Stability in Stock Market Prices and Monetary Policy in Nigeria; What Does the Empirics Say?

Ibrahim Ayoade Adekunle
Olabisi Onabanjo University, Department of Economics, Ago-Iwoye, Nigeria
adekunle_ia@yahoo.com
Anthony Emeka Elekeokwuri
University of Benin, Department of Economics and Statistics, Benin City, Nigeria
anthony_emeka@yahoo.com
Serifat Olukorede Onayemi
Olabisi Onabanjo University, Department of Economics, Ago-Iwoye, Ogun State, Nigeria
koredeleonayemi@yahoo.com

Abstract

We observed that the implications of monetary policy for stability in the stock market had been dominated by obscurity, dissimilarities and inconclusiveness in extant literature. It is not even entirely clear how variations in monetary policy regimes predict stability in Nigeria stock markets. In this study, an attempt is made to empirically examine the variations in stock returns as induced by indices of monetary policy in Nigeria for the period 1986 through 2017. Using the two-step Engle and Granger error correction modelling technique, we found the monetary policy to be positively related to stock returns. This result could be due to extensive dominance of deposit money banks (DMBs) in the market capitalisation processes and formation. There is no gainsaying to aver that DMBs are also the primary beneficiaries of the interest income from investment in the risk-free bank. Policy implications were discussed.

Key words: Stock Market Returns, Monetary Policy, ECM, Nigeria
J.E.L. Classification: O24, E5

1. Introduction

In the last one and half decades, volatility in Africa's stock market has been unprecedented, leading to heightened attention in the quest for stability in stock prices. Centrals banks or federal reserve banks monetary policies and instruments play a dominant role in arresting the volatility that has redefined the African financial market (Suhaibu, Harvey, & Amidu, 2017). For the realisation of Africa 2063 Agenda, monetary policy needs to accommodate persistent variations in stock prices in a way that will eliminate the adverse effect of volatile stock prices on the broader objective of growth and development (Suhaibu et al., 2017). Since an efficient stock market prices are required to accelerate growth and development through savings enhancement and augmented investment leading to higher productivity, the pervasive role of monetary policy in stock market stability cannot be talked about in feeble terms as we have it in extant literature today. In other climes, Agyei-Boapeah, Wang, Tunyi, Machokoto and Zhang (2019) found an efficient stock market to abate information asymmetry and the attendant cost of information gathering. Since the efficiency of the stock market is premediated on efficient stock prices, information gathering and dissemination are by far an essential component of an efficient stock price. For national productive enhancement strategy to be optimum and rewarding, financial injection needs to be guaranteed at a price that reflects the social value and operational efficiency (Ho & An, 2020). Knowing how monetary policy induces stability or otherwise in the stock market will help gauge the speed of recovery or depth of the recession that can engulf a nation.

The underlying structural relationship between monetary policy and stock market returns remains grossly understudied along various dimensions and regions with very few studies conducted in Nigeria. Even the terse findings of monetary policy-stock market relationship in Nigeria are dominated by obscurity, variability and inconclusiveness. Some stands of studies (see Lawal, Somoye, Babajide & Nwanji, 2018; Okpara, 2010; Osisanwo & Atanda, 2012 for some examples) found the monetary policy to exert a direct and positive influence on the stock market while other studies (Ayopo, Lawal, & Somoye, 2015; Umezurike & Ananwude, 2019; Umezurike, Echekoba, & Ananwude, 2019) found an inverse relationship. This study re-examines this inconclusiveness in the literature of monetary policy and stock market stability with the view of coming up with findings that can redefine policy and research on the subject matter. Beyond the country-specific analysis of monetary policy-stock market puzzle, the majority of experimental evidence has been done across African borders (see Belke & Beckmann, 2015; Bjørnland & Leitemo, 2009; Chatziantoniou, Duffy, & Filis, 2013; L. Christiano, Ilut, Motto, & Rostagno, 2010; L. J. Christiano, Ilut, Motto, & Rostagno, 2015; Galí & Gambetti, 2015; Haitsma, Unalmis, & de Haan, 2016; Ioannidis & Kontonikas, 2008; Rigobon & Sack, 2003; Thorbecke, 1997 for some examples), thus making findings not wholly generalisable. It should be noted that structural variations characterised national monetary policy approaches and the outcomes of monetary policy-stock market relationship are expected to differ based on complex policy instruments adopted in each nation. The heterogeneous nature of monetary policy instruments in developing nations particularly Nigeria where monetary policy has been highly volatile warrants the need to examine the relationship on a country basis since findings are most likely to be regional or country-specific. A country by country-level analysis of monetary policy-stock market nexus will permit policy implications that are by far most inclined to the financial market and development objective of each nation.

