Oil Price Shocks, Exchange Rate Risk and Stock Market Volatility

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Abstract

This study considers the effects of oil price shocks and the risk associated with exchange rate stock market volatility in Nigeria. Data for this study was extracted from the Central Bank of Nigeria statistical database, Nigeria Exchange Limited database and the World Uncertainty database covering the period April 2016 to September 2022. The autoregressive distributive lag (ARDL) technique was employed to capture the short and long run effects of commodity prices shocks and the volatility of exchange rate on market volatility. This study found that oil price shocks (volatility of crude oil price and the volatility of the pump price of petrol) positively and significantly influences stock market volatility both in the short-run and long-run, while exchange rate risk (exchange rate volatility) negatively and significantly determines stock market volatility in the short and as well as in the long-run. This study recommends among others that investors should demand commodity price risk and exchange rate risk premiums while pricing financial assets as this will compensate for the market risk and boost investment returns.

Keywords: Auto Regressive Distributive lag, Commodity Price Shocks, Exchange Rate Risk, Stock Market Volatility.

1. Introduction

Nigeria is one of the leading exporters of crude oil in Africa but it depends on other countries to a large extent for its bye-products (petrol, diesel and kerosene). The prices of crude oil fluctuate in the global market. For instance, Nigeria crude oil price rose from 99.64 dollar per barrel in February, 2022 to 121.23 dollar in March, 2022 (about 21.67% increase). However, the price drop from 130 dollars in June 2022 to 120.54 dollar in July same year (Source: Central Bank of Nigeria Statistical Database) representing about 7.28% decrease. This study provide evidence that variations in the prices of petroleum products affect stock market variations, which tends to align with Uwubanmwen and Omorokunwa (2015) that oil price fluctuations or volatility affect stock market performance. Indeed, oscillation in crude oil price or its bye-product affect economic activities, the value of local currency (exchange rate) and the performance of local firms, thus impacting stock market behaviour. A rise in oil price and the associated rise in inflation and interest rate lower cashflows of firms, thus impacting the price of stocks in the market (Igbinovia & Igbinovia, 2019). Lakshmanasamy (2021) demonstrated that the competitive power of firms, their earnings and by extension the value of their stocks may be affected by fluctuations in exchange rates. Anzuini et al (2013) clarified that the price of commodity has continued an upward movement since 2009, thus portraying volatility. Price volatility constitute risk because of the associated uncertainty, hence there is the need to examine the nexus between commodity price shock on stock market in Nigeria.

It has been asserted that stock price as well as commodity price react to news from the macroeconomic environment (Lombardi & Ravazzolo, 2013). Indeed, following the removal of subsidy on petroleum products in May 2023 by the administration of president Bola Ahmed Tinubu in Nigeria, there has been an increase in the landing cost of petroleum products in Nigeria. This led to rise in the price of petrol from ₦150 in April 2023 to about ₦697 as at March, 2024(National bureau of Statistics, May 2024) and by the end of December 2024 the price has risen to ₦1100 per litre. Also, the current administration introduced unified foreign exchange rate policy intended at closing the gap between official and black-market exchange rates. However, this policy saw the exchange rate soar to as high as ₦1800 per one US dollar as at February, 2024 from the earlier figure of ₦465.07 before the coming of the Tinubu administration in May 2023. Indeed, within a space of three weeks of the commencement of Tinubu regime, the Naira depreciated by about 38.7% rising to ₦763 to a dollar at the official window (ThisDay News Paper, 20th April, 2024). Depreciation in value of local currency, as seen in Nigeria in recent years affect firms' profitability, thus affecting value of stocks at the exchange. Indeed, the competitive power of firms, their earnings and by extension the value of their stocks may be affected by fluctuations in exchange rates (Cakan & Ejara, 2013; Lakshmanasamy, 2021). Jawaid and Ui-Haq (2012) advanced the idea that depreciation in local currency increases cost for firms which depend on foreign inputs for production, thus reducing earnings and the value of their stocks. Importantly, the variations in petroleum products and exchange rate have a major impact on general price level (inflation) which rises to as high as 33.95% (National Bureau of Statistics report, June 2024) aggravated by increase in commodity prices. No doubt that the interaction between these indicators may influence firms' earning, and ultimately stock market performance.

Research has showed that there is no co-integrating relationship between commodity prices and movement in stock market (Iscan, 2014; Ildirar & Iscan, 2015). Whereas, Kaur and Singla (2023) documented that a long-run co-integrating relationship exist between commodity prices and stock market. Though, studies have considered the effect of commodity prices on stock market with mix findings, the effect of the crude oil price shocks (volatility) and exchange rate risk on stock market volatility on one hand, and the interaction between exchange rate and commodity price (crude oil price) as moderating variable in asset pricing model has not been substantially exhausted. This study believed that the inclusion of exchange rate and commodity prices as interactive variable will improve commodity price-stock market model performance. The main objective of this study is to examine whether fluctuations in commodity prices and exchange rate constitute risk to the Nigerian stock market.

2. Literature Review

Oil Price Shocks

Crude oil is an important source of energy generation the world over (Sathyanarayana, et al (2018). Crude oil which is the main sources of Nigeria revenue impacts the sociopolitical and prosperity of the nation (Igbinovia and Igbinovia, 2019), and by extension the performance of firms operating within the economy. Indeed, a change in oil price no matter how little will have a significant impact on the economy wholistically (Oke, et al, 2023) and the stock market is not an exception. The price of a commodity is the worth or value accorded it in the market place. The price of oil like every other commodity fluctuates depending on the prevailing condition in international market. Crude oil price shock is the fluctuations in prices caused by changes in demand or supply of oil in international market (Hamilton, 1983).

Hamilton (2003) recognized rise in energy prices (costs) as the driver of output cost. Shock is captured by volatility or percentage change in price. Volatility cannot be controlled but its impact can be mitigated through policy measures (Ge & Tang, 2020), hence the need to considered whether the volatility of oil price affect stock market. Sadosky (1999) exposed that oil price volatility influences stock market significantly but negatively. Pert and Ratti (2008) revealed that rise in the price of crude oil negatively stimulate stock market returns in developing countries. Oke, et al (2023) found that oil price changes positively and significantly impact indicators of stock market development such as value traded ratio, turnover ratio and market capitalization ratio. Oil price shocks is important to a mono economy like Nigeria which depend heavily on export of oil for its revenue, and shocks from foreign markets have remarkable impact on growth and macroeconomic activities in developing economies (Bazzi & Blattman, 2014).

