some firms. He employed panel regression technique, and find out that all macro economic variables have significant impact on stock prices of the selected firms in Nigeria accept inflation and money supply. Therefore, he concluded that the trends in macroeconomic variables can be used to predict movement of stock prices to a great extent in Nigeria.

Also Aliyu, (2012) assess the reaction of Nigerian stock market to monetary policy innovation during the era of financial crisis, he employed GARCH and EGARCH techniques and concluded that unanticipated monetary policy shocks influences Nigerian stock exchange returns, while anticipated monetary policy shocks do not influence Nigerian stock exchange returns. His work is consistent with the theory of rational expectation, that is to say only unanticipated monetary policy can influence economic activities in Nigeria, but he uses stock prices as a measure of economic activities. Zubair (2013) who conducted a research on the Causal Relationship between NSE index and Exchange Rate, he employed Johansen's co-integration and Granger-causality tests, his results show a unidirectional causality from M2 to ASI before the crisis but absence of causality between the variables during the recent financial crises. That is to say speculators influence the NSE and also there is interconnectivity of NSE and international financial markets.

Salisu, (2012), investigated the impact CBN's Communication on stock prices using Nigerian daily data from 2007 to 2010. EGARCH modelling technique was employed, the result shows that MPC meetings have significant impact on stock prices in Nigeria, and also reduces volatility in the Nigerian stock market. This is an indication that the policy undertaken by the committee during the periods is unanticipated policies. The result is in line with the theory of rational expectation of Lucas. Sanusi (2012) investigated the impact of CBN's signals to stock prices during the periods of recent financial crisis; this study assessed the reaction of stock prices to MPC meetings after the recent financial crisis. Also Aliyu, (2012) assess the reaction of Nigerian stock market to monetary policy innovation during the era of financial crisis, he employed GARCH and EGARCH techniques and concluded that unanticipated monetary policy shocks influences Nigerian stock exchange returns, while anticipated monetary policy shocks do not influence Nigerian stock exchange returns.

This study differed from others that looked at the policy environment; all the studies used cot of borrowing which is MPR as the only monetary policy instrument and ignore measure of liquidity which is CRR, but this study considered both. Also other studies did not consider Treasury bill and fixed deposit rates as dependent of the MPC communication while this study does.

Theoretical Framework

The Efficient Market Hypothesis (EMH) provides a theoretical reason why stock market investors would seek for and appropriately respond to information from the MPC meetings. This is because the theory suggests that market participant would always incorporate all relevant information in before placing bid/offer orders. According to Fama (1970) a market is said to be efficient if all available information fully reflect true valuation (prices). For instance if there is a signal that indicate future values of particular asset will go up, rational investors will try to purchase the asset. The investors bid prices up, until prices reflect the new information.

Central Bank Communication can affect stock prices either direct or indirectly, for instance if we assumed that the signal identified from MPC Communication is that of monetary policy tightening by increasing either MPR or CRR or both. Investors in the Nigerian stock market may use the information from the meeting outcomes and perceive a negative impression about future economic performance as well as the market performance. That is to say investors' expectations about future cash flows can be altered. They would expect a lower return for their investment in the market under this condition. This would encourage them to sell out more of their stocks and cause demand for stocks to fall this could lead to a decline in the stock prices.

Methodology

In order to achieve the paper' objective, which is to investigate the sensitivity of stock prices to MPC communications, we employed Exponential Generalized Autoregressive Conditional Heteroscedasticity (EGARCH) model. This is because it is capable of modelling volatility of prices; it is a suitable model to measure the

sensitivity of stock price to MPC communications. Generalized Autoregressive Conditional Heteroskedasticity (GARCH) and Exponential Generalized Autoregressive Conditional Heteroskedasticity (EGARCH) models are specified. In the basic GARCH model, the sign of the residual or shock have no effects on conditional volatility, therefore EGARCH model is allowed to measure this, hence, we are using it in our analysis. The study uses volatility techniques, given the widely recognized nature of stock market data (the tendency of volatility to cluster); volatility models (such as GARCH) are typically used to measure this behavior. Because it allows the modelling of shocks of all sizes- big and small shocks, it provides an appropriate framework for analyzing the effect of MPC meeting which is, in this case context serves shocks causing volatility spikes around MPC meetings, but decays away until the next meeting approaches.

