MONETARY POLICY AND STOCK MARKET PERFORMANCE: EVIDENCE FROM NIGERIA

LAWSON EGHOSA IGBINOVIA
Faculty of Management Sciences, University of Benin, Nigeria
lawson.igbinovia@uniben.edu
AMENZE SANDRA AIRHIAVBERE
Faculty of Management Sciences, University of Benin, Nigeria
amenze.airhiavbere@uniben.edu

Abstract

The study used Vector Error Correction Model (VECM) causality framework to examine the influence of Monetary Policy instruments on stock market performance in Nigeria. Monthly data ranging Jan 2010 to Jun 2019 were sourced and analyzed with the VECM methodology after the preliminary test of descriptive statistics, correlation analysis, ADF stationarity test, Johansen co-integration test and Akaike Information Criteria (AIC) were satisfied according to theoretical requirement. Findings show that Monetary Policy instruments of Broad Money Supply (BMS) and Inflation Rate (INFR) were significant determinants of stock market return (proxied by all share index) in the short run. BMS, INFR, Interest Rate (INTR), Exchange Rate (EXR) and Market Capitalization (MCAP) (controlled variable) significantly impact stock market performance in the long run. Since, all the Monetary Policy instrument variables jointly explain 53% dynamics in stock market performance and their corresponding relationship when taken together is significant as indicated by F-statistics; the study concludes that Monetary Policy instruments are significant determinants of stock market performance in Nigeria via interest rate, exchange rate and inflation transmission channel.

Keywords: Nigeria, Monetary Policy, Stock market.

JEL Classification: E44, E52, C58

1. INTRODUCTION

Majority of emerging economies have recognized the importance of stock market in promoting the efficiency and quality of domestic financial system. The interconnection and interrelatedness of domestic markets with international market has made the global capital market becomes inevitable (Osakwe & Chukwululu, 2019). Monetary Policy is targeted at achieving some set of broad economic objectives exhibited in terms of macroeconomic variables like employment, exchange rate, real output, inflation rate, among others. However, monetary policy actions such as central bank discount rate dynamics have an indirect impact at best

on aforementioned variables and reasonable lags are involved in the policy transmission mechanism (Ioannidis & Kontonikas, 2006). Vibrant financial market like the mortgage market, stock market, repurchases market, foreign exchange market, government and corporate bonds markets are efficient to incorporate new information to reflect in stock prices. Thus, immediate and a more direct influence of dynamics in Monetary Policy instruments may be noticed using financial data. Identifying the nexus between Monetary Policy and financial asset prices is germane to understand better the transmission mechanism of monetary policy in asset price changes perform a fundamental role in various channels (Ioannidis & Kontonikas, 2006).

One of the economic tools used by the apex bank to influence macroeconomic variables such as production and consumer price index is Monetary Policy. The key popular Monetary Policy tools the apex bank applied is to change the short-term interest rate to achieve government macroeconomic goals (Osakwe & Chukwululu, 2019). Apex banks manage short term interest rate level and influence the cost and accessibility of loanable credit and funds in the economy via dynamics in Money Supply (MS). Changes in MS directly impact short-term interest rates and indirectly affect long term financial derivatives, exchange rates, stock price, interest rates and other assets(Asiedu, Opong & Gulnabat, 2020). These direct and indirect transmission mechanisms of changes in MS significantly influence micro and macroeconomic variables such as the general price level, production, employment levels, household consumption and business investment in all economies (Asiedu, Opong & Gulnabat, 2020).

1.1 STATEMENT OF THE RESEARCH PROBLEM

In the economy, stock prices are among the most closely monitored asset prices that are extremely sensitive to economic conditions. In transmission mechanism contest via stock market, Monetary Policy actions impact stock prices, which are linked to the real economy via their effect on investment spending (balance sheet) channel and consumption spending (wealth effect) channel (Goodhart & Hofmann, 2000). As a result of this, many researchers' attention was drawn to investigate the direct and indirect transmission mechanism of Monetary Policy variables affecting stock markets (Aliyu, 2009). Famous among these studies are Asiedu, Opong and Gulnabat (2020), Osakwe and Chukwululu (2019), Udegbunam and Eriki (2001), Osuagwu (2009), Uchendu (1996), Ioannidis and Kontonikas (2006) amongst others. These studies established mixed significant findings that were germane to the literature with respect to the relationship between some Monetary Policy variables (inflation rate, liquidity and exchange rate) and stock market performance. While there is relatively enough empirical evidence about the monetary transmission mechanism following changes in money supply in developed financial markets; the evidence remains scanty for frontier and emerging market like Nigeria.

This study therefore focuses on bridging this gap by testing the presence and effects of Monetary Policy transmission mechanism on stock market performance in Nigeria as the broad objective. The specific objectives are to:

- Examine the influence of broad money supply on stock market performance in Nigeria.
- Investigate the effect of exchange rate on stock market performance in Nigeria.
- Ascertain the impact of inflation rate on stock market performance in Nigeria.
- Study the relationship between interest rate and stock market performance in Nigeria.
- Determine the relationship between monetary policy rate and stock market performance in Nigeria.

The findings from this study will be of immense benefit to central bank, portfolio managers and stock market participants by giving them a clear insight and awareness of the relationship between Monetary Policy and stock market performance in order to better understand the effects of policy shifts in Nigeria.