Stock Market Volatility

Stock market volatility is the fluctuations in stock prices, which is usually unpredictable. Stock market volatility poses threat to investors because persistent volatility signifies price deviation from its fair value, which may result is losses. Volatility reflects the magnitude to which price rise or fall (Uyaebo et al, 2015). Market volatility is the tendency of the market price to swing up and down unexpectedly (Harris, 2003). It captures the level of risk prevailing in market index returns. To mitigate investment risk, it necessary to effectively appraise market volatility (Bhowmik & Wang, 2020), so as to ascertain the causative factors. Stock market volatility has been attributed to a lot of forces such as agents' opinion, firms leverage (Kurz, 1994; Black, 1976; Christie, 1982). But, Shillller (1981) posited that stock market volatility is caused by other factors aside changes in company fundamentals. Indeed, Corradi, Distaso and Mele (2013) ascribed aggregate market volatility to macroeconomic factors.

Price volatility discourages investors because of its impact on returns. Market volatility dampens the confidence of local and international investors because it exposes them to unbearable risk. Market volatility is the degree to which the present market index differs from the past value and capture the risk prevalence in the market (Uhunmwangho & Omorokunwa, 2022). The consequence of price volatility on trading activities at the exchange is of concern to policymakers and market participants.

Exchange Rate Risk

Exchange rate is the value of a nation's currency vis-à-vis foreign currency. Vogler and Zimmerman (2019) described exchange rate as value of a country's currency relative to another. Nzotta (2014) defined exchange rate as the rate at which one country's currency is substituted for another. Esezobor (2014) viewed exchange rate as the medium by which one local money is transformed to another. Bala and Asemota (2013) revealed that exchange rate has been volatile in Nigeria. Specifically, Dollar/Naira exchange rate, Pounds/Naira exchange rate were reported to exhibit volatility. Exchange rate risk is the potential adverse effect that fluctuations in local currency may have on investment and business performance. Exchange rate as well as its volatility are important indicators impacting economic activities in Nigeria (Bala & Asemota, 2013). Changes in local currency poses threat to both local and international investors because of the associated losses. Exchange rate risk is capture by the volatility of exchange rate. Exchange rate volatility has the potential to influence stock market behaviour because of the effect it has on firms' earnings. Indeed, exchange rate in Nigeria has witnessed exchange rate volatility sine the adoption

of foreign exchange liberalization policy of 1980s, and this has led to distortion in the pattern of production and significant variations in external reserve (Bala & Asemota, 2013), and this may affect firms' financial performance. The impact of exchange rate volatility on stock market was examined in previous studies with mixed results. Oladepo, et al (2017) reported positive effect of exchange rate volatility on stock market. A weak effect of volatility of exchange rate was found by researchers such as Zubaire and Aladejare (2017), Bala and Asemota (2013).

2.2 Theoretical Literature

Arbitrage Pricing Theory

Arbitrage Pricing Theory (APT) credited to Ross (1976) relates financial asset returns to several risk factors from the macro-economy. The flow leaning (oriented) model attributed to Dornbusch and Fisher (1980) demonstrated that changes in exchange rate influence variations in stock prices, thus constituting risk. Indeed, Naik and Padhi (2012) clarified that changes in macroeconomic variables have the capacity to stimulate stock return performance. Patel (2012) demonstrated that a long-run association exist between macroeconomic variables and stock market performance.

The arbitrage pricing theory (APT) associated market return performance to macroeconomic risk. Macroeconomic risk factors are captured in this study using oil price shocks (volatility of oil price) risk) and exchange rate risk and examine their impact on stock market volatility. The aim is to ascertain whether macroeconomic risk (presented by oil price shocks and exchange rate risk) influence stock market return volatility. If the overall stock market performance mirrored aggregate economic conditions, there is every tendency that apprehension regarding changes in macroeconomic indicators may influence the volatility of the stock market (Oseni & Nwosa, 2011). Lombardi and Ravazzolo, 2013) concluded that incorporating commodity price indicators (oil price in this study) on security pricing model produce better forecasts, and is beneficial for portfolio allocation. Officer (1973) associated volatility of the stock market to macroeconomic volatility. Uhunmwangho (2022) found that instability of macroeconomic factors determines stock market volatility.

Empirical Literature

Dawood (2007) could not find significant effect of macroeconomic volatility on stock market volatility in Karaki exchange, when co-integrating regression procedures were applied. Berk and Aydogan (2012) tested the reaction of stock market returns to crude oil price fluctuations (volatility) in Turkey from 2nd January, 1990 to 1st November, 2011. The study which implemented the vector autoregressive technique, could not found evidence that the market reacts to crude oil price surprises. Zakaria and Shamsuddin (2012) examined the impact of macroeconomic volatility on stock market in Malaysia using causality tool. It was reported that macroeconomic variable volatility Granger cause volatility of stock returns. Mlambo, et al (2013) examined the impact of exchange rate volatility on stock market in South Africa using monthly data covering 2000 to 2010. The GARCH technique utilized revealed a weak effect of exchange rate volatility on stock market performance. Degiannakis, et al (2014) inspected the impact of oil price surprises on the volatility of stock market in Europe. The study discovered that aggregate demand oil price surprises (shocks) significantly influence market volatility.

Naurin and Qayyum (2016) explored the nexus between oil price and the shocks arising from it on Pakistani's stock market covering November 1991 to December 2014 and applying EGARCH technique. The result showed that oil price volatility has negative but weak influence on stock market index. Sichoongwe (2016) found a negative effect of exchange rate volatility on Zambian stock market returns for the period 2000 to 2015, while using GARCH procedure. Perera (2016) determined the effect of exchange shocks on the volatility of Colombo stock market from January 2010 to December 2015 in GARCH framework. It was discovered in the study that Dollar and Pounds exchange rate negatively but insignificantly influence stock market returns, Uwubanmwen and Omorokunwa (2015) inspected the connection between the volatility of crude oil price and the volatility of the Nigerian stock market using quarterly data from 1990 to 2012 and error correction model framework. They found that oil price volatility determines market volatility.