ARCH and GARCH Models

The modeling process involves estimating the best fitting auto regressive model in order to obtain the errors, ε_t which can be split into a stochastic pies (Z_t) and a time dependent standard deviation (σ_t) such that

$\varepsilon_t = \sigma_t Z_t$

Where Z_t is a showing white noise, process, and the series σ_t is modeled as

$$\sigma_t^2 = \alpha_0 + \alpha_t \varepsilon_{t-1}^2 + \cdots + \alpha_q \varepsilon_{t-q}^2 = \alpha_0 + \sum_{i=1}^{p} \alpha_q \, \varepsilon_{t-i}^2 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

Where: $\alpha_0 > 0, \alpha_0 \geq 0$; $i > 0$,

This process is called ARCH (q) because σ_t is modeled purely as an AR (q) process. It can be modeled as an ARMA (p, q) process, in which case, it is called GARCH (p, q), where p is the order of the GARCH term σ_t and q is the order of the ARCH term ε_t: so that

$$q^2 = \omega + \sum_{i=1}^{q} \alpha_i \, \varepsilon_{t-i}^2 + \sum_{i=1}^{q} \beta_i \, \sigma_{t-i}^2 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

Both ARCH and GARCH shows that the sources of current conditional variance to both previous error terms and previous conditional variance, therefore this technique would be employ in order to find out whether the volatility in the Nigerian stock market persists or not. However, GARCH models cannot capture the leverage or asymmetric effect. Therefore, Exponential Generalized can be employed.

EGARCH Model Specification

The EGARCH model is usually specified in two forms that is the mean equation specification and the variance equation specification:

$$\mathrm{dLog}(\mathrm{ASI}_t) = \alpha_0 + \mathrm{dLog}(\mathrm{ASI}_{t-1}) + \beta(\mathrm{d}(R_t) + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3$$

D(R_t) = First difference of monetary policy Instruments of monetary policy (MPR and CRR (both public and private)

The variance equation can be specified as

Variance Equation

The conditional variance of the EGARCH (p q) model is given in equation

$$Log\ \delta^2 = \omega_t + \sum_{j=1}^{q} \beta \sigma_{t-1} + \sum_{i=1}^{p} \alpha \frac{\varepsilon_{t-1}}{\sigma_{t-1}} + \sum_{k=1}^{r} \gamma \frac{\varepsilon_{t-1}}{\sigma_{t-1}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 4$$

Where:

$\log(\delta^2)$ = natural log of conditional variance,

γ = a parameter measures the leverage effect.

Log (δ^2) implies that the leverage effect [1] is exponential, and the conditional variance (δ^2) is always non negative whether the parameter is positive or negative. γ is the negative parameter that measures the leverage effect, this indicate that positive shocks generate less volatility than negative shocks of the same magnitude. The presence of leverage effect can be tested by the hypothesis $\gamma > 0$. The sensitivity is asymmetric if $\gamma \neq 0$. For instance, when $\gamma = 0$, implies that the model is symmetric, meaning that negative and positive shocks have the same effect on volatility. When $\gamma < 0$, implies that the positive shocks (good news) generate less volatility than negative shocks (bad news). When $\gamma > 0$, it implies that positive innovations are more destabilizing than negative innovations. Meaning, the anticipated innovations should exert a stabilizing effect on stock volatility and vice versa for unanticipated innovations.

Finally, Augmented Dickey-Fuller (ADF) and the Kwiatkowski-Phillips- Schmidt-Shin (KPSS) unit

[1]Leverage effect is a negative correlation between the past return (prices) on future volatility of return (prices), it can also be viewed as a ratio of debt/stock. The higher the leverage effect the greater the risk or volatility, higher Leverage effect occurs due to the negative return which translates to low stock prices meaning that higher debt to stock ratio.

root test were employed to assess the time series properties of the variables before conducting the presence or absence of volatility. Daily data of stock market prices on (All Share Index (ASI) are sourced from asset management of Nigeria via the website www.cashcraft.com. While that of monetary policy instruments (Monetary Policy Rate (MPR), Cash Reserve Requirement Public sector (CRRP) are Cash Reserve Requirement Private Sector (CRRPR) are sourced from MPC meetings that contain in their communiqué the CBN website www.cenbank.org. The ASI covered the periods from 1st January, 2010 to 24th March, 2019 while that of monetary policy covered the period from part of last MPC meeting 2009 to 2nd MPC meeting in 2019.