2. LITERATURE REVIEW

2.1 MONETARY POLICY AND STOCK MARKET PERFORMANCE

Monetary Policy is associated to measures developed to affect the volume, availability and direction of credits and money to obtain the desire macroeconomic objective (Osakwe & Chukwululu, 2019). Folawewo and Osinubi (2006) defined Monetary Policy as the combination of measures developed to regulate the supply, value and cost of money in an economy, in relation with the expected level of economic activity. It is the idea the apex bank (central bank) uses to control the quantum of money in circulation in order to control aggregate demand (Mortimer, 2012). The central bank uses the Deposit Money Banks (DMBs) to execute and implement policies that guarantee the orderly amount of money in circulation and development of the economy via appropriate changes in money supply level (Masha, Essien, Musa, Akpan & Abeng, 2004). The Central Bank influenced DMBs reserve via its different Monetary Policy instruments. These instruments are liquidity ratio, primary operations; cash reserve requirement and open market operations to control reserves movement. These activities affect the banks in the area of credit operation and in turn impact the availability and cost of loanable funds. Like this, the financial system provides a useful platform and channel for monetary policy implementation (Masha et al, 2004).

The financial market is a conduit that helps to mobilize funds from the surplus to the deficit sector of the economy. The money market deals in short-term securities while capital markets specialize in the mobilization of long-term funds for the purpose of rapid economic growth and development (Ajie, 2006). The segment of the capital market that deals in buying of new issues is the primary market while the second segment is the secondary markets that consists of exchanges and over-the-counter market where securities are bought and sold for their issuance in the

primary market. The capital market generally defined as the market where medium to long-term finance can be raised (Akingbohungbe, 1996). This facilitates the buying and selling of securities such as shares and bonds (Pandey, 2002). The amount of funds available for mobilization and allocation in the financial market depends on a host of factors including disposable income, consumption pattern, price level, financial intermediation, market confidence and integrity. Osazee (2007) saw the capital market as an entity that produces the necessary lubricant that keeps the economic wheel moving. Generally, economist concur that restrictive monetary policy result to lower stock prices; and expansionary monetary policy increases stock prices (Waud, 1970).

2.2 THEORETICAL LITERATURE

2.2.1 THEORY OF PRESENT VALUE OR DISCOUNTED CASH FLOW MODEL

This valuation model was first used in the industry in the 1700s or 1800s; it was elaborated by Williams's theory of investment value in 1938. In financial economics it was widely discussed in the 1960s and became widely used in the US. The theory opposed the idea of economist that believes that prices are largely determined by expectations and counter expectations of capital gains. He positioned that in financial market prices should reflect an asset's present value (intrinsic value). The theory changed the focus from market time series to the underlying components of asset value; instead of direct forecasting of stock prices. Williams emphasize future corporate earnings and dividends.

The theory further stress that asset value should be calculated using "evaluation by rule of present worth", where the intrinsic long term worth is the intrinsic value of its future net cash flows for common stock in the form of dividend distribution and selling price. Under certainty condition, stock value is therefore, the discounted value of all its future dividends.

2.2.2 STOCK PRICE DETERMINATION MODEL

This model was built on Gordon growth model as explained by Mishkin (2007) that decline in required rate of return and rise if dividend growth rate decreases the denominator in Gordon growth model. The model further positioned that monetary policy effect on stock market performance is hinged on the following conditions; when interest rate is reduced by central bank, bond return will fall, Investors will be willing to accept a lower return on equity investment which is an alternative asset. This will result to increase in stock price base on the reduction in Gordon growth model denominator caused by decline in required rate of return. Second, interest rate reduction may likely stimulate the economy, so that Dividend Growth Rate (DGR) is likely to increase. This rise in DGR also causes Gordon growth model denominator to decrease and leads to increase in stock price (Mishkin, 2007).

2.3 EMPIRICAL LITERATURE

Several empirical studies have been carried on the links between Monetary Policy and the stock market performance in developed and emerging economies with interesting findings and conclusion.

Okpara (2010) used the Two Stage Least Squared Method and simultaneous equations to investigate the effect of monetary policy on stock returns in Nigeria between 1985 and 2006. The all share index was dependent variable of the study while Treasury bill rate, interest rate and monetary policy rate were employed as the monetary policy tools. Data were analyzed using co-integration test, Vector Error Correction Model (VECM) and the Forecast Error Decomposition Analysis (FEDA). The study discovered that monetary policy is a significant determinant of long-run stock market returns in Nigeria.

With the help of monthly data ranging from January, 2003 through December, 2013, Rifat (2015) investigated the extent to which monetary policy tools such as inflation, real output, money supply, exchange rate can explain stock market returns in Bangladesh. The study used Johansen co-integration test, VECM, and Vector Autoregressive (VAR) Model. It was found that there is no significant relationship between monetary policy instruments and stock market in Bangladesh.

Nwakoby and Alajekwu (2016) used the price-based monetary policy to study the effect of monetary policy on stock market performance in Nigeria within 1986 and 2013. All Share Index (ASI) was used as the indicator of stock market performance while the explanatory variables include monetary policy rate, Treasury bill rate, lending interest rate, liquidity ratio and deposit rate. The Johansen co-integration, OLS and granger causality tests techniques were adopted. The findings show that monetary policy has the potential (53%) to influence the stock market, but the causality analyses showed that monetary policy cannot influence stock market performance but rather stock market performance has influenced the direction of monetary policy in Nigeria through lending and deposit rates.