In this study, we revisited the monetary policy-stock market hysteresis in Nigeria with a view of affirming the exact structural relationship on the subject matter and subsequently informing policy directions. (a) we tested whether monetary policy is a source or reflection of ill-growth in Nigeria capital market (b) we estimated the magnitude of change in Nigeria's capital market as induced by prevailing monetary policy instruments in a time-series plot. We rely on the two-step Engle and Granger (1987) estimation procedure to establish a baseline relationship in our monetary policy-stock market induced model for some reasons. The two-step Engle and Granger (1987) estimation procedure permits a short-run dynamic estimation of the monetary policy-induced stock market model. Hylleberg, Engle, Granger and Yoo (1990) argued that the error correction modelling technique has specifications that prevent the convergence of the variables to their long-run equilibrating position while gradually adjusting to their short-run equilibrium. We build upon previous studies to establish the contemporaneous influence of monetary policy in the stability of the stock market in Nigeria.

The novelty of this research is in two-fold; (1) this study revisits almost forgotten inconclusiveness in the literature of monetary policy-stock market relationship in Nigeria to redirect policy and research. The latest study on the monetary policy-stock market relationship in Nigeria was conducted in 2018 (see Lawal et al., 2018; Nwaogwugwu, 2018 for an extensive review) with available data having a two (2) years lag period (2016). With recent fall in oil prices causing fiscal capacity of government reduced, there is an increased role for central banks through policy instruments to ensure the stability of the stock market amidst low levels of income, weak credit security, low savings and many other deep-rooted issues. (2) with central banks reactions to volatility and ill-growth and development concerns, an illusion of the monetary policy stock returns could determine the speed of recovery or the depth or recession that can engulf a nation. By advancing an argument for the role of stock prices in monetary policy formulation, the stock market will be enhanced to deliver not only the seemingly complex but essential role of financial injection primary targeting improved savings and investment. By extending the implications of monetary policy for stock market development, information asymmetric that causes market failure could be averted when stock prices incorporate all available information, i.e. reduce the cost of information gathering, reveals available investment opportunities and ultimately improves income redistribution or resource allocation. Having introduced the paper, the paper proceeds as follows. 2.0 presents an overview of the evolution of monetary policy and the Nigerian stock market. A

brief review of the literature follows this, and 3.0 discusses the theoretical framework, the modelling strategy and the data used in the study. 4.0 presents the estimation and empirical results, while 5.0 concludes and offers some policy suggestions.

2. Literature review

The literature on monetary policy and the stock market has increased enormously in cross-country and country-specific studies. Even more dimly discerned is the role of monetary policy on the stabilisation of stock price in Nigeria. Okpara (2010) studied the impact of monetary policy on stock market returns in Nigeria. Using the Two-stage least square technique of estimation, the author found that monetary policy to be a significant determinant of the short and long-run stock market returns. The author argued that interest rate exerts a positive and significant influence on the stock market returns. In other climes, Lawal, Somoye, Babajide and Nwanji (2018) examined the effect of interactions between fiscal and monetary policies on stock market behaviour in Nigeria. Using the ARDL and EGARCH estimation technique found that both fiscal and monetary policy instruments jointly explain a significant part of variations in the all-share index. The authors claimed that monetary policy influences stock market behaviour via the interest rate channel. They also identified that fluctuations in interest rate alter the present value of a firm's future cash flows through the corporate cost of capital and also affects levels of corporate investment. In a similar but separate study, Nwaogwugwu (2018) investigated the impact of macroeconomic policy on stock market behaviour in Nigeria. The author observed that the money supply and interest rate have significant effects on the stock market in the short and long run. The author suggested that policymakers should employ monetary policy and fiscal policy in tandem rather than isolation to realise the full potentials of the stock market.

