Available online at www.elixirpublishers.com (Elixir International Journal)

Finance Management

ISSN: 2229-712X

Elixir Fin. Mgmt. 130 (2019) 53197-53204

Do Oil price Volatility and Selected Macroeconomic Variables Influence Stock Returns? -Evidence from Nigeria

Paul, Ndubuisi
Department of Banking and Finance, Abia State University, Uturu, Nigeria

ARTICLE INFO

Article history:
Received: 3 May 2019;
Received in revised form: 23 May 2019;
Accepted: 31 May 2019;

Keywords
Volatility,
Oil Price,
Oil Price Shock,
Stock Return,
EGARCH

ABSTRACT

This study examined the impact oil price volatility and selected macroeconomic indicators on stock return Nigeria for the period of 2000 to 2015 using Exponential Generalized Autoregressive conditional Heteroscedasticity (EGARCH) model for the volatility Error correction model for long and short dynamics. The results are in three folds: First, the results revealed that oil price volatility has a significant negative impact on stock returns in Nigeria. Second, the results also revealed that there were leverage and volatility persistence in the Nigeria Stock Market. Third, the study confirms co-movement between oil price shock and equity returns in Nigeria. The study therefore recommends that the government should monitor developments in the world crude oil market with a view to diversifying the economy away from crude oil dependence to minimize the consequences of oil shocks on the stock market and the economy at large.

1.1. Introduction

The analysis of the impact of asymmetric shocks occasioned by oil price variability and macroeconomic variables on economic growth has been a major debate by both academics and policy makers for some decades now. On the one hand, it has been recognized in the literature that On the other hand, the perception that oil price spikes have a serious negative effect on the economies is based largely on the close correlation in the timing of oil price spikes and economic downturns. Most of the earlier studies concerning oil price shocks or volatility and economic activities have been conducted in the context of developed economies; for example Hamilton's (1983) in his seminar paper, oil shocks are the log change in oil prices under the implicit assumption that the effect of oil shocks on stock returns was symmetric. According to this study, changes in the oil price have been traditionally traced to supply side disruptions such as OPEC supply quotas, political upheavals in the oil-rich Middle East and activities of militant groups in the Niger Delta region of Nigeria. Akpan(2009) asserts that this shock in oil price could be a rise (positive) or a fall (negative). Two issues are usually deduced from oil price shocks: one is the magnitude of the price increase which can be quantified in absolute terms or as percentage changes, and two the timing of the shock, that is, the speed and persistence of the price increase (Akpan, 2009).

Currently practice among players in the industry would make impossible for the growth in the demand to grow rapidly enough to cause a price shock unless it is motivated by fears of supply shortages. Degiannakis et al. (2014) show that a rise in price of oil associated with increased aggregate demand significantly raises stock market volatility in Europe, and that supply-side shocks and oil specific demand shocks do not affect volatilityTheoretically, the supply side has been primarily responsible for observed oil price shocks, at least as an initial trigger. Empirically, there are at least two important dimensions of a price shock. The first is the magnitude of the price increase, which may be measured in absolute terms or in percentage changes. Furthermore, one can distinguish between nominal and relative (or real) price changes. The second aspect is one of timing: The speed and durability of price increases. Three cases may be identified: (1) A rapid (e.g. occurring within a few quarters) and sustained price increase (a "break"): (2) a rapid and temporary price hike (a "spike"); and (3} a slower but sustained rise (a "trend"). The speed of a shock is important as it affects the ability of economies to adjust, which is typically very restricted in the short run. Durability has obvious implications for the permanence and overall extent of the consequences.

Contemporary scholars have identifies that movement in oil price is attributed to exogenous political issues which can be traced to sudden demand of oil (Barsky& Kilian, 2004). Another example was documented by Kilian (2009) who provides a thorough evidence of various shocks which have direct influence on macroeconomic variables. These views have attracted various debate; some scholars have focused on stock returns and macroeconomic aggregates. While others have focused on the responses in output to oil price movements. Hence, oil-price shocks are often viewed as one of the primary exogenous causes of stock return fluctuation (Engmann; Owayang and Wall, 2012)

Crude oil is arguably one of the single most important driving forces of the global economy, and changes in the price of oil have significant effects on stock returns and welfare around the world (Rentschler, 2013). The performance of an economy is usually assessed in terms of the achievement of economic objectives. These objectives can be long term, such as sustainable growth and development, or short term, such as the stabilization of the economy in

Tele:
E-mail address: pauloabsu2017@gmail.com

response to sudden and unpredictable events, called economic shocks.