Onyeke (2016) studied the effect of monetary policy on stock returns in Nigeria from 2003 to 2014. Monthly data of ASI, inter-bank rate, consumer price index, exchange rate and Treasury bill rate were considered and analyzed with VAR techniques. The estimated results revealed that monetary policy variables did not have a significant impact on the prices of stock in Nigerian equity market.

Bissoon, Seetanah, Bhattu-Babajee, Gopy-Ramdhany and Seetah (2016) employed a panel data from five open countries to investigate the impact of monetary policy on stock markets covering the period of 2004 to 2014. The explanatory variables of interest rate and money supply were regressed on stock returns from Mauritius, London, Trinidad, Australia and Japan. Using a random effect model for the panel regression coupled with a panel vector error correction model. The results confirm that both in the short run and long run monetary variables explain changes in stock return.

Adekunle, Alalade, and Okulenu, (2016) looked at the impact of macroeconomic pricing variables such as interest rate, inflation rate, and exchange rate on capital markets growth between 1985 and 2013. Both simple and multiple regression analysis of the OLS were used to estimate the specified model equations. Findings of the study revealed that interest rates have an adverse effect on capital market growth as proxied by ASI.

Nkoro and Uko (2016) investigated the relationship between exchange rate and inflation volatility and stock prices volatility in Nigeria, using time series quarterly data from 1986Q1-2012Q4. The volatilities of exchange rate and inflation in this study were calculated using standard GARCH(1,1) models. The relationship between exchange rate, inflation volatility and stock prices volatility were examined using GARCH(1,1) models of an extended GARCH-X models. The findings of the study show that there is a negative relationship between stock market prices volatility and exchange rate and inflation volatility in Nigeria.

Suhaibu, Harvey and Amidu (2017) employed the VAR model to examine monetary policy and stock market dynamics in twelve African countries from 1979 to 2013. Findings established that real interest rate has the greatest influence on the stock market and inflation. Conversely, the stock market turns to exert greater influence on real interest rate than it does on money supply, therefore indicating a reverse relationship between monetary policy and the stock market.

Osakwe and Chukwululu (2019) examined monetary policy effect on stock market performance in Nigeria. Intermediate monetary policy target was used to proxied monetary policy of the apex bank and ASI as stock market performance proxy. The OLS regression technique was used to analyze data from 1986 to 2015. Findings show that exchange rate and money supply have significant positive effect on stock market price movement, while Interest rate has a non-significant negative effect on stock market price movement. Generally, the findings indicate that monetary policy variables significantly determine 94% of the stock market performance movements in Nigeria.

Asiedu, Opong and Gulnabat (2020) studied monetary policy effect on stock performance in 10 selected Africa countries from 1970 to 2019. The study applied random effect model as decided by Hausman test and VECM methodology thereafter. Findings confirmed the presence of monetary transmission mechanism due to changes in money supply. Also, broad money growth directly affects the stock market performance via the interest rate channel. Interest rate and inflation recorded negative effects on stock market performance indices.

It is seen that prior studies reviewed in the literature are relatively scanty in the case of Nigeria; the impact of various monetary policy instruments of money supply, exchange rate. Inflation rate and monetary policy rate on stock market performance is mixed. These mixed findings could be caused by difference in time and variables scope, variable measurement and estimation techniques employed in these studies. Thus, more studies are needed. Also, most of the studies used annual/quarterly data and VAR method which only ascertains the short run causality

relationship between monetary policy instruments and stock market performance in Nigeria, without showing the long run causality effect. Also, none of these studies controlled for other determinants of stock market performance in their model. This study stands unique from prior studies by employing recent monthly data and VECM framework to establish short and long run causality influence of monetary policy instruments on stock market performance with other determinants of stock market performance controlled for in the model; this is the contribution of this study.

3. METHODOLOGY

The longitudinal research design is employed in this study because the variables have manifested for a period and cannot be altered or manipulated by the researcher. All stock market performance indexes constitute the population of this study. However, this study purposively selects the All Shares Index (ASI) from 2010 to 2019 as the sample of this study. ASI is selected because it captures the positive and negative performance of all shares traded in the Nigeria Exchange Limited (NEL) which evaluate into a single performance index indicator of the entire market. High frequency monthly time series data of ASI and all monetary policy variables are used, to reflect more observation of share performance and Monetary Policy activities. Controlled variables of market capitalization and trade volume were sourced on annual basis. However, these variables were calibrated into monthly data using E-views 9.0 to foster data uniformity among the variables of interest in the model. ASI and all the Monetary Policy and controlled variables were sourced from the CBN Statistical Bulletin and Security and Exchange (SEC) Statistical Bulletin 2019 from Jan-2010 to Jun-2019.