Results and Discussions

Descriptive Statistics

We use descriptive statistics in order test the normality of the series, where we fund that all the series are non-normally distributed. This is because the hypotheses of normal distribution of the variables have been rejected even at 1% level throughout the series. Due to the low probability values of Jarque-Bera statistics.

Table 1: Descriptive Statistics of ASI, CRRP CRRPR and MPR

	LOG(ASI)	LOG(MKP)	LOG(VU)	MPR	CRRP	CRRPR
Mean	10.26759	29.82134	19.57544	10.62459	23.55556	11.48473
Median	10.21515	29.81021	19.55986	12.00000	0.000000	12.00000
Maximum	14.81870	31.74647	22.69016	13.00000	75.00000	31.00000
Minimum	9.890014	22.85904	8.888757	6.000000	0.000000	1.000000
Std. Dev.	0.252119	0.336466	0.640881	2.525622	30.73202	8.123944
Skewness	3.932822	-5.893251	-5.089543	-0.98372	0.804138	0.556441
Kurtosis	70.19265	122.3461	79.34274	2.248418	1.931077	2.854836
Jarque-Bera	293482.2	922272.3	380378.4	284.3.2390	239.1317	80.77058
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	15801.83	45895.05	30126.60	16351.25	36252.00	17675.00
Sum Sq. Dev.	97.76163	174.1158	631.6995	9810.547	1452575.	101505.6
Observations	1539	1539	1539	1539	1539	1539

Source: Authors Computation Using E-views 9.0

Also, a distribution with positive kurtosis is called leptokurtic, or leptokurtotic and a distribution with negative kurtosis is called platykurtic, or platykurtotic. Therefore, the series show the evidence of platykurtic distribution with a Kurtosis more than 3.0 of all the variables except MPR which shows lepterkurtic distribution with less than 3.0. Hence, the presence of skewness and kurtosis in the data indicated that all the variables except CRRPR are not normally distributed. This also supported by the Jarque-Bera test as mention earlier, which suggested that all the variables are not normally distributed. Therefore, we used EGARCH/GARCH techniques.

Unit Root Test

Before the analysis is carried out, there is need to test for stationarity in order to avoid spurious regression results. A number of stationary or unit root tests exist, but we employed the Augmented Dickey Fuller (ADF), Phillips-Perron (PP) and Kwiatkowski, Phillips, Schmidt and Shin (KPSS) tests in this study and the results are presented in table 2

Table 2: Unit Root Test

Test	ADF		PP		KPSS		
	Levels	1st difference	Levels	1st difference	Levels	1st difference	Decision rule
Log(ASI)	-2.045768^{NS}	-19.55505*	-20.36752*		2.461820^{NS}	0.174605***	I(1)
MPR	-1.759737^{NS}	-39.23747*	-1.760067^{NS}	-39.23749*	3.476787^{NS}	0.317377***	I(1)
CRRP	-1.287966^{NS}	-39.18112*	-1.106956^{NS}	-39.18112*	2.892815^{NS}	0.178595***	I(1)
CRRPR	-1.106956^{NS}	-39.21646*	-1.106956^{NS}	-39.21646*	4.3.151216^{NS}	0.051361***	I(1)

Source: Authors Computation Using E-views 9.0
Note: (*), (**) and (***) suggest the rejection of unit root at 10%, 5% and 1% respectively for ADF and PP, while we accepted stationarity for KPSS at (*), (**) and (***)10%, 5% and 1% respectively . Trend and intercept were included for the levels where their line graphs suggest significance.

Unit root test had been carried out using ADF, PP and KPSS in order to determine the stationary of the data. The results indicated that the entire variables are stationary at first difference; these findings are true for all tests.

Detecting Volatility

Having determined the unit root test there is need to test for the possible presence of ARCH effects in order to know which models require the ARCH estimation method or otherwise. There a number of testing the ARCH effect but the study employed Breusch-Pagan test, the result revealed that the variance of the residual is varies, meaning that the there is biasness in the t-values. Hence, ARCH models are the best; the ARCH test is presented in table 3.

