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Oil Price Volatility and Stock Market Returns in an Emerging Economy: Evidence from Nigeria

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Abstract: The study examines the reaction of the Nigerian stock market to fluctuations in the mainstay of the Nigerian economy. Using time series data sourced from OPEC website and the Central Bank of Nigeria (CBN) Statistical Bulletin, we investigate the effect of oil price volatility on stock market returns in Nigeria during the period 1981 to 2017. Co-integration test established the long run relationship between variables, while, the Error Correction Model (ECM) and Pair-Wise Granger Causality test were used to ascertain the short run dynamics and the direction of causality between the variables of interest. The findings reveal among other things that Oil Price Volatility (OPV) has a non-significant positive effect on Stock Market Return (SMR) both in the short and long run period. Exchange Rate (EXR) and Interest rate (INT) were significant variables that influence stock market return in Nigeria during the period under review.

Keywords: Dutch Disease; Emerging economy; Oil price; Stock returns; Volatility

Introduction

Over the years, Crude Oil has become a veritable means of energy generation in most countries of the world (Sathyanarayana, Harish & Gargesh (2018). As an important part of the Nigerian economy, oil occupies a crucial position, as it influences the nation's socio-political and economic fortunes. Ever since the oil boom of the 1970s, Nigeria has experienced a paradigm shift from her reliance on agriculture and light manufacturing to crude oil. The focus on oil has brought about a decline in the productivity of other sectors of the economy and has given rise to massive drift from the rural areas to cities, neglecting their primary occupations of fishing and farming, a phenomenon known as 'Dutch Disease'. (Adedipe, 2004; Odularu, 2007).

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Nigeria, is an oil rich nation having an emerging economy. The peculiar nature of the Nigerian oil sector puts her in a grey area. While Nigeria is one of the major exporters of oil, she continues to import refined petroleum product at international prices, though partly subsidized by government. Oriakhi, and Iyoha. (2013) assert that the direction and magnitude of effect, oil price volatility has on any economy is dependent significantly on the nature of the economy and the direction of such price change (increase or decrease). This makes it difficult to make an unambiguous and conclusive statement on the reactions of the Nigerian economy to volatility in the price of oil.

Various researchers have at several times made efforts to verify the reaction of stock market returns to oil price changes. Since the study by Hamilton's 1983, it has become widely accepted that there exist a nexus between oil price changes and macroeconomic variables. Oil price shocks can bring about inflation, especially to the oil-importing countries. Increase in oil price reduces the cash flows of businesses and the anticipation of higher interest rate could deplete the value of stocks. Consequently, a boom in oil price could pose a threat to the stock markets. The importance of the oil industry in the Nigerian economy cannot be overemphasized, as it is the largest provider of the nation's foreign exchange as well as the total revenue needed for the socio-political and economic wellbeing of the country. Therefore, an inconsiderable change in oil price could have an enormous impact on the economy, especially as a substantial part of Nigeria's crude oil is sold unrefined. Changes in the prices of oil in the global economy have recently been very swift and exceptional, partly due to amplified demand for oil by China and India. Usually, changes in the prices of either the crude oil or any of its derivatives, impact on users as well as concerned economies. Oil price continues to be of great interest to the economy because of its unique position as an important driver of the production process of many industries in the economy. It is against this backdrop that we look into the impact of oil price volatility on stock market returns in Nigeria.

The study's objective is to look into oil price volatility and stock market returns in Nigeria, with emphases the causality between Oil price volatility and stock market returns as well as their causality with selected macro-economic variables in Nigeria. Because of the oil glut of 1980s, the study is delimited to a time frame of 1981-2017 so as to take cognisance of other shocks experienced in the global oil industry till 2017.

Literature Review

Since the work of Hamilton (1983), several researchers have look into the nexus between macroeconomic variables and changes in oil price. Among them, a positive relationship was observed by a small percentage of them, while a large portion of them found a negative relationship. Although, a significant number of such researchers investigated the influence crude oil prices has on the monetary policy determination of government (Hamilton & Herrera, 2004) as well as the effects oil prices exert on exchange rates (Chen & Chen, 2007).