Oil price shock is believed to have implications for stock market performance. The effect will differ from economy to economy depending on whether the economy is an oil-exporter or oil-importer. In oil-exporting economies, a rise in oil prices improves the trade balance and disposable income. This will raise domestic demand and stock price. The reverse becomes the case in an oil importing economy (Abdelaziz et al, 2008).

In the last couple of years, the global oil and financial markets have been engulfed in systemic crisis giving research experts and policy makers serious concern. Since 2007, the world has witnessed pronounced collapse in financial institutions, stock market declines, oil prices and exchange rate volatility. Besides, the empirical researches on oil price-stock return nexus have in the past, been the concern of many economists particularly in the developing countries. The results have been mixed and empirical concensus indecisive. As a follow up, this study is aimed at examining the relationship between Oil price shocks and stock return in Nigeria (2000-2015), determine the impact of oil price shocks and macroeconomic aggregates on stock returns, identify if there are leverage effects, asymmetric effects and volatility persistence in the Nigeria stock market. The remainder of this study is structured as follows: Section 2 presents the theoretical; section 3 presents data and methodology of the study. Section 4 presents and discusses the empirical results. Finally, section 5 offers some concluding remarks on the findings.

2.1. Theoretical Framework

It is now well established in both empirical and theoretical literature that oil price shocks exert adverse impacts on different macroeconomic indicators through raising production and operational costs. Alternatively, large oil price changes—either increases or decreases, i. e. volatility—may affect the economy adversely because they delay business investment by raising uncertainty or by inducing costly sectoral resource reallocation. Bernanke (1983) offers theoretical explanation of the uncertainty channel by demonstrating that, when the firms experience increased uncertainty about the future price of oil then it is optimal for them to postpone irreversible investment expenditures. When a firm is confronted with a choice of whether to add energy-efficient or energy-inefficient capital, increased uncertainty born by oil price volatility raises the option value associated with waiting to invest. As the firm waits for more updated information, it forgoes returns obtained by making an early commitment, but the chances of making the right investment decision increase. Thus, as the level of oil price volatility increases, the option value rises and the incentive to investment declines (Ferderer, 1996). The downward trend in investment incentives ultimately transmits to different sectors of the economy. Hamilton (1988) discusses the sectoral resource allocation channel. In this study by constructing a multi-sector model, the author demonstrates that relative price shocks can lead to a reduction in aggregate employment by inducing workers of the adversely affected sectors to remain unemployed while waiting for the conditions to improve in their own sector rather than moving to other positively affected sectors. Lilien (1982) extends Hamilton’s work further by showing that aggregate unemployment rises when relative price shocks becomes more variable.

According to Hunt, Isard and Laxton (2002), an increase in oil prices can influence the economy through many channels. The first mechanism reflects the transfer of income from oil-importing to oil-exporting countries, which leads to a decrease in global demand in the oil-importing nations. The decrease in demand in the oil-importing countries outweighs the increase in the oil-exporting countries because of an assumed low propensity to consume in the later. Secondly, given the level of capital stock and assuming that wages are relatively inflexible in the short run, an increase in input costs of production will result in non-oil output being affected. Also, since crude oil is a basic input in production, an increase in oil prices leads to an increase in production costs. The third channel is when workers and producers resist a decrease in their real wages and profit margins. This results in upward pressure on labour costs and prices. The fourth channel is through the definition of core inflation. An increase in energy prices raises the consumer price index, leading to calls for action from the central bank. A tight monetary policy has dire consequences on stock returns.

According to Odularu (2007) the magnitude of the direct effect of a given price increase depends on the share of the cost of oil in national income, the degree of dependence on imported oil and the ability of end-users to reduce their consumption and switch away from oil. It also depends on the extent to which gas prices rise in response to an oil-price increase, the gas-intensity of the economy and the impact of higher .prices on other forms of energy that compete with or, in the case of electricity, are generated from oil and gas. Naturally, the bigger the oil-price increase and the longer higher prices are sustained, the bigger the macroeconomic impact.