3.1 THEORETICAL FRAMEWORK

This study is based on the theory of present value (discounted cash flow) model. This is so because it provides a useful insight that clearly explains how monetary policy dynamic affects stock market performance. The theory believes that stock price (S_p) is the intrinsic value of future dividend(DVD_{t+F}). Under constant discount rate (R) assumption it shows that:

$$S_p = M_t\left[\sum_{j=1}^{N}\left(\frac{1}{1+R}\right)^{j} DVD_{t+F}\right] + M_t\left[\left(\frac{1}{1+R}\right)^{N} S_{t+N}\right] \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where;
S_p = stock price
M_t = conditional expectations operator based on available information to market participants time *t*,
R = market participant rate of return used to discount future dividends.
N = stock holding period (investor's time horizon). The standard transversality condition monetary policy lies that as the horizon *N* increases the second term in Eq.

(1) right hand side vanishes to zero due to absence of rational stock price bubbles. Thus:

$$\lim_{N \to \propto} M_t \left[\left(\frac{1}{1+R} \right)^N S_{t+N} \right] = 0 \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots .. (2)$$

Like this the familiar version of the present value model is obtained.

$$S_p = M_t \left[\sum_{j=1}^{N} \left(\frac{1}{1+R} \right)^j DVD_{t+F} \right] \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots .. (3)$$

Campbell, Lo, and MacKinlay (1996) also used this procedure to derive Eq (3).Equation 3 denote that monetary policy dynamics can influence stock returns in dual ways. First, via altering of market participants discount rate (direct effect). That is contraction monetary policy result to rise in rate at which future cash flows of firms are capitalized which eventually reduces stock price. Due to the underlying assumption that market participant discount factor is strongly correlated to market interest rate. Second, the influence of market interest rates by the CBN. In this manner, changes in monetary policy indirectly affect firm’s stock value by changing the expected future cash flows. Expansionary monetary policy tends to spur the general level of economic activities and stock price will positively respond with higher future cash flow expectation. These channels in general perceive are strong link between monetary policy, the real economy and the stock market. Stocks are claims on future economic output, so if monetary policy has real economic effects then stock markets should be influenced by monetary conditions (Patelis, 1997). Sequel to the theoretical underpinnings it is clear that stock price movements can be determined by changes in monetary policy variables and inflation consequences, therefore our analysis of the statistical linear relationship of these variables on stock prices can be established.

3.2. MODEL SPECIFICATION

This study adapted Eq (3) from the theoretical framework, modified to suit the objective of this paper. The structural model to estimate the nexus between monetary policy variables and stock market performance is stated functionally as:

$$STMP = f(BMS, EXR, INFR, INTR, MPR, MCAP, TVLM) \ldots \ldots \ldots \ldots \ldots \ldots \ldots .. (4)$$

Given a co-integrating relationship among variables in line with existing literature, the estimated VECM with standard assumptions indicating interrelationship between monetary policy and STMP is given as:

$$STMP_t = \alpha_{1t} + \sum_{j=i}^{n} \beta_{1j}\, STMP_{t-1} + \sum_{j=i}^{n} \beta_{2j}\, BMS_{t-1} + \sum_{j=i}^{n} \beta_{3j}\, EXR_{t-1} + \sum_{j=i}^{n} \beta_{4j} INFR_{t-1} + \sum_{j=i}^{n} \beta_{5j} INTR_{t-1} + \sum_{j=i}^{n} \beta_{6j}\, MPR_{t-1} + \sum_{j=i}^{n} \beta_{7j}\, MCAP_{t-1} + \sum_{j=i}^{n} \beta_{8j}\, TVLM_{t-1} + \delta_1 \gamma_{t-1} + \epsilon_{it} \ldots \ldots (5a)$$

$$BMS_t = \alpha_{1t} + \sum_{j=i}^{n} \beta_{1j}\, BMS_{t-1} + \sum_{j=i}^{n} \beta_{2j}\, STMP_{t-1} + \sum_{j=i}^{n} \beta_{3j}\, EXR_{t-1} + \sum_{j=i}^{n} \beta_{4j} INFR_{t-1} + \sum_{j=i}^{n} \beta_{5j} INTR_{t-1} + \sum_{j=i}^{n} \beta_{6j}\, MPR_{t-1} + \sum_{j=i}^{n} \beta_{7j}\, MCAP_{t-1} + \sum_{j=i}^{n} \beta_{8j}\, TVLM_{t-1} + \delta_1 \gamma_{t-1} + \epsilon_{it} \ldots \ldots (5b)$$

$$EXR_t = \alpha_{1t} + \sum_{j=i}^{n} \beta_{1j}\, EXR_{t-1} + \sum_{j=i}^{n} \beta_{2j}\, STMP_{t-1} + \sum_{j=i}^{n} \beta_{3j}\, BMS_{t-1} + \sum_{j=i}^{n} \beta_{4j} INFR_{t-1} + \sum_{j=i}^{n} \beta_{5j} INTR_{t-1} + \sum_{j=i}^{n} \beta_{6j}\, MPR_{t-1} + \sum_{j=i}^{n} \beta_{7j}\, MCAP_{t-1} + \sum_{j=i}^{n} \beta_{8j}\, TVLM_{t-1} + \delta_1 \gamma_{t-1} + \epsilon_{it} \ldots \ldots (5c)$$