A study conducted by Sadorsky (1999), evaluates oil price volatility, with emphasis on how it influences stock exchange returns. Using a VAR model, monthly data on the United States industrial index, interest rate, industrial production as well as oil prices for the period 1947-1996 were analyses. The results reveals a significant negative effect on the stock market. Also, he looks into the asymmetric association existing between oil prices and

points that a positive variation in the prices of oil, would significantly influence both the financial market and the overall economy. However, it was also found that this effect developed after 1986. It is also concluded that the stated effects expand after 1986. Afterward Sadrosky (2001) expanded his research to Canada and found that Canadian market also sensitive to oil price and interest rate risk. In this he used multifactor arbitrage pricing theory approach. Also, Perk and Ratti (2008) found that hikes in oil prices affect stock returns negatively in developed economies. For Faff and Brailsford (1999) the focus was on oil price effect on stock market in Australia. They used industry index returns and evaluate oil risk in each industry from 1983-1996. They argued that generally oil price impact the cost of many industries. They found positive affect in oil companies while in Paper and Packaging industry and Transport and Banking industry had negative effect. They suggested that financial markets offer hedging against oil price risk and supported by Nandha and Faff (2008) who examined the short term effect of oil price changes on 35 global industries. Similarly, Maghyereh (2004) used VAR models and concludes that oil price has no significant impact on index returns.

Nandha and Faff (2008) in their study, took a sample of 35 data stream global industry indices for a period of 23 years, spanning from 1983 to 2005. Findings reveal that when oil price moves upward, its impact on stock returns is usually negative in all the sectors except of oil and gas industry and mining industry. These results were consistent with prior literature and theory. Moreover a little evidence of asymmetric was also found. Constantine and Gruici (2010) focus of the energy sector with emphases on the effects oil prices exert on the sector in the context of current economic crisis. They used daily data and apply co integration test for the data of tow benchmarks for international oil prices. They took WTI and Brent oil prices both for this analysis and for the All Country World Energy Index, an MSCI index that tracks the performance of the energy sector. Narayan and Narayan (2009) also studied oil prices impact on stock prices of Vietnam market. They used daily data from 2000-08 and took exchange rate as additional determinant of stock market. They found that all the variables are co-integrated and find that oil prices exert a statistically significant and positive influence on stock market performance indicators.

Of these researches, paucity still exist among developing countries that are oil dependent, having the status of an exporter of oil and an importer of refined oil products.

Table 1. **Prior Empirical Literature**

Author (s)	Country	Year	Methodology	Findings
Jones and Kaul	US, Canada, UK, Japan	1996	Regression analyses	The influence of oil price changes on stock market variables depends on country specific variables.
Faff and Brailsford	Australia	1999	Cointegration	The effect exerted by oil prices on stock returns varies from industry to industry
Sadorsky	US, Canada	1999	Multi factor Arbitrage Pricing theory (VAR Model)	Oil prices significantly affect stock market
Maghyereh	22 Emerging economies	2004	VAR Model	Insignificant connectivity of oil

				price variables and stock market returns variables
Sadorsky	India, Pakistan	2006	CAPM multi factor theory (VAR Model)	Oil prices significantly affect stock market
Zarour	Saudi Arabia, Bahrain, Oman, Abu Dhabi, Kuwait	2006	VAR Model	Stock prices affect market performance positively
Kandari	GCC	2007	Non linear cointegration analysis	Oil price affect GCC countries in Non linear relation
Odusami	US	2008	GARCH Model	Stock market is negatively affected by lagged value of oil prices
Cong, Wie, Jiao and Fan	China	2008	VAR Model	The effect were sectors dependent
Miller and Ratti	OECD countries	2009	VECM Model	Negative nexus between oil prices and world market indices
Imariagbe	Mexico, india, china, US, Russia, Saudi Arabia	2010	VAR Model	Oil prices and exchange rates influence stock prices
Le and Chang	Singapore, Japan, Korea, Malaysia	2011	VAR Model	A significant relationship exist between stock markets and oil prices
Aliyu	Nigeria, Ghana	2012	GARCH	Results vary in both country
Osamwonyi and Ighodaro	Nigeria	2012	VECM	Along run relationship exist among oil prices, market capitalisation and interest rate.
Igbinoba	Nigeria	2014	VECM	Oil price fluctuations negatively affect stock market

Source: *Researchers Compilation, 2018*

The study is hinged on the Arbitrage Pricing Theory (APT). According to Ross (1976), the Arbitrage Pricing Theory (APT) provide a possibility for effectively linking macroeconomic variables with stock market returns. The Arbitrage Pricing Theory (APT) is a relevant theory for explaining stock market returns (Ajao, 2013). Although most empirical papers on APT emphasise the ability of the theory to explain returns on individual security, its usefulness in providing explanations on aggregate stock market framework cannot be ruled out, where changes in a certain macroeconomic factor could become responsive to changes in an underlying systemic risk factor that determines future returns. Virtually all prior empirical studies on APT theory, connecting the state of the aggregate-economy to stock market returns, are focused on establishing a short run nexus between macroeconomic variables and the stock price in terms of first difference, assuming trend stationarity.