Table 3.ARCH test is presented

Heteroskedasticity Test: Breusch-Pagan-Godfrey				
F-statistic	18.98944	Prob. F(6,4476)		0.0000
Obs*R-squared	111.2821	Prob. Chi-Square(6)		0.0000
Scaled explained SS	3035.434	Prob. Chi-Square(6)		0.0000

Source: Authors Computation Using E-views 9.0

EGARCH (1 1) results

Table 4: Mean and Variance Equations of EGARCH (1 1) results for Log (ASI)

Mean Equation					
	C	Dlog(ASI(-1))	D(MPR)	D(CRRP)	D(CRRPR)
Dlog(ASI)	-0.001555 (0.000238) (0.0000)	-0.020865 (0.030931) (0.5000)	-0.001318^{NS} (0.001908) (0.4896)	0.000231 (5.77E-05) (0.0001)	0.000126^{NS} (0.000279) (0.6512)
Variance Equation					
	C	ARCH	GARCH	δ	D1
	-2.524337 (0.096877) (0.0000)	0.836042 (0.021498) (0.0000)	0.145753 (0.013609) (0.0000)	0.759823 (0.011082) (0.0000)	-1.421074 (0.182447) (0.0000)

Source: Authors Computation Using E-views 9.0.
Note: The values in first parentheses are the standard error while other values in the second parentheses are the probability values and finally NS means no significant.

Having determined the unit root test, this section estimates and reports the EGARCH model of equation as earlier presented in methodology. Different specifications were estimated but EGARCH (1, 1) is found to be appropriate for log(ASI). Our result revealed that EGARCH (1 1) is the appropriate model as compared to EGARCH(2 2), because EGARCH(1 1) has the least Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC) and Hannan-Quinn Criterion (HQC). The ARCH-LM Diagnostic Test was carried out in order to determine whether there is ARCH effect or not (presence or absence of serial correlation); the result revealed that the model has no additional ARCH effect as presented in table 4.

We therefore estimated and reported the EGARCH (1 1) model and presented the summary of the EGARCH result in Table 3. The results revealed that the coefficients on MPC meeting dummy is statistically significant and negative in the Log(ASI). The estimate of the dummy was negative; this suggested that MPC's actions are trustworthy and reliable. Therefore, the MPC meetings can be used to shape markets agents' expectation; hence assist in reducing the volatility of the stock prices in the NSE. That is to say, stock prices are very sensitive to MPC meetings. This is because it shapes economic agents future economic expectation about the market fundamentals thereby influencing current activities in the market, hence the stock prices. This result is in consistence with that of Sanusi (2011a and b), who established that MPC meetings is a strong tool of monetary policy in Nigeria. Also, this outcome is consistent with Salisu (2012), who found out that CBN

communication had statistically significant and economically relevant effects on stock prices.

Also, there was existence of leverage effect (δ) in the Log(ASI) for the periods under reviewed. Moreover, the positive sign of the leverage coefficient from the EGARCH models implied that positive shocks played significant impact on stock price. This implied that investors respond more rationally to good news than to bad news. This conformed to the efficient market hypothesis; and it also, consistent with the work of Aliyu (2012) who found out the presence of leverage effect with positive coefficient and is inconsistent with that of Salisu (2012) who found out the presence of leverage effect with negative coefficient.

Although our concern is to assess the sensitivity of stock prices to MPC meetings, but other monetary variables are statistically insignificant due to high probability values except that of CRRP as indicated in the mean equation in table 3. The results also tell us that there is negative relationship between the Log(ASI) and its lag values Log(ASI(-1)) and MPR, but however statistically insignificant. Also, the results revealed that there is positive relationship between Log(ASI) and both CRRP and CRRPR.

Diagnostics

Table 4: Diagnostic Test

	ARCH LM		Jacque-Bera	
Diagnostic Test	Coefficient	Probability	coefficient	Probability
EGARCH (1 1) for ASI	0.008062	0.9285	752419.1	0.00000
EGARCH (2 2) for ASI	0.944619	0.3311	610841.5	0.00000

Source: Authors Computation Using E-views 9.0

We used the ARCH- LM Diagnostic Test in order to determine the presence of ARCH effect and presented the results in table 5, the result revealed that the model has no additional ARCH effect in the model, in order words the result revealed that presences of autocorrelation in the residuals are rejected in EGARCH models as presented. The results for Jacque-Bera statistic for normal distribution show that the residuals in the models are normally distributed as presented in table 4.