Zubaire and Aladejare (2017) investigated the effect of exchange rate volatility on stock exchange in Nigeria from 1985 to 2015 using GARCH procedure. The study found a weak impact of exchange rate volatility on stock market. Oladepo, et al (2017) inspected the effect of exchange rate volatility on the performance of Nigerian exchange using ARCH, GARCH, TARCH E-GARCH. It was reported that exchange rate positively influences market performance (measured by market capitalization). Shehu and Hassan (2018) investigated the impact of oil price shocks on the Nigerian Stock Market from January 2008 to May 2017 using non-linear ARDL. It was revealed by the study that negative surprises in oil price negatively and significantly influence stock market performance, while positive changes have no significant impact. Igbinovia and Igbinovia (2019) investigated the impact of oil price volatility on the returns of Nigeria exchange limited from 1981 to 2017, using error correction method and co-integration techniques. The study found positive but not significant nexus between oil price volatility and stock returns. Adenekan et al (2020) explored the link between oil price, exchange rate and stock returns in Nigeria covering and using vector autoregressive technique as well as co-integration technique. It was reported that there is no co-integrating relationship between oil price and returns in the long-run.

Tumala, et al (2023) look at the impact of oil price shocks on stock market volatility in Nigeria and South Africa covering January 2010 to July 2022 using GARCH technique. The study found that stock market volatility reacted to oil supply and consumption demand surprises both in Nigeria and South Africa. The impact of oil price on stock market development in Nigeria was considered by Oke et al (2023), covering 1993 to 2019, using ARDL error correction mechanism (ECM) framework. The study documented that oil price directly and significantly determine stock market. El-Diftar (2023) considered the reaction of stock market returns to exchange rate in seven (7) emerging countries, using various econometric tools such as OLS, ARDL and GARCH. The study discovered that exchange rate positively and significantly influences market performance (returns) in the long-run.

3. Methodology

To determine the impact of oil price shocks and exchange rate risk on stock market volatility, he autoregressive distributive lag (ARDL) system estimator was implemented using E-View 9.0 software. The volatility of the variables namely crude oil price, pump price of petrol, exchange rate and stock market index returns were detected using the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) procedures. The Adjusted Dickson Fuller (ADF) unit root test constitutes the preliminary analysis, while the Breusch Godfry autocorrelation test and the Heteroscedasticity test formed the diagnostic tests. Cointegrating relationship between the

variable was captured using Pesaran, et al (2001) bound test and Pesaran and Shin (1999) cointegrating regression in ARDL framework. Data for this study come from the statistical database of Central Bank of Nigeria (CBN) and the database of Nigeria Exchange Limited and the world uncertainty index database from April 2016 to November 2022.

Model Specification

The model of this study is stated as follows:

SMB = f(EXRv, COMs, EX_CP, OK)……..(1)

Where:

SMB = stock market behaviour, EXRv stands for exchange rate volatility, COMs is the short form oil price shocks (surprises), EX_CP mean the interaction between exchange rate and crude oil price, Ok represent other indicators incorporated as control variable

Changes or volatility of macroeconomic variables is capable of influencing investment returns, thus constituting risk to investors at the exchange. It is submitted that in an unstable economic environment, policy action by government influence stock market volatility behaviour (Yu, et al 2021). Importantly, it has been revealed that market volatility reacts to news, particularly bad ones than good news (Atoi, 2014). Since the removal of subsidy on petroleum products in May 2023 by president Ahmed Bola Tinubu's administration in Nigeria, the pump price of petrol, diesel and aviation fuel have witnessed astronomical changes. Also, the administration introduces a unified foreign exchange rate and this resulted in depreciation in value of Naira, leading to rise in general price level with headline inflation rising to as high as 33.95% in May 2024. To capture the effects of this phenomenon on stock market, this study implements the autoregressive distributive lag (ARDL) regression procedure. ARDL model take the form:

$$Z_t = a_o + \sum_{i=1}^{n} \Upsilon Z_{t-1} + \sum_{j=1}^{d} \sum_{i=0}^{vj} \text{Xj, t}_{-1}\beta_{j,i+Et} \text{……..(2)}$$

Where:
Z_t stand for dependent variable at time t, n is the of lags of the dependent variable, v is the number of lags of the first explanatory variable, d is the number of lags of other regressors, X is the proxy for the regressors and Et is the error term.

It has been concluded that provided the variables used are cointegrated ARDL model can be implemented without first specifying which variable is 1(0) or 1(1) or requiring a uniform lag lengths for all the variables (Pesaran & Shin, 1999). Therefore, the econometric form of the above model is represented thus:

$$vASI_t = A_o + \Upsilon vASI_{t_{-1}} + b_1 vCOP_{t\_1} + b_2 vPUP_{t\_1} + b_3 vEXR_{t_{-1}} + b_4 CPI_{t\_1,2} + b_5 EPU_t + b_6 EX\_CP_t + b_7 TOR_{t\_1} + E_t \text{ ……..(3)}$$

Where:
$vASI_t$ = volatility of stock market at time t captured in this study using GARCH (1,1),
$vCOP_t$ = volatility of crude oil price at time t (proxy for commodity price),
$vPUP_t$ = volatility of pump price of petrol at time t (another proxy for commodity prices),
$vEXR_t$ = volatility of exchange rate at time t,

CPI_t = consumer price index (composite measure of commodity prices or inflation) at time t,
EPU_t = control variable (economic policy uncertainty at time t)
EX_CP_t = the interaction between exchange rate and crude oil price at time t (measured as exchange rate multiplied by crude oil price) and used as moderating variable,
TOR_t = stock market liquidity at time t (used as control variable)
E_t = the error term, and
$t\text{-}_1$ represent the lags of the variables, while b1-5 are parameters to be estimated.

The volatility of stock market index (ASI), crude oil price (COP), pump price of petrol (PUP) and exchange rate (EXR) were captured using GARCH procedures, volatility residuals was extracted and incorporated with other variables in line with Hussain and Bashir (2013), before applying regression. The condensed form of GARCH(1,1) with conditional variance as autoregressive model is presented below:

$$\text{б}^2t = K_0 + K_1\text{Ɛ}^2\text{t\_1} + K_2\text{б}^2\text{t\_1} \quad \text{.....(4)}$$

Where:
$\text{б}^2t =$ conditional variance which take value from $\text{K}_1\text{E}^2\text{t\_1}$
$\text{Ɛ}^2\text{t\_1} =$ past period error variance
$\text{б}^2\text{t\_1} =$ past period conditional variance
K_0, K_1 and K_2 are parameters to be estimated. However, to be a valid estimation K_1 and K_2 should not be negative, and $K_1 + K_2$ should not be more than one (1)

Control Variables

Control variables are indicators which may likely influence the dependent variables. Consumer price index (proxy for inflation), economic policy uncertainty and stock market liquidity were incorporated in our model as control variables. These variables were included because the effect of these variables on stock market volatility were investigated in previous studies (Li, et al, 2020; Antonopoulou, et al, 2022; Drama, 2023; Uhunmwangho & Izekor, 2024; Bedowska-Sojka and Kliber, 2019; Uhunmwangho, 2022). Iorember, et al, (2017), specifically examine the impact of inflation (consumer price index) on stock market volatility.

