

EFFECTS OF SELECTED MACROECONOMIC FACTORS ON STOCK RETURN IN THE NIGERIAN STOCK MARKET (1998-2019)

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Abstract

The nexus between stock return and macroeconomic indicators have been a debatable phenomenon for a long time. It has also be one of the major issues for domestic and foreign investors in building efficient and optimum stock portfolio in the capital market. However, the unstable macroeconomic indicators adversely affect the level of stock return in the Nigerian capital market. Against this background, this study investigates the effect of macroeconomic factors on stock return in the Nigerian capital market. The study employed secondary data obtained from Nigeria Stock Exchange (NSE) fact book and Central Bank of Nigeria (CBN) statistical bulletin within the period of 1998 to 2019. The data obtained was subjected to Autoregressive Distribution Lag (ARDL) method of analysis. Findings revealed that money supply and aggregate industrial production positively and significantly affect stock return with co-efficient and P-value at ($\beta=0.466098$, $P<0.05$; $\beta=0.213141$, $P<0.05$) while exchange and inflation rates negatively affect stock return in the Nigerian stock exchange market with co-efficient and P-value at ($\beta=-0.009285$, $P<0.05$; $\beta=-0.028260$, $P<0.05$) respectively. The study concludes that macroeconomic factors significantly affect stock return in the Nigerian stock market at both the short run and long run. The study recommends that the Central Bank of Nigeria should employ deflationary fiscal policy and Adaptive Stabilization Method of Exchange Rate policy in order to reduce variance between actual and expected stock returns in the Nigerian Stock Market.

Keywords: Foreign Exchange Rate, Inflation Rate, Nigerian Stock Market, Stock Return

JEL Codes: E63, G12

INTRODUCTION

Stock markets with predictable stock returns and sound and stable macroeconomic factors play a vital role in mobilizing long term finance for the private and public sectors of any economy. Globally, stock markets that are characterized by high level of stock returns and effective and stable macroeconomic variables influence capital formation, aggregate industrial production, and economic growth of any nations.

Stock return variances are associated with various stock markets across the globe. The level of stock return influences financial risk which affects cost of capital, investors' participation, and volume of transactions. This instantaneously may have long term implications on portfolio allocation, asset pricing, market risk and enormous negative effect on economic growth and development. Demir (2019) pointed that continuous trend in unstable stock returns in the stock market reduces market size and public confidence enhance market illiquidity and stock market inefficiency which have adverse effects on the

economy. Among developed countries, Fernando (2018) pointed that despite sound macroeconomic policies, stock exchange markets still experience levels of return volatilities.

The challenges of stock return and unstable macroeconomic indicators such as exchange and inflation rates as well as industrial production were common with developing economies especially African stock markets. African Capital Market News (2018) claimed that most returns and macroeconomic factors such as money supply, industrial production, inflation and exchange rates in African stock markets were unpredictable, volatile and at variances with the expected returns due to market information asymmetry, and unstable macroeconomic economic policies. Okonkwo (2019) emphasized that unstable macroeconomic variables especially in developing economies encourage stock returns instability resulting to wrong predictions of stock prices. Okonkwo (2019) further pointed that unstable stock returns in the Nigerian stock market were caused by unstable exchange and inflation rates as well as unsound policies on industrial production and money supply in Nigeria.

Abdullahi and Fakunmoju (2019) and Kuhe (2018) further asserted that the Nigerian stock market is characterized with high stock return volatility, decline in market capitalization and information asymmetry resulting from continuous decline in aggregate industrial production and undervalue of local currency (Naira) to foreign currencies. Various studies within and outside the Nigerian environment such as Adusei, 2014; Aliyu, 2011; Bala-Sani & Hassan, 2018; Balagobei, 2017; Barakat, Elgazzar, & Hanafy, 2016; Cyrus & Kirwa, 2015; Daferighe & Charlie, 2012; Elly & Oriwo, 2012; Haruna, Yazidu, & Paul, 2013; Kabeer, 2017; Khanyisa, Kapingura, & Palesa, 2016; Khumalo, 2013; Kirui, Wawire, & Onono, 2014; Mahedi, 2013; and Owolabi & Adegbite, 2013 among others examined the link between macroeconomic indicators and stock return. These studies employed both exchange and inflation rates to determine stock return but a majority of these studies especially in Nigeria failed to employ aggregate industrial production and money supply in modeling stock return in the Nigerian stock market. This constituted variable measurement gap this study anticipates to investigate.