Conclusion and Recommendations

This study finds out empirically that stock price is very sensitive to MPC meetings using the Log (ASI), The results from the mean equation revealed that MPC meetings influence Nigerian stock market indicators a little. The conditional variance equation revealed that the MPC meetings influence stock indicators a little higher. Therefore, the study reveals that MPC meeting influence the stock indicators because it's lower volatility in the markets.

The finding is in conformity with the theory of efficient market hypothesis. The study revealed that MPC meetings have been influencing stock market in Nigeria for the periods under review. But the meeting is influencing stock market more than the actual policy; both generally tend to lower uncertainty and volatility in the markets. Finally, the result revealed that intervention by monetary authority is influencing the stability in the Nigerian stock market and the Communication of the policy help to further stabilize the market; therefore, it portrayed the efficient market hypothesis.

Policy makers should consider MPC meetings as powerful tool for their good policies to be effective; hence, they should know that only few but powerful investors respond most to MPC meetings. The government through the monetary authorities can bring stability in the NSE market; this is because the MPC meeting can be used to reduce volatility in the market.

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Appendix I: EGARCH Estimation

A1: EGARCH (1 1) for d(Log(ASI)

Dependent Variable: D(LOG(ASI))
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/14/19 Time: 13:49
Sample (adjusted): 3 2539
Included observations: 2537 after adjustments
Convergence achieved after 242 iterations
Presample variance: backcast (parameter = 0.7)
LOG(GARCH) = C(6) + C(7)*ABS(RESID(-1)/@SQRT(GARCH(-1))) + C(8)
*RESID(-1)/@SQRT(GARCH(-1)) + C(9)*LOG(GARCH(-1)) + C(10)*D1

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.001457	0.000248	-5.873324	0.0000
D(LOG(ASI(-1)))	-0.006847	0.028191	-0.242876	0.8081
D(MPR)	-0.000528	0.002018	-0.261805	0.7935
D(CRRP)	5.48E-05	5.55E-05	0.987375	0.3235
D(CRRPR)	-0.000101	0.000375	-0.270360	0.7869
Variance Equation				
C(6)	-2.556823	0.094209	-27.13981	0.0000
C(7)	0.777976	0.018948	41.05906	0.0000
C(8)	0.104875	0.012927	8.112858	0.0000
C(9)	0.753913	0.010830	69.61086	0.0000
C(10)	-1.436652	0.178181	-8.062897	0.0000

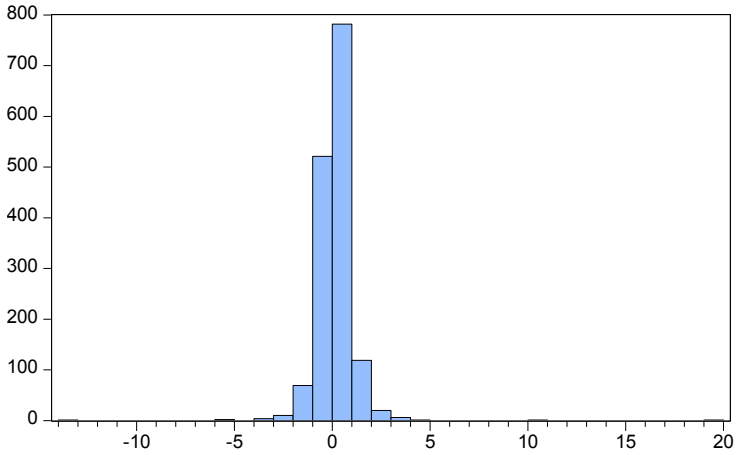
R-squared	0.006369	Mean dependent var	0.000138
Adjusted R-squared	0.003775	S.D. dependent var	0.164177
S.E. of regression	0.163867	Akaike info criterion	-5.757566
Sum squared resid	41.13767	Schwarz criterion	-5.722839
Log likelihood	4434.690	Hannan-Quinn criter.	-5.744645
Durbin-Watson stat	2.943151		