$$INFR_t = \alpha_{1t} + \sum_{j=i}^{n} \beta_{1j}\, INFR_{t-1} + \sum_{j=i}^{n} \beta_{2j}\, STMP_{t-1} + \sum_{j=i}^{n} \beta_{3j}\, BMS_{t-1} + \sum_{j=i}^{n} \beta_{4j} EXR_{t-1} + \sum_{j=i}^{n} \beta_{5j} INTR_{t-1} + \sum_{j=i}^{n} \beta_{6j}\, MPR_{t-1} + \sum_{j=i}^{n} \beta_{7j}\, MCAP_{t-1} + \sum_{j=i}^{n} \beta_{8j}\, TVLM_{t-1} + \delta_1 \gamma_{t-1} + \epsilon_{it} \ldots \ldots (5d)$$

$$INTR_t = \alpha_{1t} + \sum_{j=i}^{n} \beta_{1j}\, INTR_{t-1} + \sum_{j=i}^{n} \beta_{2j}\, STMP_{t-1} + \sum_{j=i}^{n} \beta_{3j}\, BMS_{t-1} + \sum_{j=i}^{n} \beta_{4j} EXR_{t-1} + \sum_{j=i}^{n} \beta_{5j} INFR_{t-1} + \sum_{j=i}^{n} \beta_{6j}\, MPR_{t-1} + \sum_{j=i}^{n} \beta_{7j}\, MCAP_{t-1} + \sum_{j=i}^{n} \beta_{8j}\, TVLM_{t-1} + \delta_1 \gamma_{t-1} + \epsilon_{it} \ldots \ldots (5e)$$

$$MPR_t = \alpha_{1t} + \sum_{j=i}^{n} \beta_{1j} MPR_{t-1} + \sum_{j=i}^{n} \beta_{2j} STMP_{t-1} + \sum_{j=i}^{n} \beta_{3j} BMS_{t-1} + \sum_{j=i}^{n} \beta_{4j} EXR_{t-1} + \sum_{j=i}^{n} \beta_{5j} INFR_{t-1} + \sum_{j=i}^{n} \beta_{6j} INTR_{t-1} + \sum_{j=i}^{n} \beta_{7j} MCAP_{t-1} + \sum_{j=i}^{n} \beta_{8j} TVLM_{t-1} + \delta_1 \gamma_{t-1} + \epsilon_{it} \quad \ldots (5f)$$

$$MCAP_t = \alpha_{1t} + \sum_{j=i}^{n} \beta_{1j} MCAP_{t-1} + \sum_{j=i}^{n} \beta_{2j} STMP_{t-1} + \sum_{j=i}^{n} \beta_{3j} BMS_{t-1} + \sum_{j=i}^{n} \beta_{4j} EXR_{t-1} + \sum_{j=i}^{n} \beta_{5j} INFR_{t-1} + \sum_{j=i}^{n} \beta_{6j} INTR_{t-1} + \sum_{j=i}^{n} \beta_{7j} MPR_{t-1} + \sum_{j=i}^{n} \beta_{8j} TVLM_{t-1} + \delta_1 \gamma_{t-1} + \epsilon_{it} \quad \ldots (5g)$$

$$TVLM_t = \alpha_{1t} + \sum_{j=i}^{n} \beta_{1j} TVLM_{t-1} + \sum_{j=i}^{n} \beta_{2j} STMP_{t-1} + \sum_{j=i}^{n} \beta_{3j} BMS_{t-1} + \sum_{j=i}^{n} \beta_{4j} EXR_{t-1} + \sum_{j=i}^{n} \beta_{5j} INFR_{t-1} + \sum_{j=i}^{n} \beta_{6j} INTR_{t-1} + \sum_{j=i}^{n} \beta_{7j} MPR_{t-1} + \sum_{j=i}^{n} \beta_{8j} MCAP_{t-1} + \delta_1 \gamma_{t-1} + \epsilon_{it} \quad \ldots (5h)$$

Where:

STMP = Stock market performance (Proxied by all share index)
BMS = Broad money supply (Proxied by M_2) for monetary aggregate
INTR = Interest rate (Proxied by Treasury bill rate).
EXR = Exchange rate (proxied by real exchange rate)
INFR = Inflation rate (Proxied by Consumers price index)
MPR = Monetary policy rate. Used to capture monetary transmission via the interest rate channel, as the new included monetary policy rate in Nigeria (Osuagwo, 2009)
MCAP = Market capitalization (Total market capitalization)
TVLM = Trade volume (Aggregate volume of trade in the market)
n = Maximum number of lags
α = autonomous term

β_1, β_2, β_3, β_4, β_5, β_6, β_7, β_8 = parameter of explanatory variables to be estimated.

γ_{t-1} = Error correction term

ϵ_{it} = Stochastic term

The *A priori* expectation is derived from the empirical literature is given as;

$\alpha_0 > 0$

$\beta 1$, $\beta 2$, $\beta 3$, $\beta 4$, $\beta 5$, $\beta 6$, $\beta 7$ and $\beta 8 > 0$

MCAP and TVLM are controlled variables included in the model variables that are important determinants of STMP.