At equilibrium, the APT advocates that expected return on security i E (R_i) will be given by;

$$E(R_i) = R_{FR} + \square_{i1}(F_1 - R_{FR}) + \square_{i2}(F_2 - R_{FR}) + \square_{in}(F_n - R_{FR}) \ldots\ldots\ldots\ldots\ldots \quad (1)$$

Where:

$E(R_i)$	= Expected rate of return on security
$\square_{i1}$	= Sensitivity of security 1 to economic factor 1
$\square_{i2}$	= Sensitivity of security of security 1 to economic factor 2
F_2	= Expected value of factor 2
F_n	= Expected value of factor n
$\square$	= Beta coefficient
R_{FN}	= Risk free rate of return (Rose, 1976)

In explaining stock market returns, we limit this study to key macroeconomic factors like oil price volatility, Exchange rate and Interest rate. Stemming from the above, we hypothesise that:

H1: Oil price volatility has no significant impact on stock market returns in Nigeria.

H2: there is no causality between selected macro-economic variables and stock market returns in Nigeria.

Methods

An ex-post facto research design within a time series frame work is adopted in this study. Stationarity and cointegration test are conducted for variables implicated for this study. Also we tested the direction of causality between the variables. Suffice to say that, oil price volatility, our key endogenous variable was generated via GARCH technique/procedure. Secondary data on All-share index, oil price, Exchange rate and interest rate index are obtained from various editions of the Nigerian Stock Exchange (NSE) Fact Book, OPEC website and the Central Bank of Nigeria (CBN) Statistical Bulletin of 2017.

In this study, the model of Faft and Brailsford's (1999) was adapted.

$$R\, i\mathit{t} = \square i0 + \square i1RM\mathit{t} + \square i2OILR(USD)\mathit{t} + \square\square 3XR\mathit{t}\ eit \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots .. \quad (2)$$

Where:

R i*t*	: is the return on the ith asset or portfolio in period t;
RMt	: is the return on market index in period t;
OILR (USD)*t*	: is the oil price in period t;
XR*t*	: is the Unites States dollar exchange rate at time t;
eit	: is the error term

Modifying Faff and Brailsford model, we employ a multifactor model:

$$SMR\, i\mathit{t} = \square\ i0 + \square\ i1OPV\mathit{t} + \square\ i2EXR\mathit{t} + \square\ i3INT\mathit{t} + \square it \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where:

SMR	: Stock market return
OPV	: Oil price volatility
EXR	: Exchange rate

INT : Interest rate
On a prior expectation $\square_0 < > 0, \square_{1,} \square_{2,} \square_3 < 0$

Measurement of Variables
Yearly time series financial and macroeconomic data are employed for this study. The modes of generation, measurement/operationalization of these variables are highlighted below.
Stock Market Return (SMR)
In this study, we compute the stock market returns (SMR) as the yearly change n the closing point of the All-share index (ASI) of the Nigerian Stock Exchange. Relying on Saryal (2007) model, adapted in Ajao (2013), we compute the stock market returns as follows:

SMR = log [ASIt] x 100…………………………………………. (4)

Oil Price Volatility (OPV)
We use the Generalized Auto-Regressive Conditional Heteroskedasticity (GARCH) in generating and measuring the volatility of oil prices. Suffice to say that the Autoregressive Condition Heterroskedasticity (ARCH) models were first used by Engle (1982) and its generalization as GARCH was by Bollerslev (1986). These models have become widely used and accepted in time series studies that are of macroeconomic or financial nature due to their ability to capture volatility clusterity. We therefore generated the volatility of oil prices using the GARCH (1,1) model, due to its simplicity and effectiveness in capturing volatility clustering and persistence.

Exchange Rate **(***EXRT***)**
This was taken as the real exchange rate of the Naira to the dollar.