Considering the problem and gap identified, this study examined the effect of selected macroeconomic factors (industrial production, money supply, exchange and inflation rates) on stock return in the Nigerian stock market. From the gap and problems identified, this study stated null hypothesis that; selected macroeconomic factors (industrial production, money supply, exchange and inflation rates) have no significant effect on stock return in the Nigerian stock exchange market.

LITERATURE REVIEW

This sub-section focuses on conceptual and empirical review of variables such as industrial production, money supply, exchange rate, inflation rate and stock return as well as theoretical framework.

Industrial Production

According to Ozturk and Agan (2017), industrial production measures the output of the industrial sector which typically comprises mining, manufacturing, utilities and, in some cases, construction. Ozturk and Agan (2017) further conceptually pointed that industrial production can be connoted as annual variation in industrial production as a percentage thus reflects the change in the volume of industrial output as compared to the previous year. Majali and Al-Assaf (2014) also defined industrial production as an economic tool that measures the changes in industrial activity in a country over a given period of time. In Nigeria, index of industrial production measures the amount of output from manufacturing, mining and electricity (Kawode, 2015).

Money Supply

Omodero (2019) defined money supply as all the physical cash in circulation throughout the nation, as well as the money held in checking accounts and savings accounts. It does not include other forms of wealth such as long-term investments, home equity, or physical assets that must be sold to convert to cash. It also does not include various forms of credit such as loans, mortgages, and credit cards. Money supply is a tool that gives boost to economic growth based on unexpected increase in money stock (Jawaid, Qadri, & Ali, 2011). Umeora (2010) maintained that money supply is the life wire of all economic activities and so has powerful effect on the economic life of any nation in the sense that an increase in money supply puts more money in the hands of producers and consumers, thereby stimulating investment and consumption activities which in turn would result to growth.

Omodero (2019) conceptually pointed that money supply can be linked to stock prices through portfolio substitution or inflationary expectations effects. In case of the portfolio-balance model, an increased money supply may result in portfolio shifts from idle money to financial assets including equities. Alternatively, Omodero (2019) pointed that an increase in money supply may cause unanticipated increases in inflation and inflation uncertainty. This would lead to higher interest rates and cause a negative link between money supply and stock prices.

Exchange Rate

The price of one currency in terms of another is called the exchange rate. Yang and Zeng (2014) defined foreign exchange rate as the price of a currency in terms of another country's currency. Osigwe and Uzonwanne (2015) defined exchange rate as how much or rate at which a foreign currency per unit can exchange to a local or domestic currency. Obi, Oniore and Nnadi (2016) viewed exchange rate as the ratio between a unit of one currency and the amount of another currency for which that unit can be exchanged at a particular time. Abdullahi, Fakunmoju, Abubarkar and Giwa (2017) defined it as the price strength of one country's currency in relation to another country currency. This means that exchange rate deals with price strength of one currency against another currency which serves as an indicator for economic and stock market performance. Stemming from this definition, exchange rate of currency establishes the connection between domestic and foreign prices of goods and services and also serves as one of the indicators for economic activities and stock market performance (Abdullahi *et al.*, 2017; Manoel-de-Sousa, Noriller, Hupples, Vaz Lopes & Meurer, 2018).

Inflation Rate

According to Shiblee (2009), inflation can be defined as a sustained increase in the general level of prices for goods and services. Inflation rate is a rise in the general level of prices of goods and services in an economy over a period of time (Ariss, 2012). Thus, inflation is a persistent rise in the overall (or average) level of prices of all goods and services. Inflation occurs when prices of goods increase or when it needs more money to purchase few goods. Stock prices are the reflector of various variables such as inflation, exchange rate, interest rate and industrial production (Aliyu, 2011). Thus, a predictable increase in the rate of inflation slows down financial market development, stock market liquidity and reduced stock returns financial value (Owolabi & Adegbite, 2013). Barakat, Elgazzar and Hanafy (2016) pointed out that uncertainty about inflation rate enhances increase in stock return volatility.