In other related cross bother finding, Misati and Nyamongo (2012) investigated the effect of monetary policy on the stock market in Kenya using the VAR estimation technique and found an insignificant relationship between monetary policy and the stock market. However, the authors observed that stock market volatility creates instability in monetary policy variables. These findings are in line with Hung and Ma (2017) that studied the implications of the interactions between the stock market and interest rate policy. Using a regime-switching model to identify four stock market states (bull, bear, bubble, and crisis periods) and HAM to measure the expectations of investors toward stock price movement. The authors found that adjustments in interest rate policy affect stock market expectations only during market bubble periods. They suggest that that policy-makers use changes in stock market expectations as an important basis for interest rate adjustments.

Other cross-African findings on the monetary policy and stock market were conducted by Mangani (2011) using the GARCH model estimation procedure, and the author found that discount rate changes is an essential determinant of mean returns and return volatility in the stock market. The author argued that changes in monetary policy have a significant effect on market portfolios and returns. Suhaibu Harvey and Amidu (2017) examines the effect of monetary policy on stock market dynamics in 12 African countries. Employing a panel VAR estimation technique, the authors established that stock markets of the 12 African countries are positively affected contemporaneously by their respective monetary policies through the interest rate channel, but could not find evidence to the reverse reaction. The authors identified that between the two monetary policy stances considered (money supply and real interest rate), the real interest rate has the most significant influence on the stock market and inflation. Conversely, the stock market turns to exert more considerable influence on real interest rate than it does on money supply, therefore indicating a reverse relationship between monetary policy and the stock market. They provided evidence to the existence of a significant relationship between monetary policy and stock market performance and that the relationship is bidirectional.

In other climes, studies on the effects of monetary policy on the stock market were conducted by Ivrendi and Guloglu (2012) that investigated the interactions between changes in stock prices and monetary policy regimes in four Asian countries Korea; Malaysia; Singapore and Thailand. Using a Markov regime-switching autoregressive conditional heteroskedasticity (MS-ARCH) found the existence of an asymmetric relationship between volatility of stock prices and stability of monetary policy regimes. In another study, Neuhierl and Weber (2019) considered the effects of

monetary policy on asset prices and stock returns in the USA. The authors establish that changes in short term interest rates have a significant effect on stock and asset prices. In a related but distinct study, Ansari and Sensarma (2019) investigated the impact of US monetary policy on stock indices in BRICS Countries, employing the Vector autoregression models. The authors found that the Federal funds rate only had a significant positive impact on the Bombay Sensex index. While the transmission effect of the US monetary policy on other countries, stock indices seem to be insignificant. This finding is in variance with the findings of Prabu, Bhattacharyya and Ray (2016) that argued that monetary policy announcements in the USA have no significant impact in stock market indices in India. Singh & Nadkarni (2020) examined the effect of monetary policy on asset prices across 22 emerging countries Using the generalised method of the moment estimation procedure, and the authors found that contractionary monetary policy shocks lead to shrinkage in aggregate credit demand which in turn results to a drop in the demand of financial assets this set in motion a lower demand and a declining asset prices. Balcilar, Ozdemir, Ozdemir, and Wohar, (2020) studied the effects of unconventional monetary policy in the American financial markets using the smooth transition vector autoregressive model (STVAR). The authors found monetary policy affects the risk structure of the financial markets. They argued that the risk spillover moved from purchased assets to non-purchased assets after quantitative easing announcement. In a more recent study, Wang, (2020) studied the effects of unconventional monetary policy on stock repurchases in the USA and Japan. Using Tobi and Probit analysis, the author found that during periods of unconventional monetary policy firms with more liquidity are likely to enjoy lower borrowing cost and are more likely to repurchase stock, firms with higher financial leverage are more likely to abstain from stock repurchases, and firms coordinate dividends and stock repurchases to please shareholders.