Interest Rate
This is taken as the money interest rate as given by the CBN in Nigeria.

Findings

The study involves series of analyses. First, the study tests for stationarity (unit root properties) of variable. The quest to avoid spurious regression result necessitate this test, as bounds test require that variables are I(0) or I(1). so in the presence of I(2) variables, the computed F-statistics provided by Pesaran et al. (2001) will be invalid. In the same vein, other diagnostic tests were applied to data in the model to ascertain the presence of serial correlation, heteroskedasticity, and conformity with normality.

Before proceeding to the Engle and Granger Co-integration exercise, we conduct some tests to ensure that all variables are stationary at levels or difference. I(0), 1(1) or I(2). In achieving this, an Augmented Dickey Fuller (ADF) and a Phillips Perron (PP) tests were applied at both levels first difference and second difference. These are followed by the Parsimonious Error Correction Model (ECM) for testing equilibrium in both short run and long run horizons. The volatility of oil prices was computed using the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) 1.1.

Descriptive Statistics

The summary, distribution and other properties of variables that is important to ensure that the equations estimated tracked the data well, before accepting the results of our model specification is given below:

Table 2. **Summary Statistic**

	SMR	EXR	INT	OPV
Mean	20.52568	75.73900	12.80919	1428.367
Median	18.46000	22.05000	13.00000	94.18000
Maximum	130.9400	298.9700	26.00000	8902.180
Minimum	-45.77000	0.550000	5.000000	13.35000
Std. Dev.	34.00773	75.52746	4.171498	2645.809
Skewness	0.741455	0.717550	0.623784	1.892982
Kurtosis	4.371627	2.939645	4.258717	5.132210
Jarque-Bera	6.290596	3.180694	4.842062	29.10643
Probability	0.430054	0.203855	0.808830	0.150000
Sum	759.4500	2802.343	473.9400	52849.59
Sum Sq. Dev.	41634.92	205358.3	626.4503	2.52E+08
Observations	37	37	37	37

Source: *Extracted from E-view 7.0 Output, 2018*

The ratio between mean and median values in table 4.1 is approximately one except for OPV. Showing high level of consistency among variables. There is a meaningful difference between minimum and maximum value with low standard deviation (except for OPV). All the variables considered skewed to the right with long tail as indicated by their positive values. SMR, INT and OPV have peaked properties with the kurtosis value that is greater than three (0) that is relative to normal. Only EXR has a normal distribution property as indicated by the kurtosis value of approximately three (3) which is a bench mark for normal distribution. The Jarque-Berra (J-B) statistic are not significant at 1% and 5% level in the light of their corresponding probability values indicates that all the variables under consideration are normally distributed.

Co-integration Results

Table 3. **Engle and Granger Co-integration test**

Variable	Level	Mackinnon Critical Values	Prob*	Remark
RESID (ECM)	-5.626285	-4.243644*	0.0003	Stationary
*, **stationary at 5% and 1% level of significance respectively				

Source: *Extracted from E-view 7.0 Output, 2018.*

Co-integration tests were conducted on the models, using Augmented Dicky-Fuller (ADF) test on the residual of the models (Engle and Granger two stage co-integration approach). The results shown in table 4.3 reveals that the hypothesis of none existence of co-integrating vector is rejected at level and indicative of co-integrating vector at one percent significant level. The conclusion stemming from this result is that there exist a long run relationship exists between the variables in the models. On the basis of this, we proceed to estimate equilibrium correction models.