Stock Return

Pandey (2008) defined stock return as the expected returns on a stock given its current prices and expected future cash flows. Muchiri (2014) defined stock returns as the change in stock prices relative to the initial

prices at which the investor bought the stock. Kganyago and Gumbo (2015) defined stock returns as the capital gain as well as any income earned by the investor from the stock. These returns could be in the form of profit through trading or in the form of dividends given by the company to its shareholders from time-to-time. Uzuke, Obiora-Ilouno and Eze (2016) view stock market returns as an index to investors or government in making their investment decisions. Onoh (2016) ascribed that stock returns is any change in value of the investment, and/or cash flows which the investor receives from the investment such as interest payments or dividends. It may be measured by All Share Index either in absolute terms or as a percentage of the amount invested. Onoh, Ukeje and Nkama (2017) conceptualized stock price or All Share Index (ASI) as stock return and defined stock return as the return from the variation in stock prices. Gautami and Kalyan (2018) defined stock return as a profit in terms of capital gain and dividend on stock investment in the stock exchange market.

Empirically, Balagobei (2017) and Jepkemei (2017) examined the effect of macroeconomic factors on stock returns. Their studies revealed stock return is affected by macroeconomic factors excluding interest rate. The study further established that there is negative effect of exchange and inflation rates on stock return. Likewise, the studies of Kabeer (2017) and Papadamou, Sidiropoulos, and Spyromitros (2017) examined the effect of selected macroeconomic factors such as inflation and foreign exchange rates, and foreign direct investment on stock returns in different countries. Their findings revealed that inflation and exchange rates have positive and significant effect while foreign direct investment has negative and insignificantly affect stock return in Bangladesh. In Pakistan, the study revealed that inflation and exchange rates have adverse and significant effect on stock return whereas foreign direct investment has insignificant and positive effect on stock return. In Sri Lanka, there is a significant and positive effect of foreign exchange while foreign direct investment and inflation rate have significant and adverse effect on stock return. In India and China, both exchange and inflation rates have significant and adverse effect while foreign direct investment has insignificant and positive effect on stock return.

Considering majority of these past empirical studies in the international context, they failed to employ money supply and aggregate industrial production as measure for macroeconomic factors in modeling the nexus of selected macroeconomic factors and stock returns, thus established by Arbitrage Pricing Theory (APT) that dynamism trend of macroeconomic factors determined expected stock returns.

Furthermore, Kirui, Wawira, and Onono (2014) and Haruna, Yazidu, and Paul (2013) examined the nexus between macroeconomic variables, volatility and stock returns using a time series data. They revealed that gross domestic product and stock returns have insignificant relationship while Haruna, Yazidu, and Paul (2013) found that there exists significant association between stock return and inflation rate both in the long run and short run. The study of Kuwornu and Victor (2011) and Cyrus and Kirwa (2015) in Ghana and Kenya examined the link between stock returns, and inflation rate. These studies established a significant connection between stock returns and inflation rate.

In the same vein, Khumalo (2013) and Elly and Oriwo (2013) examined the nexus between macroeconomic factors and stock market performance using time series data. Their studies employed Pearson correlation and autoregressive distributed lag method of analyses and they showed a weak positive nexus between stock return and inflation rate. They also found that inflation rate exerts a significant and adverse effect on stock prices in South Africa. Similarly, Khanyisa, Kapingura, and Palesa (2016) studied the nexus between stock return and macroeconomic variable in South Africa from 1994 to 2012. The study showed that inflation rate positively influences stock return.