4. Data Analysis and Presentation of Results

This section presents the unit root test results on the variables used for the study, the outcome of GARCH volatility, lag selection criterion, cointegration test and ARDL regression result.

Unit Root Test on Variables

Data collected over a period of time may not be stationary in its original form. To verify this, the variables used were subjected to Augmented Dickson Fuller unit root test at levels and at first difference. The outcome is presented in table 1.

Table 1: Unit Root Tests

	Unit Root @ Levels			@ First Difference		
Variable	ADF Statistic	5% ADF Critical Value	Remark	ADF Statistic	5% ADF Critical Value	Remark
VASI	-1.691295	-2.899619	Not Stationary	-7.727417	-2.900137	Stationary

VCOP	-2.056549	-2.900137	Not Stationary	-7.088745	-2.900137	Stationary
VPUP	-6.269431	-2.899619	Stationary	-10.79773	-2.900137	Stationary
VEXR	-0.421298	-2.905519	Not Stationary	-8.127220	-2.900137	Stationary
LER-CP	-3.283890	-2.900137	Stationary	-- 7.662372	-2.900670	Stationary
LCPI	1.039446	-2.901779	Not stationary	-4.510769	-2.900137	Stationary
LEPU	-4.641243	-2.899619	Stationary	-11.20282	-2.900137	Stationary
TOR	-6.318840	-2.899619	Stationary	-8.874541	2.901217	Stationary

Source: Authors' computation with the aid of E-view software

Table 1 evidently reveals that all the variables are not stationary at levels. Specifically, VASI, VCOP, VEXR and LCPI are not stationary. Meaning, they are not integrated of order 1(0). On this backdrop, the unit root test was repeated on the variables at their differenced level and table 1 shows that the variables are not stable. This result tends to imply that the absence of unit root on the variables, thus the regression carry out on the variables at their first difference will be consistent and reliable. Based on this satisfactory outcome, regression procedure was conducted on the variables. However, it was necessary to first detect volatility of some of the variables.

Detection of Volatility in the Dataset

It has been revealed that commodity price surprises and stock market volatility influence each other (Kang et al, 2017). On this backdrop, the Generalized Autoregressive Heteroscedasticity (GARCH) procedure was applied to detect the volatility of the indicators namely crude oil, petrol price, exchange rate and market index. The GARCH output is displayed on table 2 below

	ASI		**COP**		**PUP**		**EXR**	
Variables	Coeff.	Z.Stat.	Coeff.	Z.Stat.	Coeff.	Z.Stat.	Coeff.	Z.Stat.
LOG(GARCH)	1515.254*	5.898333	1.719904	2.52468*	10.85994*	31.89252	3.281733*	3.825392
	Variance Equation							
Residual Variance	0.644276**	2.125146	0.699006	4.646438*	0.319621*	3.264533	0.218566*	3.467474
GARCH(-1)	0.332166*	2.550372	0.382738	5.679703*	0.383598*	3.588965	0.801576*	26.91366
*; ** (Significance at 1% and 5% respectively)								

Table 2: GARCH Output on Variables
Source: Authors' Compilation.

Table 2 above reveals that the variable of concern in this study namely crude oil price (COP), petrol pump price (PUP), exchange rate (EXR) and all share index (ASI) exhibit volatility because the coefficient of mean GARCH and the residual variance of all the variables are positive

and significance at 5% levels. This result validates that these variables are volatile during the period under investigation.
Based on the confirmation of volatility in the variables, the variance residual (volatility) of the variables were extracted and added to other modelled variables in excel worksheet before regression was applied on them.

Lag Selection

Before conducting autoregressive distributive lag regression on the variables used in this study, it was necessary to detect the maximum lag length appropriate for the study. To the end, the vector autogression (VAR) procedure was applied on the variables to enable this study select the lag length. The result of the VAR lag selection measures is displayed in table 3 below.

Table 3: VAR lag order selection Techniques

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1650.676	NA	8.50e+08	46.10212	46.38670	46.21541
1	-1041.732	1048.738	369.5802	31.43700	34.28283*	32.56993
2	-922.4500	175.6094	140.8685	30.37361	35.78069	32.52619
3	-834.7149	107.2318	153.6160	30.18652	38.15486	33.35874
4	-730.9791	100.8542	146.6546	29.55498	40.08456	33.74683
5	-548.4115	131.8544*	27.27723	26.73365	39.82448	31.94515
6	-361.3666	88.32679	13.40771*	23.78796*	39.44004	30.01910*

Source: Authors' display of E-View estimation

The maximum lag length appropriate for this study is six (6), judging by the Akaike information (AIC), the Hannan-Quinn information (HQ) criteria and the final prediction error (FPE) criterion in table 3 above.

Cointegrating Relationship

To ascertain whether there is cointegrating relationship among the variables used in this study, a post-estimation ARDL bound test and ARDL cointegration procedures were applied on the ARDL regression result. The ARDL bound test in Table 4 below reveals the existence of cointegrating association among the variables used in this study.

Table 3: ARDL Bound Test Outcome

Test Parameter	Statistic value
F. Stat.	4.58
1(0) Bound critical Value @ 10%	2.03
1(0) Bound critical Value @ 5%	2.32
1(0) Bound critical Value @ 1%	2.96
1(1) Bound critical Value @ 10%	3.13
1(1) Bound critical Value @ 5%	3.5
1(1) Bound critical Value @ 1%	4.26

Source: Authors' presentation from E-view output.

Table 4 above indicates that the F. statistic of 4.58 is higher than both the upper and the lower bound value at 10%, 5% and 1% levels respectively. This implies that cointegrating association exist among the variables. This result is further validated by the ARDL cointegration outcome displayed in table 5.