In most of oil exporting countries, like Nigeria, government which is considerably large in comparison with small private sector, directly receives the oil revenue. Spending this revenue, government's behaviour becomes the most important characteristic of the economy. In other words, the funds needed for government's expenditure come from oil revenue. So, fiscal and monetary policies depend upon oil price (Riman et al, 2013). Since any rise or fall in the oil price is not permanent oil revenue variation injects instability to the economy. In this situation, so/called - resource curse occurs. When oil price rises, the government has more money to spend. In other words, according to Kilian (2005), when the country's terms of trade are favourable, oil-dependent government's spending can be easily financed through oil revenue. Though, this revenue can be used to finance developmental projects to increase the welfare, but inefficient public spending and fiscal expansion lead to wastes. This destructive strategy, over time, makes the economy more vulnerable to oil price volatility particularly in the presence of capital market imperfections (Anashasy, Bradley and Joutz, 2005).

Oil price changes also influence foreign exchange markets and generate stock exchange panics, higher interest rate, produce inflation and eventually lead to monetary and financial instability. According to Jimenez-Rodriguez and Sanchez (2004). some of these indirect effects may involve economic policy reactions. For instance, authors like Bohi (1991) and Bernanke, Gertier and Watson (1997), argue that economic downturns observed after oil price shocks are caused by a combination of direct impacts of the shocks themselves and the monetary responses to them. Mckillop (2004) adds that such could lead to higher interest rates, inflation and even a plunge into recession.

2.2. Empirical Literature

Studies on impact of oil- price, macroeconomic variables on stock return are scanty in Nigeria. Notable studies in Nigeria have been grouped and reviewed under the following sub-headings based on the objectives of the study. Sadorsky (2001) in study conducted with respect to Canada, shows a significant and positive relationship between oil and gas equity index and the price of crude oil. The author indicates a positive relationship between the return on the index and the return on the stock market as a whole. Finally a negative association is found between the stock market index value and both the premium on 3-month vs. 1-month Government debt and the US/Canadian Dollar exchange rate.

Papaetrou (2001) on the other hand tests the dynamic linkage between crude oil price and employment in Greece using industrial production and industrial employment as alternative measures of economic activity. His study is modelled in a cointegrated VAR framework and extends out by looking at the generalized variance decomposition and impulse response functions, which is very encouraging as most studies have not gone beyond cointegration and error corrections modeling.

Omojolaibi (2013) examines the effects of crude oil price changes on stock returns in oil-dependent economy-Nigeria. A small open economy Structural Vector Autoregressive (SVAR) technique was employed to study the macroeconomic dynamics of domestic price level, stock returns, money supply and oil price in Nigeria. The sample covers the data from 1985:ql to 2010:q4. The Impulse Response Functions (IRFs) and the Forecast Error Variance Decompositions (FEVDs) results suggest that domestic policies, instead of oil-boom should be blamed for inflation. Also, oil price variations are driven mostly by oil shocks. However, domestic shocks are responsible for a reasonable portion of oil price variations, which impacts negatively on stock prices.

Using linear and non-linear specifications, Hammoudeh and Choi (2006) examine the long-run relationship among the GCC stock markets in the presence of the US oil market, the S&P 500 index and the US Treasury bill rate. They report that the T-bill rate has direct impact on these markets, while oil and S&P 500 have indirect effects. The findings of Maghyereh and Al-Kandari (2007) are consistent with the presence of significant nonlinear impacts of oil price changes on stock price indices in the GCC countries over the long-run. In a more recent study,

Arouri and Fouquau (2009) focus on the short-run relationships between oil prices and GCC stock markets using a nonparametric method and show some evidence of nonlinearities in Qatar, Oman, and UAE. Indeed, the relationships between oil prices and stock markets in these countries are found to be asymmetric and regimes witching with respect to the values of oil price changes. Unfortunately, the unknown analytical form of this nonlinear link does not facilitate the use of their results in portfolio management or policy decision-making process.

Frankel (2010) used the VAR model with quarterly data from 1970 to 2003 to examine the effect of oil price shock on stock returns in Nigeria. Their findings showed that while oil prices significantly influenced exchange -rates, it did not have significant effect on stock returns and output in Nigeria. The conclusion drawn from the study was that an increase in the price of oil results in wealth effects which appreciates the exchange rate and increases the demand for Common stocks

Akinleye and Ekpo (2013) examined the macroeconomic implications of symmetric and asymmetric oil price and oil revenue shocks in Nigeria, using the Vector Autoregressive (VAR) .estimation technique. The paper stated that both positive and negative oil price shocks influence stock returns only in the long run rather than in the short run. While examining positive and negative shocks to external reserves, it revealed stronger implications for stock returns in the long run, with positive rather than negative oil price shocks having stronger short and long run effects on stock prices and therefore triggering inflationary pressure and domestic currency depreciation as- importation rises. However, results obtained showed that oil revenue shocks are capable of affecting stock returns only in the long run while raising general price levels marginally in the short run after the initial shocks, with evidence of serious threat to interest rate and the domestic currency in the short and medium term, as the volume of imports increases significantly along with the external reserves. Findings on the asymmetric effects of oil price shocks revealed that positive shocks to oil price stimulate stock prices in the Nigerian economy in the short run in line with theory, thereby creating inflationary pressure and domestic currency depreciation.