In Nigeria, Okonkwo (2019) studied macroeconomic factors and stock price in Nigeria. The study revealed a weak influence of exchange rate on stock prices in Nigeria. Abdullahi, Lawal, and Etudaiye-Muhtar (2012) examined how firm size affects risk and return in the Nigerian stock market. The study measured sectoral size with sectoral capitalization) and expected return with share prices using monthly data. It revealed that firm size has no significant influence on either firm or sectoral return. Adusei (2014), Daferighe and Charlie (2012), Nwaogwugwu (2018), Nwokoye and Otu (2018), Owolabi and Adegbite (2013) and Uzuke, Obiora-Ilouno, and Eze (2016) examined the effect of macroeconomic variables on stock market performance in Nigeria. These studies employed correlation method of analysis and showed that there exists adverse relationship between inflation rate and the stock market performance measures. Also, these studies found inverse but significant relationship amid inflation rate and market capitalization in the short-run while a positive and significant nexus in the long-run.

From the empirical review of related literatures, within and outside the Nigerian context on macroeconomic factors, market performance and stock return employ inflation and interest rates as well as foreign exchange rate as measures for macroeconomic factors to model stock return. It can be deduced that past studies failed to include money supply and aggregate industrial production in modeling stock return especially in Nigeria context. This indicates that studies on the effects of selected macroeconomic factors measure by (aggregate industrial production, money supply, inflation and exchange rates) on stock return were scanty in Nigeria. Furthermore, there exist among these studies mixed findings. Similarly, there exist methodological gap from previous studies reviewed in Nigeria in relations to study variables. Most of these studies employed regression and correlation methods of analyses in evaluating macroeconomic indicators and stock return in Nigeria. These methods of analyses failed to account for dynamic effect of long and short runs of macroeconomic indicators on stock return. Based on these empirical gap and mixed findings identified, this study intends to bridge the gap in literature by investigating the effects of selected macroeconomic factors (aggregate industrial production, industrial production, money supply, inflation and exchange rates) on stock return in the Nigerian stock market.

Theoretical Framework

This study is anchored on Arbitrage Pricing Theory in order to describe the nexus between selected macroeconomic factors and expected stock returns.

Arbitrage Pricing Theory

Arbitrage Pricing Theory (APT) was developed by Ross (1976). The APT predicts a security market line linking expected returns variance to multi-factor risks. This indicates that APT establishes the model link between expected return spread and multi-macroeconomic factors risks. The APT relies on three key prepositions; (i) stock returns are explained by macro-multi-risk factors model (ii) there are sufficient stocks to diversify away unsystematic risk and (iii) well-functioning stock markets do not allow for the persistence of arbitrage opportunities. Ross (1976) addressed the concern and shortcoming of CAPM by developing a completely different model called the APT. The APT introduced by Chen, Roll & Ross (1986) involves identifying macroeconomic variables which influence stock risks and returns spread.

The application of APT enables investors to relax the restrictions associated with CAPM. In APT, the correlation between assets and the macroeconomic risk factors associated with it are used to predict its returns. This is achieved by combining exogenous macroeconomic variables in a linear manner (Eita, 2011). In this regard, a factor beta is used to measure an asset's exposure to macroeconomic risk factors.

The following related studies Abdullahi (2011), Abdullahi, Lawal, and Etudaiye-Muhtar (2012), Assefa and Mollick (2014), Azar (2014), Bala-Sani and Hassan (2018) were built upon this theory.

METHODOLOGY

This study adopted an ex-post facto research design using secondary data within the period of 23 years between 1998 and 2019. The study employed monthly data from January 1998 to December 2019. This study employed Auto-regressive Distributive Lag (ARDL) bound test to model the dynamic effect among the study variables.