Table 5: ADRL cointegration Outcome

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(VCOP)	-48.677618	50.479066	-0.964313	0.3387
D(VPUP)	43.531332	32.154159	1.353832	0.1808
D(VEXR)	-198.470899	64.164716	-3.093147	0.0030
D(LCPI)	-138565.1200 91	101526.8962 94	-1.364812	0.1773
D(LCPI(-1))	253985.9333 36	91885.98631 9	2.764142	0.0075
D(LEPU)	3799.427067	933.467025	4.070232	0.0001
D(LEX_CP)	9482.295656	2183.641688	4.342423	0.0001
D(TOR)	1641.687451	717.395099	2.288401	0.0256
CointEq(-1)	-0.429189	0.069658	-6.161347	0.0000

Cointeq = VASI - (-276.6928*VCOP + 341.4885*VPUP - 291.6787*VEXR + 5582.9089*LCPI + 8852.5746*LEPU + 22093.5231*LEX_CP + 10990.5564*TOR -265359.5424)

Source: Authors' compilation with the aid of E-View software

Table 5 demonstrates that a cointegrating association between the dependent variable and the regressors exist. The coefficient of the cointegrating equation reveals that the speed of movement from the short to the long run stood at about 42.92% in absolute value. The T. statistic of the cointegrating equation is significant at 5% level and is correctly signed, suggesting that a long-run association exists.

Diagnostic Tests

To avoid inconsistent estimates, it was necessary to carry out diagnostic tests on the ARDL regression output. To this end, the ARDL regression estimates was subjected to the Breusch-Godfrey autocorrelation and the Heteroskedasticity tests. The result of the tests are presented in table 6 below.

Table 6: Diagnostic Tests Outcome

Parameters	**Breusch-Godfrey Serial Correlation LM Test**		
F-statistic	0.168829	Prob. F(2,59)	0.8451
Obs*R^2	0.432474	Prob. Chi^2	0.8055
Parameters	**Heteroskedasticity Test: ARCH**		
F-statistic	1.485514	Prob. F(1,73)	0.2268

Obs*R^2	1.495775	Prob. Chi^2	0.2213

Sources: Authors' computation aided by E-View software

The result of the Breush-Godfrey test for autocorrelation reveals the absence of serial correlation in the regression output. Table 6 also shows that the regression result has no heteroscedasticity issues because the probability of F. statistic and Chi^2 are not significant at 5% level. Overall, the diagnostic test outcome indicates that the model is appropriately specified, therefore the result obtained from the regression is consistent and can be used for policy direction.

ARDL Short-Run and Long Regression Outcome

The outcome of the short and long-run ARDL regression are displayed in table 7 below

Table 7: Short-Run and Long-Run ARDL Regression output (VASI = Dependent Variable)

Short-Run Result				**Long-Run Result**			
Variable	Coeff.	T-Stat.	Prob.	Variable	Coeff.	T-Stat.	Prob.
VASI(-1)	0.570811	8.194445*	0.0000	VCOP	-276.6928	-2.276306**	0.0264
VCOP	-48.67762	-0.964313	0.3387	VPUP	341.4885	5.308781*	0.0000
VCOP(-1)	-70.07587	-2.681962*	0.0094	VEXR	-291.6787	-2.708345*	0.0088
VPUP	43.53133	1.353832	0.1808	LCPI	5582.9089	1.422027	0.1601
VPUP(-1)	103.0318	2.916283*	0.0050	LEPU	8852.5746	3.476117*	0.0009
VEXR	-198.4709	-3.093147*	0.0030	LEX_CP	22093.5231	3.758619*	0.0004
VEXR(-1)	73.28562	1.434561	0.1565	TOR	10990.5564	4.517623*	0.0000
LCPI	-138565.1	-1.364812	0.1773				
LCPI(-1)	394947.2	2.166519**	0.0342				
LCPI(-2)	-253985.9	-2.764142*	0.0075				
LEPU	3799.427	4.070232*	0.0001				

LEX CP	9482.296	4.342423*	0.0001				
TOR	1641.687	2.288401**	0.0256				
TOR(-1)	3075.338	4.064163*	0.0001				
R2	0.9587						
Adj. R2	0.9493						
F. Statistic	101.2097						
Prob. F(Stat.)	0.0000						
D.W Stat.	1.8009						
*; **= Significance at 1% and 5% respectively				*; **= Significance at 1% and 5% respectively			

Source: Authors' compilation aided by E-view software

It is obvious in table 7 above that market volatility in the immediate past significantly and positively influence the current level of market volatility, implying that the shocks in the market in the past are major predictor of the current behaviour of the market. Indeed, when there is upward movement in price (upward volatility), risk seeking investors believe that the trend will continue and so intensifies their investment activities and this action trigger further price rise. Table 7 also reveals that the volatility of crude oil price (VCOP) proxy for commodity price risk negatively influence current volatility of the stock market. The current variation in crude oil price has no significant effect, while the past shocks in crude oil price significantly influence stock market volatility. The negatively significant impact of past crude oil volatility at 5% levels, tends to implies that the variations in crude oil constitute a major risk to the Nigerian stock market. However, the current volatility of the pump price of petrol (VPUP) another proxy for commodity price risk has positive but insignificant influence on market volatility. However, the previous volatility of pump price of petrol positively and significantly determines stock market volatility. Meaning, as pump price of petrol rises, stock market risk intensifies. The positive effect of fuel (petrol) price volatility on market volatility suggests that the upward movement in fuel price constitute risk to trading activities in the exchange. Surely, risk averters see the rise in pump price of petrol as threat because of the increase in firms' operating cost associated with it, which may reduce earnings for the firms and reduce investment returns.

Table 7 further reveal that the current exchange rate volatility negatively and significantly influences current market volatility, while the one period lag of the exchange rate volatility positively but insignificantly account for the volatility in market index, suggesting that current fluctuations in local current rate is a threat to stock market activities because of the risk it poses to the market. Table 7 also shows that the current level of consumer price index (LCPI) negatively but insignificantly influences stock market volatility, while the past level of consumer price index (LCPI-1) significantly affects market volatility. The result implies that, as the general price level rises, stock market risk (volatility) intensifies after a lag of one and two period. However, the negative effect of the past period consumer price index on market volatility, implies that rises in the general price level has the capacity to slow down trading activities, thus minimizing market volatility. This is because rise in general price level (inflation) reduce the purchasing power of the people, thus reducing investment activities.