Parsimonious Error Correction Model (ECM) Results

Table 4. **Regression results for ECM Short run and Long run**

Short run dependent variable: □ SMR
Long run dependent variable: SMR

Variable	ECM Short Run Coefficient	t-Statistic	Prob.	Long Run Coefficient	t-Statistic	Prob.
C	-94.08750	-4.137102	0.0012	-19.63132	-1.209021	0.2361
OPV				4.35E-05	0.019161	0.9848
EXR				-0.086342	-1.166654	0.2525
INT				3.669532	3.215405*	0.0031
DSMR(-1)	-0.330640	-1.926608	0.0762			
DSMR(-2)	-0.701222	-4.350065*	0.0008			
DOPV	0.003940	0.580840	0.5713			
DOPV(-1)	-0.003468	-0.722899*	0.4825			
DOPV(-2)	-0.004913	-1.156548*	0.2683			
DOPV(-3)	0.011369	1.093261	0.2941			
DEXR	-0.790016	-2.677774*	0.0190			
DEXR(-1)	0.789744	1.503745	0.1565			
DEXR(-2)	-1.301431	-2.641022**	0.0204			
DEXR(-3)	1.213141	3.584811	0.0033			
DINT	2.556933	2.132400**	0.0526			
DINT(-1)	2.836431	1.596344	0.1344			
DINT(-2)	6.412020	5.221634*	0.0002			
ECM(-1)	-0.154747	-2.720537**	0.0484			
AR(3)	-0.817781	-4.598903	0.0005			
R-squared	0.809929			0.276480		
Adjusted R^2	0.590616			0.180011		
F-statistic	3.693024*			2.865991		
Prob(F-statistic)	0.011497			0.040117		
Durbin -Watson Stat	2.017520			1.898427		

*NB: *, ** and *** connote significance of result at 1%, 5% and 10% respectively.*

Source: *Extracted from E-view 7.0 Output, 2018)*

The parsimonious Error Correction Model (ECM) results corrected for autocorrelation with Cochrane-Orcutt AR(3), convergence was achieved after 9 iterations with 29 observations included reveals that the error correction term (-0.15) took the expected sign being negative and also statistically significant at 5% level of significance as indicated by the t- value of -2.72 when compared with its probability value. The intensity of adjustment of the variables to attain equilibrium in the long run after short run shock is approximately 15%. The R^2 value of 0.81% and Adjusted R^2 value of 59% in the ECM result shows that

the regression fit is very tight. This means that 59% of the total systematic variation in dependent variable (Stock Market Return) (SMR) was explained by all the explanatory variables taken together in the model. These results affirm that at least 41% of total systematic variation in stock market return is attributable to factors not included in this model, hence captured the stochastic term.

The result further reveals that if all the explanatory variables are zero, there is a significant decrease in stock market return by -94.08750 in the short run and a non-significant decrease by -19.63132 in the long run as shown by the intercept (constant). The one and two period lag of SMR (dependent variable) considered has significant negative effect on the current period stock market return (except for SMR-1). The entire lagged period considered for all the independent variables have varying degree of relationship with their current year variables. The one (OPV-1) and two (OPV-2) period lag considered for Oil Price Volatility (OPV) exert a non-significant negative influence on current year OPV and the three (OPV-3) period lag has a non-significant positive effect on current year OPV. On Exchange rate (EXR), the one period lag has non-significant positive effect on current year EXR. The two and three period lag considered has mixed significant effect on current year EXR. The effect of EXR-2 was negative while that of EXR-3 was positive. On Interest Rate (INT), the two period lag INT-2 considered has significant positive impact on the current year INT. But the one period lag INT-1 has non-significant positive effect on current year interest rate (INT).

The overall model is statistically significant as indicated by the F-statistic value of 3.69 which is high and significant when compared with the probability of 0.01 indicating that a significant relationship exist between all the explanatory variables taken together and the dependent variable. The model may not have autocorrelation since the Durbin-Watson statistic value of 2.01 and 1.898 for the ECM short run and OLS long run result is approximately 2.0. However, because of the dependent variable lag at the right side of the equation, the Breuch-Godfrey serial correlation LM was further used to validate our result to ensure there are low likelihood of autocorrelation in the model. We show a tabular representation of result is shown below;

Table 5. **Serial Correlation Test Result**

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.374281	Prob. F(2,11)	0.2933
Obs*R-squared	5.797575	Prob. Chi-Square(2)	0.0551

Source: *Extracted from E-view 7.0 Output, 2018*

The null hypothesis (H_i) is accepted if test outcome shows serial correlation exist up to order two (2). As a result, we accept the null hypothesis (Ho) that there exist no serial correlation as the probability value 0.29 is greater than 0.05. An indication that the residuals are not serially correlated. Therefore, we accept the model as useable and adjudged reliable for policy recommendation without necessarily subjecting it to further modification or re-specification.