Güntner (2014) finds that global oil supply shocks have no significant impact on international stock markets, while an increase in global aggregate demand has the effect of rising oil prices and stock returns, which is more persistent for net oil exporters. However, idiosyncratic oil demand shocks, that is, those due to changes in the demand of oil that are independent of changes in global aggregate demand, appear to have a negative impact on stock markets of oil importing countries.

Fasanya and Onakoy (2013) examined the impact of oil price movements on stock prices in Nigeria during the period 1970 to 2011 making use of annual time series data. The empirical analysis rests on dynamic VAR analytical framework. To capture the possible channels reflecting the fluctuations in the oil prices, the mode] includes money supply, real exchange rate, government spending and inflation. The findings indicated that lagged effects of the VAR model are not able to capture any significant impact of changes in oil prices, and oil price shocks are therefore not found to affect stock prices, exchange rate or inflation in the short run but show a positive significant relationship to stock prices in the long run. Following the VAR model results, the generalized impulse responses reaffirm the direct link between the net oil price shock and stock returns, as well as the indirect linkages.

Ushie, Adeniyi and Akongwale (2012) offer an elaborate econometric analysis which tests the sensitivity of stock returns to oil price shocks, using the Impulse Response functions (IRFs) and Variance Decomposition (VDC) techniques within a Vector Autoregressive (VAR) framework. The sensitivity analysis showed that fluctuations in oil prices have resulted in inflation, high stock returns and real exchange rate appreciation in Nigeria. Importantly, the institutional variable was found to be significant.

Ojapinwa and Ejumedia (2012) examine the industrial impact of oil price shocks in Nigeria from 1970-2009, the econometric approaches adopted in the paper is the VAR impulse response. This study came out with empirical evidence that will help in understanding the impact of oil price shocks on stock returns in Nigeria while also considering other variables like Exchange rate, inflation, unemployment and money supply. The study came to the conclusion that oil price, inflation and exchange rate have the potentials of causing significant changes in stock returns in Nigeria.

3. Methodology and Data

3.1. Computation of equity return

Following Hamadu and Ibiwoye (2010), and Bamumathy and Azhagaiah (2015, equity return is approximated by

The steps in building models

i) To generate the return series from the ASI. The daily returns, was calculated with the following formula $R_t = \ln(\frac{P_t}{P_{t-1}})$ Given that P_t will be observed as the daily ASI share index and P_{t-1} is the past value of the ASI. In our study, Rt represents the daily return of a market index and

ii)The second step is to ensure stationarity in the time series variable to be estimated

iii) The third step is to test for ARCH effect and clustering volatility.

iv) The fourth step is to proceed in estimating the ARCH family models

The ARCH family models consist of ARCH (q), GARCH (p, q), TGARCH (p, q), EGARCH (p, q) and PGARCH (p, q). ARCH (q) model gives the variance of a series using its past variance. The "q" stands for the order of the past variance. The GARCH (p, q) is the improvement of ARCH (q) model because it comprises of an order of past conditional variance and past residual in determining conditional variance. TGARCH (p, q), EGARCH (p, q) and PGARCH (p, q) are the improvements of GARCH (p, q) model because they account for asymmetric effects in a variance model. The "p" is the order of the past residual term while the "q" remains the order of the past conditional variance.

3.2. Unit Root Test Analysis

Empirical work based on time series data assumes that the underlying time series is stationary. (Broadly speaking), a data series is said to be stationary if its mean and variance are constant (non-changing) over time and the value of covariance between two time periods depends only on the distance or lag between the two time periods and not on the actual time at which the covariance is computed (Agrawal, et al., 2010). This will help to determine whether the variables are likely to be co-integrated. In this study we used the Augmented Dickey Fuller (ADF) test for stationarity of the variables.

3.3. Volatility

This paper uses two steps estimation procedure for volatility modeling.