A1.1: ARCH Test for Residual of EGARCH (1 1) of d(Log(ASI)

Heteroskedasticity Test: ARCH

F-statistic	0.008051	Prob. F(1,1534)	0.9285
Obs*R-squared	0.008062	Prob. Chi-Square(1)	0.9285

A1.2: Normality Test for Residual of EGARCH (1 1) of d(Log(ASI)



Series: Standardized Residuals
Sample 3 1539
Observations 1537

Mean	0.129392
Median	0.107835
Maximum	19.29876
Minimum	-13.02916
Std. Dev.	1.019437
Skewness	3.536856
Kurtosis	111.1613
Jarque-Bera	752419.1
Probability	0.000000

Appendix II; EGARCH (2 2) for d(Log(ASI)

Dependent Variable: D(LOG(ASI))
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/14/19 Time: 13:50
Sample (adjusted): 3 2539
Included observations: 2537 after adjustments
Convergence achieved after 61 iterations
Presample variance: backcast (parameter = 0.7)
LOG(GARCH) = C(6) + C(7)*ABS(RESID(-1)/@SQRT(GARCH(-1))) + C(8)
*ABS(RESID(-2)/@SQRT(GARCH(-2))) + C(9)*RESID(-1)
/@SQRT(GARCH(-1)) + C(10)*LOG(GARCH(-1)) +
C(11)*LOG(GARCH(
-2)) + C(12)*D1

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.001880	0.000245	-7.670765	0.0000
D(LOG(ASI(-1)))	0.010764	0.034527	0.311768	0.7552
D(MPR)	-7.99E-05	0.003720	-0.021469	0.9829
D(CRRP)	1.70E-05	0.000115	0.148369	0.8821
D(CRRPR)	-0.000202	0.000781	-0.258163	0.7963
Variance Equation				
C(6)	-0.439514	0.049171	-8.938423	0.0000
C(7)	0.719458	0.010084	71.34489	0.0000
C(8)	-0.607386	0.016481	-36.85451	0.0000
C(9)	0.026561	0.005260	5.049884	0.0000
C(10)	1.575675	0.028980	54.37172	0.0000
C(11)	-0.620789	0.025132	-24.70160	0.0000
C(12)	-0.739596	0.072719	-10.17062	0.0000

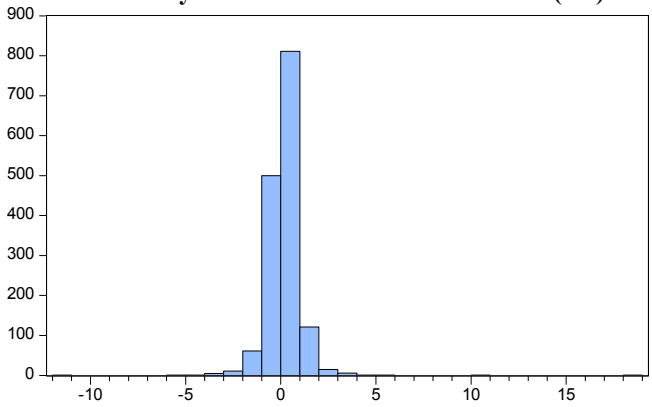
R-squared	-0.010499	Mean dependent var	0.000138
Adjusted R-squared	-0.013138	S.D. dependent var	0.164177
S.E. of regression	0.165252	Akaike info criterion	-5.733038
Sum squared resid	41.83605	Schwarz criterion	-5.691366
Log likelihood	4417.840	Hannan-Quinn criter.	-5.717533
Durbin-Watson stat	2.961401		

A2.1: ARCH Test for Residual of EGARCH (2 2) of d(Log(ASI)

Heteroskedasticity Test: ARCH

F-statistic	0.943969	Prob. F(1,1534)	0.3314
Obs*R-squared	0.944619	Prob. Chi-Square(1)	0.3311

A2.2: Normality Test for Residual of EGARCH (2 2) of d(Log(ASI)



Series: Standardized Residuals	
Sample 3 1539	
Observations 1537	
Mean	0.160947
Median	0.140501
Maximum	18.57389
Minimum	-11.40457
Std. Dev.	0.996145
Skewness	3.848278
Kurtosis	100.3599
Jarque-Bera	610841.5
Probability	0.000000