Test for Causality

Table 6. **Pairwise-Granger causality test result**

Null Hypothesis:	Obs	F-Statistic	Prob.	Decision	Remark
DEXR does not Granger Cause DOPV	33	3.96708**	0.0304	Reject	Partial
DOPV does not Granger Cause DEXR		0.05045	0.9509	Accept	Feedback
DINT does not Granger Cause DOPV	33	0.72782	0.4919	Accept	None
DOPV does not Granger Cause DINT		0.43878	0.6492	Accept	
DSMR does not Granger Cause DOPV	33	1.52620	0.2349	Accept	Partial
DOPV does not Granger Cause DSMR		2.68030***	0.0861	Reject	Feedback
DINT does not Granger Cause DEXR	33	0.08666	0.9172	Accept	None
DEXR does not Granger Cause DINT		0.81645	0.4522	Accept	
DSMR does not Granger Cause DEXR	33	1.69032	0.2027	Accept	None
DEXR does not Granger Cause DSMR		1.26316	0.2984	Accept	
DSMR does not Granger Cause DINT	33	0.66605	0.5217	Accept	Partial
DINT does not Granger Cause DSMR		8.65005*	0.0012	Reject	Feedback

Source: *Extracted from E-view 7.0 Output, 2018*

*,** and *** represent 1%, 5% and 10% level of significant respectivel

The granger causality test reveals that exchange rate (EXR) granger cause oil price volatility (OPV) in a unidirectional manner and not the other way. More importantly, the causality results for Oil Price Volatility (OPV) and Stock Market Return (SMR) shows a unidirectional relationship. Thus, OPV granger causes SMR and not the other way. In effect, as Nigeria oil price changes, it will attract more stock market return. The result further shows that interest rate (INT) granger causes Stock market return in a unidirectional manner. This means that movement in interest rate can increase stock market return.

Discussion of Findings and Policy Implications of Result

The findings and the policy implications of our empirical result are presented: Oil Price Volatility (OPV) in Nigeria, has a non-significant but positive influence on Stock Market Return (SMR) both in the short run and long run horizons during the period covered by this study. Which connotes that a 1% upsurge in oil price volatility will result to 0.003940 and 4.35E-05 non-significant increases in stock market return in the short and long run respectively. This result corroborated the findings of Maghyereh (2004) in the literature. However, contrary to the findings of Sadorsky (1999), Park and Ratti (2008), and Reboredo (2008) in the literature. This could be as a result of the Nations positions as an exporter of oil and an importer of refined oil products.

The empirical results further reveal that Exchange Rate (EXR) considered in the model has significant negative effect on stock market return only in the short period. While in the long run, the effect is still negative but not significant. This implies that a 1% upward movement in exchange rate will result to 79% significant decreases in stock market return in the short run period. While a 1% rise in exchange rate in the long run will result to 9%

non-significant decreases in stock market return. This outcome is not in tandem with theory, and the result conforms to the findings of Adjasi and Biekpe (2005), Kutty (2010) and Jorion (1990) in the literature.

The empirical results also gave indications that Interest Rate (INT) exerts a uniform effect on stock market returns. Interest rate in both long and short run periods exerts a positive influence on stock market return Nigeria. This means that a 1% upsurge in interest rate givess rise to 2.556933 significant increase and 3.669532 significant increase respectively in stock market return in both short and long-run periods making it in tandem with the conclusion of Chen Roll and Ross (1986), Patelis (1997) in the literature.

Finally on causality relationship, oil price volatility and interest rate granger causes stock market return unidirectional and not the other way. The exchange rate, we observe it granger cause oil price volatility in a unidirectional manner not the other way. However, exchange rate was seen to have no causal link with stock market return. This finding is in accordance with the submission of Mishra (2004) in the literature.

Summary of Findings

In both short run and long run periods, Oil Price Volatility (OPV) exerted a non-significant positive influence on Stock Market Returns (SMR) in Nigeria, during the period covered by the study.

Exchange Rate (EXR) exert a significant but negative effect on stock market returns in the short run and a non-significant negative influence on stock market return in the long run horizon.

Interest rate has a significant positive influence on stock market return in both long run and short run.

Oil price volatility and interest rate granger causes stock market return partially and not the other way. Also, exchange rate granger causes oil price volatility in a unidirectional manner not the other way. But no causality relationship was found between exchange rate and stock market return.