4. METHOD OF DATA ANALYSES

4.1 DATA ANALYSES

Table 1. *Summary Statistics*

	ASI	BMS	INTR	EXR	INFR	MPR	MCAP	TVLM
Mean	4.473860	7.249474	10.26177	210.9596	11.86070	11.73465	7.005439	4.979035
Median	4.470000	7.220000	10.80000	164.6250	11.67000	12.00000	7.015000	4.980000
Maximum	4.650000	7.540000	15.25000	309.7300	17.63000	14.00000	7.150000	5.040000
Minimum	4.300000	7.020000	1.040000	150.0800	7.970000	6.000000	6.800000	4.720000
Std. Dev.	0.092502	0.145935	3.281858	66.43842	2.781532	2.536304	0.103275	0.050816
Skewness	0.027376	0.355706	-0.971938	0.651517	0.395401	-1.287127	-0.496717	-2.084613
Kurtosis	1.979280	2.170782	3.631980	1.568849	2.345786	3.433815	2.158531	10.61156
Jarque-Bera	4.963117	5.670123	19.67166	17.79393	5.003486	32.37115	8.051159	357.7621
Probability	0.083613	0.058715	0.000053	0.000137	0.081942	0.000000	0.017853	0.000000
J-B Joint Stat	3200.976			Df = 14		Prob. = 0.0000		

Source: Researcher's Estimation 2021

Table 1 shows the Jarque-Bera (JB) statistics which is of more concern because it factors in the Skewness and Kurtosis values of the variables in its computation. On individual bases, only ASI and BMS are normally distributed since their corresponding probability values are not significant at 5% level of confidence. Generally, all the variables are not normally distributed as indicated by the JB joint statistics of 3200.98 approximately that is significant at 5% confidence level after considering degree of freedom. Thus, confirming the stationarity of these variables becomes imperative. However, the strength and direction of relationship between the variables is determined first.

Table 2. *Correlation Matrix*

	ASI	BMS	INTR	EXR	INFR	MPR	MCAP	TVLM
ASI	1.000000	0.447950	0.129888	0.274553	-0.135897	0.446162	0.736725	0.510680
BMS	0.447950	1.000000	0.344572	0.690897	0.224370	0.790768	0.606510	-0.155872
INTR	0.129888	0.344572	1.000000	0.380249	0.170549	0.747918	0.372870	0.076419
EXR	0.274553	0.690897	0.380249	1.000000	0.586018	0.671027	0.508486	-0.132344
INFR	-0.135897	0.224370	0.170549	0.586018	1.000000	0.042039	0.095773	-0.004512

MPR	0.446162	0.790768	0.747918	0.671027	0.042039	1.000000	0.690903	0.092321
MCAP	0.736725	0.606510	0.372870	0.508486	0.095773	0.690903	1.000000	0.301419
TVLM	0.510680	-0.155872	0.076419	-0.132344	-0.004512	0.092321	0.301419	1.000000

Source: Researcher's Estimation 2021

Table 2 revealed that only INFR has weak negative association with ASI. This indicates that increase in INFR reduces ASI performance during the studied period vise-visa. Other variables have direct relationship with ASI which means that increase in these variables increases ASI vise-visa. However, only the coefficient of MCAP and TVLM were strong and other monetary policy variables were weak. There is evidence of multi-collinearity absence among the variables since there is no correlation coefficient among the endogenous variables that is > 0.80 in the matrix.

Table 3. *Stationarity Test*

Augmented Dicky-Fuller (ADF) Test			
Variables	ADF Stat	Order	Remark
ASI	-9.625152*	I(1)	S
BMS	-10.43751*	I(1)	S
INTR	-8.225669*	I(1)	S
EXR	-7.358154*	I(1)	S
INFR	-2.796278***	I(0)	S
MPR	-10.21230*	I(1)	S
MCAP	-4.182124*	I(1)	S
TVLM	-12.21073*	I(2)	S
Critical Values			
1%	-4.042042	1(1)	2nd Diff
5%	-3.450436	1(1)	2nd Diff
10%	-2.580908	1(0)	2nd Diff

Source: Researcher's Estimation 2021

Table 3 show that only INFR is stationary at levels I(0). This warranted the differencing of other non-stationary variables. At first difference all variables (except for TVLM) were stationary at order I(1). Only TVLM were stationary at second difference I(2) after taking the second difference. These variables are fit to be used in our regression model in this their stationary state. However, since TVLM fails to meet VECM requirement as the only variable stationary at order I(2), VTLM is dropped in the VECM estimation.

Table 4. *Co-integration Test*

Rank (Trace) Unrestricted Co-integration Test				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.488299	233.5812	159.5297	0.0000
@ most 1 *	0.375150	164.5698	125.6154	0.0000
@ most 2 *	0.338688	116.1346	95.75366	0.0010
@ most 3 *	0.250174	73.54108	69.81889	0.0245

@ most 4	0.197303	43.88594	47.85613	0.1124
@ most 5	0.126838	21.24875	29.79707	0.3423
@ most 6	0.067676	7.278401	15.49471	0.5455
@ most 7	0.000589	0.060678	3.841466	0.8054
4 co-integrating Eqs is identified by Trace test @ 5% level				
* indicates the hypothesis rejection @ 5% level				
**MacKinnon-Haug-Michelis (1999) p-values				
Maximum Eigenvalue Unrestricted Cointegration Rank Test				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.488299	69.01144	52.36261	0.0005
@ most 1 *	0.375150	48.43516	46.23142	0.0286
@ most 2 *	0.338688	42.59355	40.07757	0.0255
@ most 3	0.250174	29.65513	33.87687	0.1471
@ most 4	0.197303	22.63719	27.58434	0.1895
@ most 5	0.126838	13.97035	21.13162	0.3675
@ most 6	0.067676	7.217724	14.26460	0.4637
@ most 7	0.000589	0.060678	3.841466	0.8054
3 co-integrating is shown by Max-eigenvalue test at 5% level				
* Means hypothesis rejection at 5% level				
** Prob coefficients of MacKinnon-Haug-Michelis (1999)				

Source: Researcher's Estimation 2021

Both the Trace and Maximum Eigen statistic in table 4 confirm more than one co-integrating association between variables. This means that long run (co-integrating) relationship exist among variables.