3. Research methodology

In gauging the quantitative relevance of monetary policy for stability in the stock market in Nigeria, this study augments the quantity theory of money of Friedman (1970). We proceed to specify the general money demand function in the form;

$$M^d = f(Y_p, r_b, r_e, r_m, II^e) \qquad \textbf{(1)}$$

In the general money demand function, money demand M^d is positively related to permanent income Y_p, negatively related to expected interest rates on bonds r_b, the expected rate of return on equity r_e, scheduled market interest rate r_m, and inflation n rate II^e. The rate of return on bonds and equity represent the opportunity costs of holding money. The rate of return on money is the services provided by holding money as well as any interest payments on money deposits at banks. Expected inflation II^e represents the return on holding goods. This element is the unique relationship that agents hold goods as assets and substitutes them for money if they expect a price to rise that is capital gains on holding goods.

The flow constraint governs this illustration;

$$(\psi d - \psi s) + dV = 0 \qquad \textbf{(2)}$$

where ψd is aggregate demand and ψs is aggregate supply, and, dV is the change in inventory holdings. On the other hand, the asset allocation decision can be viewed from Walras's law stock constraint;

$$(M^d - M^s) + (B^d - B^s) = 0 \qquad \textbf{(3)}$$

where M^d and M^s is the stock level of money demand and supply, and B^d and B^s is the stock level of bond demand and supply which refers to all alternative interest-bearing financial assets which include equities. Considering a condition of full equilibrium, if there is an increase in money supply M^s, the left-hand equation will be negative, which is a situation of the excess money supply, which will make the term on the right to be positive for excess bond demand. Hence the price of bonds or equity will increase, and necessarily interest rate will fall, bringing the equity market into equilibrium, and by Walras' Law, the money market as well will be in equilibrium. A generalised portfolio constraint can be stated by relating the money demand to conditions in the goods market to create a direct channel of aggregate demand to output.

$$(M^d - M^s) + (B^d - B^s) + (\psi d - \psi s) = 0 \qquad \textbf{(4)}$$

In expansionary monetary policy, M^s will increase hence the money market that is the term on the left will be negative. In any case, because of the goods market, there may not necessarily be an excess demand for bonds, since the disequilibrium in the money market can be offset by an excess demand for goods, i.e. $M^d - M^s < 0, B^d - B^s = 0$, and $\psi d - \psi s > 0$. By the Keynesian multiplier, as there is excess aggregate demand, then output ψ^s will rise and money demand M^d will rise so that the goods market and money market are brought into equilibrium. Therefore Friedman proposes that an increase in money supply does not necessarily imply an excess demand for equity or bonds but may be offset by an increase in the demand for durable household goods such as a house or an automobile. This proposition is one that we wish to prove or rebut in this study, to know whether changes in the money supply leads to proportionate changes in stock prices or otherwise.

This study is a prototype of Suhaibu et al. (2017). The functional relationship is specified thus;

$$SHARE_{INDEX} = f(EXC_{RATE}, M_2, CPI) \qquad \textbf{(5)}$$

Where $SHARE_{INDEX}$ represents all share index,M_2 give aggregate money supply in the economy and CPIas a measure of inflationary tendency. The monetary policy-induced stock market is expressed as;

$$SHARE_{INDEX_t} = A + \sum_t^{n=1} \gamma_n EXC_{RATE_t} + \sum_t^{n=1} \pi_n M_{2_t} + \sum_t^{n=1} \omega_n CPI_t + \mu_t \qquad \textbf{(6)}$$

Where γ, π, and ω are the elasticities of the exchange rate, money supply and inflation. A is the efficiency of the monetary policy-induced stock market model. EXC_{RATE} is the exchange rate; M_2 is the depth of money supply in circulation; and CPI measures inflationary propensity; μ_t represents the idiosyncratic error composition