The functional model of this study was adapted from the study of Hasan and Zaman (2017) who examined the effect of macroeconomic indicators on stock returns with the principle of underlying Arbitrage Pricing Theory linking macroeconomic factors and stock return volatility. This study therefore modified Hasan and Zaman (2017) model. The model was specified as;

$$R_{ASI} = f(INF, INT, EXCH) \text{ ----- Eqn 3.1}$$

$$R_{ASIt} = \beta_0 + \beta_1 INF_t + \beta_2 INT_t + \beta_3 EXCH_t + \mu_t \text{ ----- Eqn 3.2}$$

Where;

- R_{ASIt} = Stock Returns
- INF_t = Inflation Rate
- INT_t = Interest Rate
- $EXCH_t$ = Exchange Rate
- U_t = Error term

From the econometric model in Eqn 3.2, Interest rate was removed as several scholars and literature criticized that interest rate could be fixed for more than four months, thereby making it inappropriate to determined stock return volatility. The Hasan and Zaman (2017) empirical model in Eqn 3.1 was modified in line with the APT model and objective of this study which captured multi-factor macroeconomic risks associated with stock returns. Therefore, this study included money supply, aggregate industrial production as well as inflation and exchange rates as risk-factors affecting stock return volatility. The model was therefore modified and specified as;

$$R_{ASIt} = \beta_0 + \beta_1 INF_t + \beta_2 AIP_t + \beta_3 MS_t + \beta_4 EXCH_t + \mu_t \text{ ----- Eqn 3.3}$$

Where;

- R_{ASIt} = Stock Return ($ASI_t - ASI_{t-1} / ASI_{t-1}$)
- INF_t = Inflation Rate
- AIP_t = Aggregate Industrial Production
- MS_t = Money Supply
- $EXCH_t$ = Exchange Rate as measured by Naira/USD
- U_t = Error term

The modified model was subjected to Auto-regressive Distributive Lag (ARDL) in order to suit the feature of stationarity of the study variables. The ARDL was specified as:

$$\begin{aligned} \Delta \ln ASI &= \partial_0 + \partial_1 \ln ASI_{t-1} + \partial_2 \ln INF_{t-1} + \partial_3 \ln AIP_{t-1} + \partial_4 \ln MS_{t-1} + \partial_5 \ln EXCH_{t-1} \\ &+ \sum_{i=1}^k \gamma_{1i} \Delta \ln ASI_{t-i} + \sum_{i=1}^k \gamma_{2i} \Delta \ln INF_{t-i} + \sum_{i=1}^k \gamma_{3i} \Delta \ln AIP_{t-i} + \sum_{i=1}^k \gamma_{4i} \Delta \ln MS_{t-i} \\ &+ \sum_{i=1}^k \gamma_{5i} \Delta \ln EXCH_{t-i} + \varepsilon_t \text{ --- --- --- Eqn 3.4} \end{aligned}$$

K = lag length for the Unrestricted Error-Correction Model (UECM)
 Δ = first differencing operator
 ε = white noise or disturbance error term

The co-integrating long-run relationship will be estimated using the specification below:

$$\Delta \ln ASI = \partial_0 + \partial_1 \ln ASI_{t-1} + \partial_2 \ln INF_{t-1} + \partial_3 \ln AIP_{t-1} + \partial_4 \ln MS_{t-1} + \partial_5 \ln EXCH_{t-1} + \varepsilon_t \text{ --- Eqn 3.5}$$

The short-run dynamic model is specified thus:

$$\begin{aligned} \Delta \ln ASI &= \partial_0 + \sum_{i=1}^k \gamma_{1i} \Delta \ln ASI_{t-i} + \sum_{i=1}^k \gamma_{2i} \Delta \ln INF_{t-i} + \sum_{i=1}^k \gamma_{3i} \Delta \ln AIP_{t-i} + \sum_{i=1}^k \gamma_{4i} \Delta \ln MS_{t-i} \\ &+ \sum_{i=1}^k \gamma_{5i} \Delta \ln EXCH_{t-i} + \gamma_6 \varepsilon ct_{t-1} + \varepsilon_t \text{ --- --- Eqn 3.6} \end{aligned}$$

Where:

εct_{t-1} = the error correction term lagged for one period

γ = the coefficient for measuring speed of adjustment in equation (5)

Based on extant literature review, the a priori expectations for the study variables are; $\partial_1, \partial_2, \partial_3 > 0$; $\partial_4, \partial_5 < 0$

RESULTS AND DISCUSSIONS

Descriptive Statistics of Study Variables

The result of the preliminary statistics is presented in Table 1.