It is obvious in table 7 above that as economic policy uncertainty rises, market risk (volatility) intensifies. This is because of the apprehension associated with policy inconsistencies. This is probably why there exist a positive and significant effect of this indicator (policy uncertainty) on volatility. The result in table 7 above also shows that the current interactions between exchange rate and crude oil (LEX_CP) positively and significantly influence stock market volatility. Indeed, the depreciation in the value of local currency may upset the benefit accruable from crude oil exports price in international market, thus adversely effecting domestic market, particularly stock market activities. It is obvious in table 7 reveals that both the current and past period stock market liquidity positively influence stock market volatility. The effect is significant at 5% level, suggesting that the current level of liquidity is not sufficient to mitigate market volatility. Indeed, most emerging African markets are less liquid, and the illiquidity of the market itself is a source of risk to investors, hence the positively impact.

As shown table 6 above, the adjusted R^2 which stood impressively stood at 0.9493, indicates that the disparity in the dependent variable in the past is normalize in the current level by the regressors to the tune of about 95%. The Durbin Watson statistic of 1.8909 implies the absence of autocorrection in the regression output. The F.statistic which measures the goodness of fit of the model is significant at 0.05 level, suggesting that the variables used are appropriate.

Interpretation of the Long-Run Result

The long-run ARDL regression result in table 7 above shows that the volatility of crude oil price (proxy for commodity price risk) negatively and significantly influences stock market volatility in the long-run. The effect is significant at 0.05 level and denotes that as crude oil price changes in international market, the risk (volatility) of the domestic capital market intensifies. Meaning, instability in the price of crude oil constitute risk to the market in the long-run. Similarly, the volatility in the pump price of petrol (fuel) positively and significantly determines market volatility in the long-run. The significant of this indicator at 1% level tends suggests that fluctuations in fuel price exacerbate stock market risk (volatility). Truly, increase in prices of petrol is tantamount to increase in cost of production and this affect earnings performance of firms, thus constituting risk to return on investment in the long run. Table 7 further indicates that exchange rate volatility negatively and significantly accounts for stock market volatility. Fluctuations in exchange rate, particularly depreciation in the value of local currency discourages local and foreign investors leading to sell-off momentarily but in the long run may reduce trading momentum. The consumer price index (a measure of composite commodity prices) positively but weakly determines stock market volatility. This result tends to implies that changes in the general price level does not constitute major threat to stock market activities in the long-run. Table 7 also reveals that economic policy uncertainty (used as control variable in this study) has positive and significant effect on stock market volatility in the long-run. Meaning, as uncertainty intensifies, stock market volatility soar. Similarly, the interaction between exchange rate and crude oil price (EXR_CP) positively and significantly accounts for stock market volatility in the long run. Also, the liquidity of the stock market has directly and significantly drive market volatility in the long-run. This behavour may be due to the small size trading activities associated with developing capital market like the Nigerian exchange.

Overall, this finding agrees with the arbitrage pricing theory (APT) that macroeconomic variables constitute risk to stock market performance, Uwubanmwen and Omorokunwa (2015) that the volatility of oil price influence stock market volatility. Degiannakis, et al (2014) who discovered

that oil price surprises significantly influence market volatility. Tumala, et al (2023) who that stock market volatility reacted to oil supply and consumption demand surprises.

5. Discussion of Findings

This study aims to ascertain the link between commodity price shocks, exchange rate risk and stock market volatility. This study found that commodity price volatility (volatility of pump price and crude oil price) significantly influences market volatility in the short-run as well as long-run. Specifically, the volatility of crude oil price proxy for commodity price shocks positively and significantly influences stock market volatility, while the volatility of the pump price of petrol another surrogate for commodity price surprise directly(positively) and strongly account for market volatility in the short and long run. The positive effect of these indicators suggests that the current upward movement in fuel prices has a spillover effect on stock market. Surely, some investors, particularly the risk averse ones see the rise in pump price of petrol as threat because of the effect it may have on firms' earnings and investment returns. Whereas, the risk seekers may seize the opportunity to boost their trading activities, believing that the rise in pump price will spur rise in general prices level and this may boost earnings of some firms, thus bringing in more returns. These opposing reactions may have diverse effect on stock price movement resulting in variability. This finding tends to provide support for Oke, et al (2023) that oil price positively and significantly determines stock market, and Uwubanmwen and omorokunwa (2015) who found that the volatility of oil price determines stock market volatility. The finding also provide support for Degiannakis, et al (2014) who discovered that oil price surprises significantly influence market volatility.This finding is contrary to Berk and Aydogan (2012) who could not find evidence that the stock market responds to crude oil price surprises.

Exchange rate risk proxy by volatility of exchange rate in this study negatively and significantly drive stock market volatility both in the short and long runs. Depreciation in the value of local currency discourages investors, particularly foreign portfolio investors because the value of their investment and its returns may have depreciated, thus slowing down trading momentum. This finding tends to aligned with Sichoongwe (2016) who found negative effect of exchange rate volatility on Zambian stock market. This study also found that the interactions between exchange rate and crude oil positively and significantly impact stock market volatility in the short-run and long-run. Indeed, the depreciation in the value of local currency may upset the benefit accruable from rise in oil price and this may have adverse effect domestic market, thus constituting risk stock market.

6. Conclusion and Recommendation

This study investigates the influence of commodity price shocks and the risk associated with exchange rate on market volatility in Nigeria. Data for the study was collected from the Central Bank of Nigeria statistical database, Nigeria Exchange Limited database and the World Uncertainty Index database (sourced from www.economicpolicyuncertainty.com) from April 2016 to September 2022. The volatility of the stock market, oil price shocks and exchange rate risk (proxy by exchange rate volatility) were detected using GARCH (1,1) procedures. The autoregressive distributive lag (ARDL) estimation technique was engaged in this study. This study concludes that oil price shocks (volatility of crude oil and petrol price) and exchange rate risk (volatility) are important factors influencing stock market volatility in Nigeria. Specifically, the

volatility of crude oil price and the volatility of pump price of petrol positively and significantly influences market volatility in the long and short run. However, exchange rate risk (exchange rate volatility) negatively and significantly determines stock market volatility both in the short-run and long-run.