To adjust for variance in unit and measurement (heteroskedastic) and to produce a consistent and robust estimate in the institution moderating remittances-growth relationship, we take the semi-logarithms and time derivatives of equation **(6)** to generate the following dynamic function:

$$lnSHARE_{INDEX_t} = A + \sum_t^{n=1} \gamma_n lnEXC_{RATE_t} + \sum_t^{n=1} \pi_n lnM_{2_t} + \sum_t^{n=1} \omega_n CPI_t + \mu_t \qquad \textbf{(7)}$$

Data

We rely on country-specific indices of monetary policy and the stock market from 1986 through 2017. Our choice of Nigeria was premeditated on the crunch need to examine the monetary policy and stock market relationship in a country by country analysis to account variances in outcomes. Monetary policy instruments and policy mix in African nations are heterogeneous and as such finding on the monetary policy and the stock market is expected to differ. Data availability was also an important consideration when choosing the scope and dimension of the study. We measured stock market stability with all share index as in Hameed, Kang, and Viswanathan (2010); the monetary policy was measured using money supply (M_2) as in Akalpler and Duhok (2018), predominant exchange rate as in Baak (2012). We included control variable (inflation) in our baseline model. Inflation reported as the persistent rise in general price level influence stock market return through the price composition. We measure prevailing inflation using the consumer price index as in Quah and Vahey (1995). The data are mainly obtained from the CBN statistical bulletin of various issues up until 2017 and the World Bank Database (World Development Indicator, 2017). The variables of the study and their respective descriptions and sources are contained in Table 1.

Table no. 1: Variable Description

Abbreviation	Variable	Measured As	Source
$SHARE_{INDEX_t}$	Stock Prices	All Share Index	CBN Statistical Bulletin, 2017
EXC_{RATE_t}	Exchange Rate	Nominal Exchange Rate	CBN Statistical Bulletin, 2017
M_{2_t}	The volume of Money in Circulation	Broad Money Supply	CBN Statistical Bulletin, 2017
CPI_t	Inflation	Consumer Price Index	World Development Indicator (WDI), 2017

Source: Authors, 2020

Empirical Strategy

In accounting for the dynamics of stock returns as predicted by monetary policy instruments in Nigeria, We establish the pre-estimation evaluation and determine the fits. These are the preliminary evaluation of the data using the descriptive statistics method to help the show, describe and summarise the data in a meaningful way. The descriptive statistics established the normality conditions of the dataset using averages and Jarque-Bera values (Gujarati and Dawn, 2009). We tested the Augmented Dickey-Fuller (ADF), Philip Perron Test and the KPSS Test confirmatory test to ascertain the stationarity of the variables. In tandem with the frontline literature on unit-root testing, the time series unit root test is based on estimating equation **(8)**:

$$\Delta Y_t = \alpha_i + \eta y_{t-1} + \delta_t + \sum_{k=1}^{k_i} \theta_i^{(k)} \Delta y_{t-k} + \varepsilon_t$$
$$\varepsilon_t \sim idN(0, \theta_\varepsilon^2) = 1,2, \dots \dots . N, t = 1,2 \dots \dots T \qquad \textbf{(8)}$$

Where y_t denotes the y variable observed for the N entities in the T periods, and Δ is the difference operator. The unit root test involves the null hypothesis $H_0 : \rho_i = 0 \; \forall i$ against the alternative $H_A : \rho_i = \rho < 0 \; \forall i$.

For robustness and heteroskedasticity consistency, we estimated the Kwiatkowski, Phillips, Schmidt, and Shin (1992) (KPSS) test reconfirmation test for stationarity due to its richness in time series data stationarity confirmation. The KPSS unit root test reports a null hypothesis of no unit root in any of the series estimated. Given the residuals obtainable from the individual ordinary least square (OLS) regressions of a constant, or on a constant and a trend, the KPSS unit root test requires only the specification of the form of the OLS regressions: whether to include only individual-specific constant terms, or whether to include both constant and trend terms. In particular, the KPSS appears to over-reject the null of stationarity and may yield results that directly contradict those obtained using alternative test statistics (see Hasan and Koenker (1997); Said and Dickey (1984) for discussion and details).