Table 1: Preliminary Statistics of Study Variables

	lnEXCH	LnMS	lnINF	LnAIP	lnASI
Mean	67.126	20.13819	19.13684	7.640874	37.3908
Median	87.105	61.1575	12.22000	5.290000	61.2613
Maximum	93.279	94.4960	72.73000	18.80000	14.8900
Minimum	28.375	50.4585	5.400000	1.410541	21.7070
Std. Dev.	65.008	29105449	17.77015	5.478743	5034725
Skewness	0.0152	1.514156	1.671756	1.36334	1.302161
Kurtosis	1.336	2.808743	2.679295	1.865416	2.368027
Jarque-Bera	3.577	12.69029	18.08217	3.787838	5.704904
Probability	0.167	0.301755	0.100118	0.553481	0.250703

Sum	2501.038	6.24E+08	593.2420	236.8671	1.15E+08
Sum Sq. Dev.	126780.3	2.54E+16	9473.349	900.4988	7.60E+14
Observation	272	274	274	274	274

Source: Authors Computation (2020)

The result of the preliminary statistics shows that foreign exchange rate (EXCH) has an average of 67.1264 and varies from a minimum of 28.3750 to a maximum of 93.2792. Money supply (MS) has a mean of 20.13819 with a minimum of 50.4585 and a maximum of 94.4960. The inflation rate (INF) has a mean of 19.13684 with minimum value of 5.4000 and a maximum value of 72.73. Likewise, aggregate industrial production (AIP) has a mean of 7.64087 and its minimum values ranges from 1.4105 to a maximum of 18.8000. Finally, All Share Index (ASI) average value equals 37.3908 and its minimum value ranges from 21.7070 to a maximum of 14.8900. The skewness and kurtosis indicate that the data relating to each of the study variables are normally distributed as these values were within the cut of point of -3.0 to 3.0. In the light of this, the study found parametric statistical analysis appropriate for this study. The probability of Jarque-bera statistics was not significant at 5% level of significance for all the study variables; therefore the variables are normally distributed.

Correlation Matrix

Table 2: Correlation Coefficients for Multicollinearity Test

Variables	MS	AIP	EXCH	INF	ASI	Variance Inflation Factor (VIF)
MS	1					3.77
AIP	0.421	1				1.31
EXCH	0.451	0.173	1			1.53
INF	-0.193	-0.335	0.421	1		2.63
ASI	0.261	-0.610	0.522	-0.310	1	2.81

Source: Authors Computation (2020)

The correlation matrix of variables is presented in Table 2 in order to show the relationship that exists among the variables and to also verify if none of the relationships among the explanatory variables of the models have correlation coefficient as high as 0.8, which is a threshold above which inclusion of such variables in the same model would cause a problem of severe multicollinearity. Since the correlation coefficient of the explanatory variables were less than 0.8 for all the variables measured, this shows that no existence of multicollinearity among the study explanatory variables. Furthermore, the result of the VIF shows that the value of the VIF; 3.77, 1.31, 1.53, 2.63 and 2.80 for MS, AIP, EXCH, INF and ASI respectively were less than 5. Therefore, there is no problem of multicollinearity in the model.

Stationarity Results

Table 3: Result of Unit Root (Stationarity) Test

Variables	Augmented Dickey-Fuller (ADF)	5% Critical level	Philips-Perron (PP)	5% critical level	Order of integration	
					ADF	PP
LogASI	-5.351434	-3.544284	-5.321882	-3.544284	I(0)	I(0)
LogMS	-3.439170	-3.544284	-2.415037	-3.540328	I(0)	I(1)
			-9.535922	-3.544284		
logAIP	-2.389979	-3.540328	-2.367579	-3.540328	I(1)	I(1)
	-4.733450	-3.544284	-4.740173	-3.544284		
logINF	-5.833414	-3.540328	-5.832560	-3.540328	I(0)	I(0)
logEXCH	-2.226208	-3.540328	-2.157749	-3.540328	I(1)	I(1)
	-5.452461	-3.548490	-6.777187	-3.544284		

Source: Authors computation (2020)

The result both the Augmented Dickey Fuller and Philips-Perron test reveal that All Share Index and inflation rate were stationary at levels. This indicates that they are integrated of order zero [I(0)]. On the other hand, money supply, aggregate industrial production and exchange rate were stationary at first difference which mean that they are integrated of order one, that is I(1). In any case, the results clearly show that the variables that would make up the models of this study are combination of I(0) and I(1) series. As a consequence, the use of ARDL bounds test procedure to co-integration is required.