This study recommends that investors should demand oil price risk and exchange rate risk premiums while pricing financial assets as this will boost their investment returns. The regulatory agencies, particularly the Security and Exchange Commission should initiate policy aim at boosting the resilience of the stock market against external shocks such as the introduction of more derivative instruments and listing of more institutional investors.

References

Anzuini, A., Lombardi, J.M., & Pagano, P. (2013). The impact of monetary policy shocks on commodity prices. *International Journal of Central Banking, 9(3), 119-144.*

Antonopoulou, H., Manalougou, V., & Theodorakopoulos, L. (2022). The role of economic policy uncertainty in predicting stock return volatility in the banking industry: A Big Data Analysis. *Emerging Science Journal*, 6(3), 569-577.

Adenekan, A.T., Hilili, M.J., & Okereke, A.N. (2020). Oil price, exchange rate and stock market performance in Nigeria. *Central Bank of Nigeria Economic and Financial Review, 58(4), 63-103*

Atoi, V.N. (2014). Testing volatility in Nigeria stock market using GARCH model. *CBN Journal of Applied Statistics, 5(2), 65-73*

Bedowska-Sojka, B., & Kliber, A. (2019). The causality between liquidity and volatility in the polish stock market. *Finance Research Letters,* 30, 110-115

Berk, I., & Aydogan, B. (2012). Crude oil price shocks and stock returns: Evidence from Turkish stock market under global liquidity conditions. Institute of Energy Economics (EWI) Working Paper, No 12/15

Bazzi, S., & Blattman, C. (2014). Economic shocks and conflict: Evidence from commodity prices. *American Economic Journal: Macroeconomics, 6 (4),* 1-38.

Bhowmik, R., & Wang, S. (2020). Stock market volatility and return analysis: A systematic literature review. *Entropy, 22 (522), 1-18.*

Bala, A.D., & Asemota, O.J. (2013). Exchange–Rates volatility in nigeria: application of garch models with exogenous break. *CBN Journal of Applied Statistics, 4(1),* 89-116

Black, F. (1976). Studies of stock price volatility changes. *Proceedings of the Business and Economics Statistics Meetings, American Statistical Association, 11, 177-181.*

Christie, A. A. (1982). The stochastic behavior of common stock variances: Value, leverage and interest rate effects. *Journal of Financial Economics, 10, 407-432.*

Corradi, V., Distaso, W., & Mele, A. (2013). Macroeconomic determinants of stock market volatility and volatility risk premiums. *Journal of Monetary Economics, 60(2), 203-220*

Cakan, E., & Ejara, D.D. (2013). On the relationship between exchange rates and stock prices: Evidence from emerging markets. *International Research Journal of Finance and Economics, 111, 115-124.*

Dawood, M. (2007). Macroeconomic uncertainty of 1990s and volatility at karachi stock exchange. Munich Personal RePEc Archive (MPRA) Paper No. 3219, May.

Drama, B. G. H. (2023). Global economic policy uncertainty, oil shocks and volatility in some Southern African Development Community Stock Markets: A GARCH-MIDAS Approach. *Journal of Economics and International Finance, 15(4), 85-98.*

Dornbusch, R., & Fischer, S. (1980). Exchange Rates and the Current Account. *American Economic Review*, *70(5), 960-971*.

Esezobor, A. (2014). The Role of Exchange Rate in Economic Growth. *International Journal of Business and Economics Research, 3*(3), 91-97.

Degiannakis, S.A., Filis, G., & Kizys, K. (2014). The Effects of Oil Price Shocks on Stock Market Volatility: Evidence from European Data. *The Energy Journal, 35(1),* 35-56

El-Diftar, D. (2023). The impact of exchange rates on stock market performance of the Emerging 7. *Journal of Capital Markets Studies, 7(2), 125-139* (DOI 10.1108/JCMS-03-2023-0005)

Ge, Y., & Tang, K. (2020). Commodity prices and GDP growth. *International Review of Financial Analysis, 71* (Available at https://doi.org/10.1016/j.irfa.2020.101512)

Gujarati, D.N. (2009). *Basic econometrics (5th Edition.).* McGraw-Hill Companies INC, USA.

Hussain, M., & Bashir, U. (2013), Dynamic linkages of exchange rate and stock return volatility: Evidence from Pakistan, Idia and China. *International Review of Management and Business Research,2(2), 345-354.*

Harris, L. (2003). *Trading and exchanges: Market microstructure for practitioners*. Oxford University Press, Hong Kong, China.

Hamilton, J.D. (2003). What is an oil shock? *Journal of Econometrics, 113, 363-398*

Hamilton, J.D. (1983). Oil and the Macro economy since World War 11. The Journal of Political Economy 91, 228-248.

Iscan, E. (2014). The relationship between commodity prices and stock prices: Evidence from turkey. *International Conference in Economics held between third and fifth September, 2014 in Czech Republic, 1-11.*

Ildirar, M., & Iscan, E. (2015). The interaction between stock prices and commodity prices: East Europe and Central Asia countries. International Conference On Eurasian Economies, 41-47.

Iorember, P., Sokpo, J., & Usar, T. (2017). Inflation and stock market returns volatility: Evidence from the Nigerian Stock Exchange 1995Q1-2016Q4: An E-GARCH Approach. Munich Personal RePEc Archive (MPRA) Paper No. 85656, November. (Available at https://mpra.ub.uni-muenchen.de/85656/)

Igbinovia, M.I., & Igbinovia, L.E. (2019). Oil price volatility and stock market returns in an emerging economy: Evidence from Nigeria. *Sriwijaya International Journal of Dynamic Economics and Business, 3(3), 193-206*

Jawaid, S.T., & Ui-Haq, A. (2012). Effects of interest rates, exchange rate and their volatilities on stock prices: Evidence from banking industry of Pakistan. *Theoretical and Applied Economics, 19(8), 153-166.*

Kang, W., Ratti, A.R., & Vespignani, J. (2017). Global commodity prices and global stock volatility shocks: Effects across countries. Federal Reserve Bank of Dallas Working Paper No. 311, April, 1-33

Kurz, M. (1994). On the structure and diversity of rational beliefs. *Economic Theory, 4, 877-900.*

Krugman, P. (2015). Strength is Weakness. New York Times, March, 13th (Available at https://www.nytimes.com/2015/03/13/opinion/paul-krugman-strengthis-weakness.html?mcubz=0)

Li, T., Ma, F., zhang, X., & Zhang, Y. (2020). Economic Policy Uncertainty and the Chinese Stock Market Volatility: Novel Evidence. *Economic Modelling, 87,* 24-33

Lombardi, M.J., & Ravazzolo, F. (2013). On the correlation between commodity and equity returns: Implications for portfolio allocation. *Bank for International Settlements, Working Papers No. 420, July, 1-32.*

Lakshmanasamy, T. (2021). The relationship between exchange rate and stock market volatilities in India: ARCH-GARCH estimation of the casual effects. *International Journal of Finance Research, 2(4), 245-259.*

Mlambo, C., Maredza, A., & Sibanda, K. (2013). Effects of exchange rate volatility on the stock market: A Case Study of South Africa. *Mediterranean Journal of Social Sciences, 4(14), 561-570*

Naik, P.K., & Padhi, P. (2012). The impact of macroeconomic fundamentals on stock pricesrevisited: Evidence from Indian data. *Eurasian Journal of Business and Economics,* 5(10), 25-44.