Then, we proceed to estimate the Johansen co-integration test to establish whether there is a long-run relationship between the variables. The primary step in the Johansen co-integration test is to obtain the optimal lag length because the Johansen co-integration test is sensitive to lag length. If the lag length is not optimal, the test will give a spurious result. The optimal lag length was determined by the Schwarz Information Criterion (SC) according to Koehler and Murphree (1988). Finally, we estimated the error correction model (ECM) as described by Engle and Granger (1987). For an extended result, we estimated the Granger causality test to determine the direction of causality between the stock returns and monetary policy. We also conducted a posted estimation test to confirm the robustness and validity of the regression model. These are the Breusch-Godfrey Serial Correlation to test for the presence of serial correlation, Breusch Pagan Heteroscedasticity to test for heteroskedasticity and Cusum stability test to verify the structural stability of the model.

4. Result and interpretations

4.1. Descriptive Statistics

Table 2 shows the mean and median of all the observations in the data set lie within the maximum and minimum values indicating the high tendency of the normal distribution. All the variables are positively skewed. The kurtosis statistics show that all the variables were platykurtic suggesting that their distributions were flat relative to normal. The Jarque-Bera statistics shows that the series is normally distributed since the p-values of all the series are not statistically significant at 5% level. Thus, informing the acceptance of null hypothesis that says each variable is normally distributed.

Table no. 2: Descriptive Statistics of the Data Set

	$lnSHARE_{INDEX}$	lnM_2	INF_{RATE}	$lnEXC_{RATE}$
Mean	68.419	20.635	5.969	6.371
Median	64.462	18.641	2.543	2.658
Maximum	0.237	1.409	-0.335	-0.374
Minimum	1.277	3.692	1.701	1.736
Std. Dev.	4.524	11.925	3.027	3.056
Skewness	0.104	0.003	0.220	0.217

Kurtosis	30	30	30	30
Jarque-Bera	68.419	20.635	5.969	6.371
Probability	0.199847	0.491498	0.292960	0.205646

Note: Descriptive statistics were taken before the variables were transformed into logarithm forms. The Jarque-Bera test whether a given series follow a normal distribution or not. It tests the null hypothesis that a given series is normally distributed.

Source: Authors, 2020

The study presents the results of the correlation analysis of the set of variables employed in Table 2 above. The table shows that the correlation coefficients among the variables are below 0.95 indicating that there is no tendency for multicollinearity to occur among the independent variables.

Table no. 3: Correlation Matrix of the Data Set

	$SHARE_{INDEX}$	M_2	INF_{RATE}	EXC_{RATE}
$SHARE_{INDEX}$	1			
M_2	-0.765	1		
INF_{RATE}	-0.788	-0.768	1	
EXC_{RATE}	0.457	0.688	0.546	1

Source: Authors, 2020

4.2. Time Series Properties of the Variables

In Table 4, we report the result of the ADF, PP, and the KPSS confirmatory tests. All tests confirmed that variables are non-stationary at levels but are stationary at first difference. These empirical outcomes did uncover not only the non-stationary properties of all the variables but also established the covariance nature of the data set under investigation. We proceed to estimate the ECM to establish the baseline relationship between the variables of interest. This is indispensable in this research because the choice of the estimation strategy is consistent with the data behaviour and in consonance with contemporary ECM-centric literature (see Furuoka & Munir, 2014; Malpezzi, 1999; Maysami & Koh, 2000 for some examples).