Autoregressive Distributive Lag (ARDL) Result

Table 4: ARDL Short and Long Run Coefficients for the Study Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DEXCH)	-0.001902	0.000739	-2.574468	0.0300
D(DEXCH(-1))	0.001481	0.000770	1.924542	0.0864
D(INF)	-0.011440	0.003857	-2.966478	0.0158
D(INF(-1))	-0.022345	0.004908	-4.553104	0.0014
D(MS)	0.401952	0.002862	0.681831	0.0125
D(MS(-1))	-0.016929	0.004835	-3.501384	0.0067
D(AIP)	-0.019749	0.006829	-2.892077	0.0978

D(AIP(-1))	0.706469	0.004050	1.597364	0.0446
ECM-CointEq(-1)	-0.581456	0.101867	-5.707987	0.0003
Long Run Coefficients				
EXCH	-0.009285	0.003463	-2.681225	0.0252
INF	-0.028260	0.005015	-5.634881	0.0003
MS	0.466098	0.013176	4.462776	0.0545
AIP	0.213141	0.013784	3.953367	0.0253
C	-34.761275	1.533046	-22.674650	0.0000
R-squared	0.6928760	F-stat (p-val)	97.15 (0.000)	

Source: Authors computation (2020)

Foreign exchange rate has a negative and significant effect both in the short run coefficient and long run coefficient on the stock return volatility. This indicates that a point increase in foreign exchange rate will lead to a short and long runs decrease in stock return volatility by about 0.2 percent in the short run and vice versa, and a long run decline in stock return by about 0.9 percent and vice versa. This implies that foreign exchange rate affects stock return volatility both in the short and long runs. Likewise, Inflation has negative significant effect both in the short run and long run coefficient. This implies that inflation is short and long run determinant of stock return volatility and a percent point increase in inflation will lead to a decrease in stock return by about 0.05 percent in the long run, and vice versa.

Furthermore, money supply has a significant negative coefficient effect on stock return volatility in the short run but has positive and significant long run coefficient effect on the stock return volatility. This implies that money supply is short and long runs determinant of stock return volatility and a percent point increase in money supply in the long run will result to an increase in stock return volatility by about 46.6 percent and vice versa. Lastly, aggregate industrial production is not a short but a long run determinant of stock return volatility which has positive and significant effect in the long run coefficient. This is indicated by its insignificant coefficients in the short estimates, but has long run significant effect on stock return volatility that is increase in aggregate industrial production leads to significant increase in stock return volatility in the long run. This indicated that the study reject the null hypothesis that; exchange rate, money supply, aggregate industrial production and inflation rate do not significantly affect stock return volatility in the Nigeria stock exchange market at 5% level of significance. These findings were consistent with Hasan and Zaman (2017), Kuwornu and Victor (2011), Owolabi and Adegbite (2013), Jepkemei (2017) among others

Presented in Table 4 is the ARDL short-run error correction model and its long-run coefficients for the stock return volatility model. The result shows that the overall model, measured by the F-statistic, is statistically significant with statistic value of 97.15 and p-value of (0.000). This indicates a rejection of the null hypothesis that the stock return volatility model is not statistically significant, that is the explanatory variables (money supply, aggregate industrial production, exchange and inflation rates) significantly explain stock return volatility in the Nigerian stock exchange market. The model R-squared is seen to have a value of approximately 0.69, indicating that about 69 percent of variation in stock return volatility is explained by the model. The error correction term {ECT(-1)} in the short run model shows that about 58 percent of model disequilibrium is corrected in each period.