4.2. DIAGNOSTIC TEST

Table 7. *VEC Residual Portmanteau Tests for Autocorrelations*

Q-Stat	Prob.	Adj Q-Stat	Prob.	df
22.37263	NA*	22.57978	NA*	NA*
86.17441	0.6235	87.57413	0.5822	91
125.2196	0.8095	127.7244	0.7630	140
160.1708	0.9371	164.0071	0.9053	189
199.7479	0.9661	205.4869	0.9374	238
260.9242	0.8633	270.2268	0.7537	287
323.6328	0.6763	337.2389	0.4707	336
370.1968	0.6972	387.4913	0.4548	385
398.9045	0.8853	418.7826	0.6915	434
447.5074	0.8748	472.2949	0.6276	483
482.3253	0.9397	511.0210	0.7361	532
554.0003	0.7838	591.5629	0.3716	581

Source: Researcher's Estimation 2021

Table 7 show that the Q-stat coefficient and it adjusted version are not significant as indicated by their corresponding prob values that is > 0.05 up to order 12. This shows the absence of serial correlation in the model. Thus, this model is reliable for policy formulation without re-specification. The ASI lag period considered positively and significantly impact current year ASI on an average in the short run.

4.3 DISCUSSION OF FINDINGS

In the short run, all the monetary policy variables have varying degree of ceteris paribus cause-effect relationship with stock market performance (ASI). A percentage change in BMS, MCAP and MPR is associated with -0.62(62%), -0.37(37%) and -0.011 (0.11%) significant decrease in ASI on the average respectively (except for MPR). These variables fail to conform to *A priori* expectation, and this implies that policy effort towards this direction has not achieved it desired objective of using monetary policy, MCAP and MPR to spur stock market performance. This finding is in line with that of Thorbecke (1997), Cassola and Morana (2004) whom confirmed in their study that monetary policy instruments have significant impact on stock market performance in the short run. A percentage change in INTR, EXR and INFR is related with 0.0022 (0.22%), 0.0002 (0.02%) and 0.015467 (1.55%) increase in ASI in the short run. However, only the increase in INFR is significant. This means that monetary policy is in the right direction with the behavior of these variables conforming to *A priori* expectation and inflation rate is within a reasonable threshold to positively influence stock market performance. Ajie and Nenbee (2010), Osakwe and Chukwululu (2019) confirmed this in their studies that INTR and INFR had short run significant effect on stock prices in the short run. Contrary to that of Zhao (1999), Udegbunam and Eriki (2001), Asiedu, Opong and Gulnabat (2020) in the literature that INFR negatively influence stock market performance. More so, positive feedback effect was observed between ASI and EXR while ASI variable had a negative causal effect feedback on other monetary policy variables in the short run. However, these feedback effects from stock market to monetary policy instruments were not significant. These finding is in tandem with that of Suhaibu, Harvey and Amidu (2017).

In the long run, the ceteris paribus cause-effect relationship shows that long run causality effect exists between monetary policy variables and ASI as shown by their corresponding coefficients. A percentage change in BMS, INTR, INFR and MCAP is associated with 3.52%, 4%, 10% and 71% significant decrease in ASI, respectively. This also implies that monetary policy should be relied upon only for a short time because it has adverse effect on stock market performance via interest and inflation rate channel. The result also shows that stock market investment is not a good hedge against inflation in Nigeria in the long run. EXR and MPR have positive effect on stock market performance during the studied period. However, only the effect of EXR is significant. This means that monetary policy via exchange rate channel significantly influences stock market performance on the average ceteris paribus. These findings corroborated that of Patelis (1997), Ioannidis and Kontonikas (2006) that monetary policy instruments significantly impact stock

returns in the long run. However, contrary to that of Rifat (2015) and Onyeke (2016) who found that there is no significant relationship between monetary policy instruments and stock market in Bangladesh and Nigeria, respectively.

5. CONCLUSION AND RECOMMENDATIONS

The study on monetary policy instruments on stock market in Nigeria based on its findings concludes that monetary policy instruments are significant determinants of stock market performance in Nigeria via interest rate, exchange rate and inflation transmission channel. Based on this, the study recommends that:

- Monetary policy in Nigeria should be used for a short period in order to positively influence stock market performance through interest rate, exchange rate and inflation transmission channel.
- Monetary policymakers should make and implement the right policy tools to achieve the desired results through the monetary transmission mechanism.
- The CBN must keep inflation rate within a meaningful threshold not to erode the value of stock market investments.
- Restrain should be imposed by regulatory authorities in indiscriminate use of policy instruments, because to a large extent the use of monetary policy instrument affects stock market performance.
- Nigeria stock exchange development should require professionals who possess an indebt understanding on how monetary policy work. Hence, the board of the Nigerian exchange limited should be handled, not just by professional guru but also a specialist in economics and finance.