Table no. 4: Unit Root Tests

Variables	@LEVEL			@FIRST DIFFERENCE			ORDER OF INTEGRATION
	ADF	**PP**	**KPSS**	**ADF**	**PP**	**KPSS**	
	Intercept {Trend & Intercept}	**Intercept {Trend & Intercept}**	**Intercept {Trend & Intercept}**	**Intercept {Trend & Intercept}**	**Intercept {Trend & Intercept}**	**Intercept {Trend & Intercept}**	
$SHARE_{INDEX}$	0.452 {0.562}	0.693 {0.723}	0.445 {0.853}	0.682* {0.832}**	0.567* {0.672}*	0.642* {0.993}*	I(1)
M_2	-1.882** {0.562}*	-1.423** {0.723}*	-1.673** {0.873}*	0.993* {0.676}*	0.874* {0.552}*	0.429* {0.639}*	I(1)
INF_{RATE}	-1.562 {0.972}	-1.973 {0.352}	-1.321 {0.782}	-1.442* {0.772}*	-1.562* {0.782}*	-1.748* {0.147}*	I(1)
EXC_{RATE}	0.782 {0.883}	0.634 {0.832}	0.789 {3.882}	0.883* {0.561}*	0.993* {0.884}*	0.348* {0.273}*	I(1)

Note: T-Stat values of intercept estimates are reported in the text box while T-Stat values of trend & intercept estimates are in the parentheses; $* \ P < 0.01$, $** \ P < 0.05$ respectively

Source: Authors, 2020

The primary form of the ECM model is given as:

$$\Delta lnSHARE_{INDEX_t} = A + \sum_t^{n=1} \gamma_n \Delta lnEXC_{RATE_t} + \sum_t^{n=1} \pi_n \, \Delta lnM_{2_t} + \sum_t^{n=1} \omega_n \Delta CPI_t + + CointEq_{-1} + \mu_t \quad \textbf{(9)}$$

All other variables remain as earlier defined, Δ is the first difference operator, $RGDP_{t-n}$ gives the lagged value of the regressand and $Coint_{-1}$ represent the error correction component of the ECM model. The Error Correction Mechanism will indeed tell how much deviation from the long run is being corrected in the short run. In order words, it gives the speed of adjustment from long-run equilibrium to the short run.

4.3. Lag Length Selection

The issue of finding the appropriate lag length for each of the underlying variables in the ECM model is fundamental because we seek Gaussian error terms. For optimal lag length selection, we rely on the Schwartz information criteria (SIC) to obtain the lag length value that minimises the Information Criterion and at which the model does not have autocorrelation is the optimal lag length.

Table no. 5: Lag Length Selection

Lag Length	SC
1	1.653*
2	2.862
3	5.442

Note: $*\ P < 0.01$, $**\ P < 0.05$ respectively

Source: Authors, 2020

Based on the result in table 5, the lag length, which minimises SIC, is lag one (1) and thus our optimal lag length. Given our optimal lag length, we proceed to confirm the long-run relationship between the variables.

4.4. Co-Integration Test.Johansen Co-Integration Test

The result of the Johansen Co-integration for both the Trace Statistic and Maximum Eigen Value is reported in Table 6. With the hypothesised level of acceptance is 5 per cent/

Table no. 6: Result of Johansen Co-integration test based on Trace Statistic and Max Eigenvalue

		Trace Statistic			**Max. Eigen Value**		
No. of CE(s)	Eigenvalue	Trace Statistic	0,05 Critical Value	Prob.	Max-Eigen Value	Critical Value	Prob.**
None *	0.57	138.42	33.45	0.02	55.33	40.10	0.01
At most 1 *	0.89	75.24	34.66	0.01	52.23	56.88	0.01
At most 2*	0.53	78.89	74.56	0.05	33.45	27.58	0.09
At most 3*	0.45	29.22	23.44	0.03	12.33	21.13	0.71
At most 4	0.67	56.43	34.46	0.22	4.78	14.26	0.23
At most 5	0.89	8.45	5.77	0.02	2.46	3.84	0.05

Notes: Trace test indicates 4 cointegrating eqn(s) at the 0.05 level
Max-eigenvalue test indicates 2 co-integration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Authors, 2020

The result means merely that there is a long-run relationship between the regressed and the regressors based on the rejection of the null hypothesis at 5% level of significance. The determination of the short-run association is computed in the next section.