Table 5: ARDL Bounds Test

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	K
F-statistic	19.367229	4

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.72	3.92
5%	3.23	5.15
2.5%	3.69	5.23
1%	4.29	5.92

Source: Authors Computation (2020)

The result of ARDL bound test shows that there exist long run relationships between the study variables, since the F-statistics is greater than the upper bound of Pesaran critical value (3.92, 5.15, 5.23 and 5.92), we reject the null hypothesis of no long run relationship and accept the alternative hypothesis of significant relationship. From the ARDL bounds test output, F-statistics is more the upper bound value (19.367229 > 4.35) at 5% level of significance. Therefore the study variables can be said to move in the same direction in the long run.

Table 6: Result of Diagnostic Test for all the Models

Model	Breusch-Pagan-Godfrey Heteroscedasticity Test:		Breusch-Godfrey Serial Correlation LM Test	
	F-statistic	P- value	F-statistic	P-value
<i>R_{ASIt}</i> model	1.573	0.7647	2.349	0.461

Source: Authors computation (2020)

From the model diagnostics in Table 6, the *R_{ASIt}* model is free from both problems of serial correlation and heteroskedasticity, judging from its respective F-statistic values of 2.35 and 1.57 and p-values of 0.461 and 0.765. These indicate non-rejection of the hypotheses that there is absence of serial correlation and heteroskedasticity in the model.

Discussion of Findings

Based on the finding of this study, null hypothesis one and three stating that aggregate industrial production and money supply have no significant effect on stock return in the Nigerian stock exchange market were rejected at 5% level of significance. This indicated that both aggregate industrial production and money supply significantly affect stock return in the Nigerian stock market. These findings were in line with the findings of (Balagobei, 2017; Cyrus & Kirwa, 2015; Jepkemei, 2017; Kirui, Wawire, & Onono, 2014; Papadamou, Sidiropoulos, & Spyromitros, 2017) as they established that macroeconomic factors or announcement affect stock return. Furthermore, this study also rejected the null hypothesis two

and four that exchange rate and inflation rate do not significantly affect stock return in the Nigerian stock exchange market at 5% level of significance. These findings were consistent with Adusei (2014), Jepkemei (2017), Kuwornu and Victor (2011), Owolabi and Adegbite (2013) and not in line with the study of De-Groot, Pang, and Swinkels (2012). In addition, the finding of the study showed that short run and long run effect exist among the study variables. The finding of this study is consistent with Arbitrage Pricing Theory that macroeconomic factors could cause systematic risks to stock market expected return.

CONCLUSION AND RECOMMENDATIONS

Based on the findings, this study has been able to establish the linkage between the effect of selected macroeconomic factors (money supply, aggregate industrial production, inflation rate and exchange rate) on stock return in the Nigerian Stock Market. Consequently, this study concludes that macroeconomic factors significantly affect stock return both in the short and long runs in the Nigerian Stock Market.

The following policy recommendations are suggested based on the findings of this study:

- i. Central Bank of Nigeria should employ deflationary fiscal policy to manage inflation and avoid higher rates of inflation that may reduce the variance between actual and expected stock returns in the Nigerian Stock Market.
- ii. Central Bank of Nigeria should employ Adaptive Stabilization Method of Exchange Rate policy such as (buy up foreign exchange for the reserves, reduction in purchase of volume of foreign exchange and incentive to induce owners of foreign currencies to acquire local currency denominated assets) in achieving stable exchange rate.
- iii. Central Bank of Nigeria should monitor the level of money in circulation so as to maintain adequate/optimum level of money supply; as this will ensure availability of financial resources to invest in stock market which in turn enhances economic activities and productivity as well as economic growth.
- iv. Stable macroeconomic factors policies is critical to aid adequate planning by various stakeholders in terms of resource utilization, predictable business environment, effective and efficient industrial production, inflow of foreign investors, enhancement of stock market performance indices and economic growth.

Suggestion for Further Study

- i. Further study should consider other macroeconomic factors apart from selected macroeconomic factors used in this study in relation to stock return.
- ii. Comparative study between developed, developing, and emerging economies should be done on the effect of selected macroeconomic factors on stock return.

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