Nzotta, S. M. (2014). Determinants of exchange rate in Nigeria: An autoregressive distributed lag (ARDL) approach. *European Journal of Business and Management, 6*(13), 54-63.

Naurin, A., & Qayyum, A. (2016). Impact of oil price and its volatility on stock market index in Pakistan: Bivariate EGARCH model. Munich Personal RePEc Archive (MPRA) Paper No. 70636, April (https://mpra.ub.uni-muenchen.de/70636/)

Oke, O.B., Alli, O.I., & Agbesuyi, K.O. (2023). The effects of oil price volatility on stock market development in Nigeria. *Economic Insights – Trends and Challenges, 12(2), 51-60.(https://doi.org/10.51865/EITC.2023.02.04)*

Oladepo, F., Olufemi, P.A., Abayomi, O.I., & Daniel, S.O. (2017). Exchange rate volatility and stock market performance in Nigeria. *Nigerian Journal of Management Sciences, 6(1), 308-317*

Oseni, I.O., & Nwosa, I.P. (2011). Stock market volatility and macroeconomic variables volatility in Nigeria: An exponential GARCH approach. *Journal of Economics and Sustainable Development, 2(10), 28-42.*

Officer, R. R. (1973). The volatility of the market factor of New York stock exchanges. *Journal of Business, 46, 434-453.*

Patel, S. (2012). The effect of macroeconomic determinants on the performance of the Indian Stock Market. NMIMS Management Review, 22,117-127.

Perera, H. A. P. K. (2016). Effects of exchange rate volatility on stock market return volatility: Evidence from an emerging market. *International Journal of Science and Research, 5(1), 1750-1755.*

Pesaran, M.H., & Shin, Y. (1999). An autoregressive distributive lag modelling approach to cointegration analysis. Econometric and Economic Theory in the 20th century. The Ragnar Frisch Centennial Symposium, Strom, S.(ed), Cambridge University Press.

Pesaran, M.H, Shin, Y., & Smith, R. (2001). Bounds testing approaches to the analysis of level relationships. Journal of Allied Economics, 16, 289-326.

Ross SA. (1976). The Arbitrage Theory of Capital Asset Pricing. *Journal of Economic Theory, 13, 341-360.*

Sathyanarayana, S., Harish, S.N., & Gargesh, S. (2018). Volatility in Crude Oil Prices and its impact on Indian Stock Market: Evidence from BSE Sensex SDMIMD. *Journal of Management, 9(1), 65-87.*

Sichoongwe, K. (2016). Effects of exchange rate volatility on the stock market: The Zambian experience. *Journal of Economics and Sustainable Development, 7(4), 114-119*

Shiller, R.J. (1981). Do stock prices move too much to be justified by subsequent changes in dividends? *American Economic Review, 71, 421-436.*

Shehu, A., & Hassan, A. (2018). Oil price shocks and stock market performance in Nigeria economy. A Non-Linear ARDL Analysis, 2008-2017. *Nigerian Journal of Securities Market, 3(1),* 64-75

ThisDay News Paper, 20th April, 2024

Tumala, M.M., Salisu, A.A., & Gambo, I.A. (2023). Disentangled oil shocks and stock market volatility in Nigeria and South Africa: A GARCH-MIDAS approach. *Economic Analysis and Policy, 78,* 707-717

Uyaebo, S.O., Atoi, V.N., & Usman, F. (2015). Nigeria stock market volatility in comparison with some countries: Application of asymmetric GARCH Models. *CBN Journal of Applied Statistics, 6(2), 133-160.*

Uhunmwangho, M., & Igbinosa, S.O. (2022). Financial liquidities and African Stock Markets. *Journal of Academic Research in Economics, 14(1), 95-108.*

Uhunmwangho, M. (2022). Determinants of stock market volatility in Africa. *African Journal of Economic Review, 10(2), 136-151.*

Uhunmwangho, M., & Izekor, A. O. (2024). Economic policy uncertainty, macroeconomic volatility and stock market behaviour in Nigeria. *Journal of Economics and Allied Research, 9(2), 73-91*

Uhunmwangho, M., & Omorokunwa, O.G. (2022). Volatility, liquidity and stock market returns. *Journal of Economic Research in Economics, 14(2),* 365-376.

Uwubanmwen, A.E., & Omorokunwa, O.G. (2015). Oil price volatility and stock price volatility: evidence from Nigeria. *Academic Journal of Interdisciplinary Studies, 4(1), 523-260.*

Vogler, J., & Zimmerman, K. F. (2019). Exchange rate. in *international encyclopedia of geography: People, the Earth, Environment and Technology* (pp. 1-11). John Wiley & Sons.

Yu,X., Huang, Y., & Xiao, K.(2021). Global economic policy uncertainty and stock volatility: Evidence from Emerging Economies. *Journal of Applied Economics, 24(1), 416–440*

Zapata, O.H., Detre, D.J., & Hanabuchi, T. (2012). Historical performance of commodity and stock markets. *Journal of Agricultural and Applied Economics, 44(3),339–357*

Zakaria, Z., & Shamsuddin, S. (2012). Empirical evidence on the relationship between stock market volatility and macroeconomics volatility in Malaysia. *Journal of Business Studies Quarterly, 4(2),* 61-71.

Zubaire, A.Z., & Aladejare, A.S. (2017). Exchange rate volatility and stock market performance in Nigeria. *Asian Journal of Multidisciplinary Studies, 5(11),* 194-201