Conclusion

We probe into the nexus between oil price volatility and stock market returns in Nigeria. This was embarked upon against the background that oil price changes are highly relevant tool for economic management in Nigeria that will accelerate stock market and spur economic growth in the long run. Time series data on oil price, exchange rate and interest rate from 1981 to 2017 were extracted from the statistical bulletin of the Nigerian Apex bank (CBN) and analyzed. To this aim, the study concludes and recommends that more needs to be done to enthrone effective and efficient utilization of revenue accrued from oil sales in Nigeria since oil price is determine by exogenous factors outside government control. More so, stable and competitive interest and exchange rates must be ensured alongside improvements in the socio-economic overheads. Government must also embarked on measures to provide a stable political climate to help build the confidence of investors (both within and outside Nigeria) in the Nigerian Economy.

The findings of this study provide a basis for the following recommendations;

a. Diversification of Nigeria economy and export promotion strategies should be encourage by the government in order to maintain a surplus balance of trade.
b. Government should ensure stable macroeconomic policies and adequate security in order to attract foreign investors into the Nigeria economy.
c. Effective policies of fiscal and monetary drive, should be formulated by financial regulatory authorities.
d. Government should increase its public expenditure investment on infrastructural facilities like education, roads, power, telecommunication etc. to attract more foreign investment to Nigeria.
e. The coordination and harmonization of monetary policies in Nigeria must be of paramount interest to government in order to improve the financial integration process. Adequate steps must be taken in this direction.
f. Further studies should look at the mediating variables that translate oil price volatility to stock returns.

References

Adedipe, B. (2004). *The Impact of Oil on Nigeria's Economic Policy formulation. Maximizing Pro-poor Growth: Regenerating the Socio-economic Database*, organized by overseas development institute in collaboration with the Nigerian economic summit group, 16th – 17th June 2004,

Adjasi, C.K.D. & Biekpe, B.N. (2005). *Stock market returns and exchange rate dynamics in selected African countries: Abivariate analysis*," available at http//www.ajbms.org/article.pdf2ajbms (accessed 21 October, 2018).

Ajao, M.G. (2013). A robust application of arbitrage pricing Theory (APT). *Unpublished PhD seminar paper. Department of Banking and Finance*, University of Benin, Benin City. 1-19.

Bollerslev, T. (1986). Generalised autoregressive conditional heteroskedasticity. *Journal of Econometrics*. 31 (3), 307-327.

Chen, S.S. & Chen H.C. (2007. Oil prices and real exchange rates. *Energy Economics*, 29 (3), 390- 404.

Faff, R. & Brailsford, T.(1999). Oil price risk and the Australian stock market. *Journal of Energy Finance and Development*, 4 (1), 69-87.

Hamilton, J.D. (1983). Oil and macroeconomy since World War II. *The Journal of Political*, 91 (2), 228- 248.

Jorion, P. (1990). The exchange rate exposure of U.S. multinational. *The Journal of Business*, 63 (1), 331-345.

Kutty, G. (2010). The relationship between exchange rate and stock prices: the case of Mexico. *Journal of Finance*, 1 (2), 1-12.

Maghyereh, A. (2004). Oil price shocks and emerging stock markets. A generalized VAR approach. *International Journal of Applied Econometrics and Quantitative Studies*, 1(2), 27–40.

Nandha, M., and Faff, R. (2008). Does oil move equity prices? A global view. *Energy Economics*, 30 (9), 86–97.

Odularu, G.O. (2007). *Crude Oil and Nigeria Economic Performance.*

Oriakhi, D.E. & Iyoha D. O. (2013). Oil price volatility and its consequences on the growth of the Nigerian economy: an examination (1970-2010. *Asian economic and Financial Review*, 3 (5), 683-702

Patelis, A.D. (1997). Stock returns predictability and the role of monetary policies. *The Journal of Finance*, 52 (1), 1951-1972.

Perk, J., & Ratti, R. A. (2008), "Oil price shocks and stock markets in the US and 13 European countries," *Energy Economics*, Vol. 30 no. 1, pp. 587–608.

Pesaran, H.M. Shin, Y. & Smith, R. J. (2001). Bounds testing approaches to the analysis of level Relationships. *Journal of Applied Econometrics*, 16 (1), 289-326.

Ross, S.A. (1976). The Arbitrage theory of capital asset pricing. *Journal of Economic Theory* 13 (3), 341-360.

Sadorsky, P. (1999). Oil price shock and stock market activity. *Energy Economics*, Vol. 21 (1), 449-469.

Sadorsky, P. (2001). Risk factor in stock returns of Canada oil and gas companies. *Energy Economics* 23 (1), 17-28.

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.