4.5. Two-Step Engle And Granger Error Correction Model

Table no. 7: Short-run Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-11.193	1.340	-8.353	0.000**
$\partial(lnM_2)$	0.062	0.051	1.219	0.034**
$\partial(EXC_{RATE})$	0.299	0.154	1.933	0.044**
$\partial(CPI)$	0.095	0.173	0.546	0.030**
ECM(-1)	-0.371	0.172	-2.161	0.040**
R-squared	0.856			
Adjusted R-squared	0.454			
F-statistic	11.543			
Prob(F-statistic)	0.000*			
Durbin-Watson stat	1.967			

Note: *(1%)**(5%) ***(10%)respectively

Source: Authors, 2020

Table 7 represents the result of short-run estimates by using the Error Correction Model (ECM). The estimated coefficient of the error correction vector is 0.371. This means that the error correction term **ECM(-1)** is the speed of adjustment correcting back at the rate of 37.1 per cent annually. The negative sign and the significant probability signify the existence of co-integration among the variables. This shows that approximately 37.1% of the previous year's disequilibrium in the economy is corrected in the short run, which implies that adjustment of the deviation of the explanatory variable back to normality is very high. The result of the short run in Table 7 indicates that they all have a positive and significant relationship with macroeconomic instability in the short run. The Durbin Watson value of 1.88 indicates no serial autocorrelation among the explanatory variables in the model. The F-statistics of 11.36061 is statistically significant at 1 per cent level, indicating that the explanatory variables are jointly significant.

Table no. 8: Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.845890	Prob. F(3,25)	0.4433
Obs*R-squared	2.236642	Prob. Chi-Square(3)	0.3268

Source: Authors, 2020

Given the probability value of 32.68 per cent, we fail to reject the null hypothesis and conclude that our short-run model is free from serial correlation.

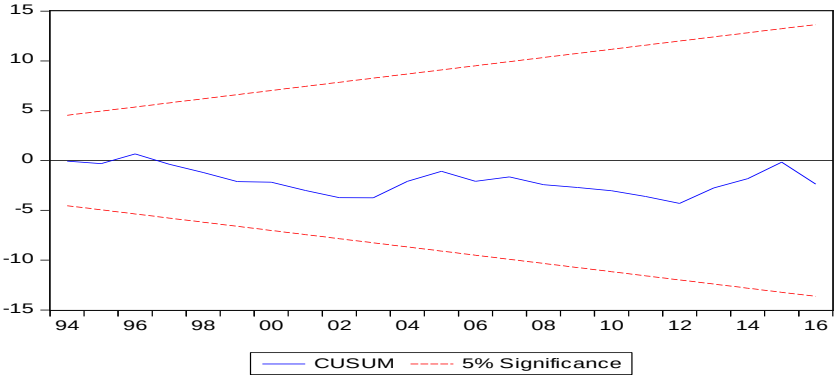
Table no. 9: Heteroscedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	3.029755	Prob. F(6,27)	0.0214
Obs*R-squared	13.68061	Prob. Chi-Square(6)	0.3334

Source: Authors, 2020

The p-value (0.3334) of Obs* R-squared showed that we could not reject the null hypothesis. This implies that residuals have a constant variance which is desirable. That is, residuals are homoskedastic.

Figure no. 1: CUSUM Stability Test



Source: Authors, 2020

The above figure shows that the CUSUM line is within the critical bounds of 5 per cent level of significance, which indicates that the model has structural stability.

5. Conclusions

The study investigates stock market returns and monetary policy in Nigeria from 1986 to 2017 (31 years). In evaluating its objectives, the paper adopts Error Correction Modeling techniques to account for the dynamics of the model and also prevent the variables from converging to their long-run characteristics by gradually adjusting it back to their short-run equilibrium positions. The empirical result indicates that money supply, exchange rate and the inflation rate has a positive and significant relationship with economic growth in the short-run. The findings of the study agree with the results of Jonathan and Oghenebrume (2017), who also found a linear relationship between the variables. It is therefore recommended that the financial institutions should do more to enhance capital financing sources options to the public as a means toward better return on the stock.

6. References

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