REFERENCES

Adekunle, O. A., Alalade, Y.S.A., Okulenu, S. A. (2016). Macro-economic variables and its impact on Nigerian capital market growth. *International Journal of Economics and Business Management, 2*(2), 22 – 37.

Ajie, H. A. (2006). Financial institution in Nigeria. Port Harcourt: Pearl Publishers.

Akingbohungbe, S.S. (1996). The role of the financial system in the development of the Nigerian economy. Paper Presented at a Workshop Organized by Centre for Africa Law and Development Studies.

Aliyu, S. (2009). Stock prices and exchange rate interactions in Nigeria: An intra-global financial crisis maiden investigation. *Munich Personal Repec Archive (MPRA)* Paper No. 13283. Retrieved from http://mpra.ub.uni-muenchen.de/id/eprint/13283.

Asiedu, M., Opong, E. O., Gulnabat, O. (2020). Effects of monetary policy on stock market performance in Africa: Evidence from ten (10) African countries from 1980 to 2019. *Journal of Financial Risk Management, 9*, 252-267.

Bernanke, B., Gertler M., (1989). Agency costs, net worth, and business fluctuations.

American Economic Review, 79, 14-31.

Bernanke, B., Gertler M., (1995). Inside the black box: The credit channel of the monetary policy transmission. *Journal of Economic Perspectives, 9*, 27-48.

Bissoon, R., Seetanah, B., Bhattu-Babajee, R., Gopy-Ramdhany, N., Seetah, K. (2016). Monetary policy impact on stock return: Evidence from growing stock markets. *Theoretical Economics Letters, 6*, 186-1195.

Boschen, J., Mills, L., (1995). The relation between narrative and money market indicators of monetary policy. *Economic Inquiry, 33*, 24-44.

Cassola, N., Morana, C., (2004). Monetary policy and the stock market in the Euro area. *Journal of Policy Modeling, 26*, 387-399.

Folawewo, A.O., Osinubi, T.S. (2006). Monetary policy and macroeconomic instability in Nigeria: A rational expectation approach. *Journal of Social Sciences*, *12*(2), 93- 100.

Gertler, M., Gilchrist, S., (1993). The role of credit market imperfections in the monetary transmission mechanism: Arguments and evidence. *Scandinavian Journal of Economics*, *95*, 43-64.

Goodhart, C., Hofmann, B. (2000). Financial variables and the conduct of monetary policy, Sveriges Risk bank Working Paper, No. 12.

Jensen, G., Johnson, R., (1995). Discount rate changes and security returns in the US, 1962-1991. *Journal of Banking and Finance*, *19*, 79-95.

Ioannidis, C., Kontonikas, A. (2006). Monetary policy and the stock market: some international evidence. Department of Economics Journal, Adam Smith Building, University of Glasgow, Glasgow, *3*(2), 1-25.

Masha S. N, Essien M. L., Musa D., Akpan, B., Abeng M. O. (2004). Theoretical issues in financial intermediation, financial markets, macroeconomic management and monetary policy. In Nnanna, O. J., Englama A. and Odoko, F. O. (eds), Financial Markets in Nigeria. Central Bank of Nigeria Publication, 7-27.

Mortimer, R. (2012). Monetary policy explained. Economic basics, December 30. Retrieved 29th November 2016 from http://romeconomics.com/monetary-policyexplained/.

Nkoro, E. & Uko, A.K. (2016). Exchange rate and inflation volatility and stock prices volatility: Evidence from Nigeria, 1986-2012. *Journal of Applied Finance & Banking*, *6*(6), 57-70.

Nwakoby, C. & Alajekwu, U.B. (2016). Effect of monetary policy on Nigerian stock market performance. *International Journal of scientific research and management*, *4*(9), 4530-4442.

Onyeke, C.E. (2016). Impact of monetary policy on stock returns in Nigeria. *Middle-East Journal of Scientific Research*, *24*(5), 1778-1787.

Patelis, A., (1997). Stock return predictability and the role of monetary policy. *Journal of Finance, 52*, 1951-1972.

Rifat, A. (2015). Impact of monetary policy on stock price: Evidence from Bangladesh. *Journal of Investment and Management*, *4*(5), 273-284.

Thorbecke, W., (1997). On stock market returns and monetary policy. *Journal of Finance*, *52*, 635-654.

Pandey, I. M. (2002). Financial management. Vijay nicole imprints, Aminjikar Chennai Ltd.

Suhaibu, I., Harvey, S.K., Amidu, M. (2017). The impact of monetary policy on stock market performance: Evidence from twelve (12) African countries. *Research in International Business and Finance*, *42*, 1372-1382.

Udegbunam, R., Eriki, P.O. (2001). Inflation and stock price behavior: Evidence from Nigerian stock market, *Journal of Financial Management & Analysis*, *XX14*(1), 1-10.

Waud, R., (1970). Public interpretation of federal reserve discount rate changes: Evidence on the announcement effect. *Econometrica*, *38*, 231-250.

Willaims, J.B. (1938). The theory of investment value. Retrieved from numeraire.com 23/6/2021

Zhao, X. (1999). Stock prices, inflation and output: Evidence from China, *Applied Economics Letters, 6*(8), 509-511.