(a) The idea behind ARCH model is that the current value of a variable is determined by its previous value(s).

$$y = \lambda_0 + \lambda_1 x_{t-1} + \mu_t \quad (1)$$

$$h_t^2 = \omega + \sum_{i=1}^{q} \alpha_i \varepsilon_{t-1}^2 \quad (2)$$

Equation (1) is the mean equation of the volatility model, while equation (2) is the variance model. ARCH model comprises of mean and variance equations, and are estimated simultaneously. However, much concern is placed on the variance equation because of its capability to forecast volatility. h_t^2 is the current volatility, α_i is the parameter measuring the effect of its lagged value that is, ε_{t-1}^2,where ω and α_i are no-negative parameters to ensure that the conditional variance is positive, and ε_t^2 is the square error obtained from the mean equation.

3.3.2. GARCH MODEL. The Conditional Variance Equation

GARCH model can be specified in order (*p*, *q*) because it comprises of "*p*" ARCH term and "*q*" GARCH term.

$$\varepsilon_t | \Omega_{t-1} \sim N(0, h_{t-j}^2) \quad (3)$$

$$h_t^2 = \omega + \sum_{i=1}^{p} \alpha_i \varepsilon_{i-2}^2 + \sum_{j=1}^{q} \beta_j h_{t-j}^2 \quad (4)$$

$\omega > 0$, α_i, $\beta_j \geq 0$, $\rightarrow$ $h_t^2 \geq 0$, $i = 1, \dots \dots p$, and $j = 1, \dots . q$

where $\Omega_{t-1}$is the set of all information available at time t-1. The conditional variance of the GARCH model defined in equation 5 is a function of three terms. The first term is the mean of yesterday's forecast, ω. The second term is the lag of the squared residuals obtained from the mean equation, ε_{i-2}^2 , or the ARCH terms. The ARCH terms represent the news (information) about volatility from the previous period that has a weighted impact, which declines gradually, while never reaching zero, on the current conditional volatility. The third term is the GARCH term, h_{t-j}^2 , measuring the impact of last period's forecast variance. It is important to note that these three parameters (ω, α_i's, and β_j's) are restricted to be non-negative to ensure positive values for the conditional variance or $h_t^2 \geq 0$.

A) Estimation with ARCH-type Models (EGARCH)

To capture the volatility spillover, the study adopted the ex-post facto design as it relied on secondary sources of data. The analytical tools consist of the Exponential Generalized Autoregressive Conditional Heteroscedasticity (EGARCH) Model.The methodological framework employed for testing volatility was based on the assertions of Adjasi et al (2008) and Koulakiotis et al (2006). According to them, EGARCH is preferred to GARCH in modeling volatility in the financial market because GARCH is weaker than EGARCH in studying financial markets.

Generally, the standard EGARCH specification is expressed as follows:

$$\log \sigma_i^2 = \alpha_0 + \sum_{i=1}^{p} \alpha_i \left| \frac{e_{t-i}}{\alpha_{t-i}} \right| + \sum_{j=1}^{q} \beta_j log\left(\alpha_{t-j}^2\right) + \sum_{i=1}^{p} \gamma_k \frac{e_{t-i}}{\alpha_{t-i}} \quad (5)$$

Where

$\log \sigma_i^2$ = logarithm of conditional variance of stock market returns

$\alpha_0, \alpha_i, \beta_j, \& \gamma_k$ are intercept, coefficient, coefficient and asymmetric effect respectively

According to Brooks (2008), the EGARCH is preferred for two reasons;

(1) By using $\log(\sigma_i^2)$, even if the parameters are negative, the equation will be positive.

(2) asymmetries are allowed under EGARCH formulation if $\gamma_k < 0$, this implies that leverage effect exists; and where $\gamma_k = 0$, it indicates that an asymmetric effect exists in the model.

To determine the impact of oil price shocks and other macroeconomic aggregates on stock returns we use

SR= f (oilp, infl, m2,tbr, extr) + Ut (6)

Explicitly, the above equation is stated in its standard form as:

In(er) = a_0 + a_1In(oilp) + a_2In(infl) + a_3In(m2) + a_4In(tbr) + a5In(extr) + Ut (7)

Where:

ER = Equity return obtained as shown in equation (4)
oilp = Crude oil price volatility or variations in crude oil price at time (t)
m2 = Money supply
tbr = Treasury Bill rate
infl = Inflation rate
extr = Exchange rate
a_0 = Intercept, a_1 to a_5 = the coefficients of the variables to be estimated,
U_t = Error term
a_1, a_3>0, a_5, a_2 and a_4 < 0

3.4. Error Correction Mechanism (ECM)

Having determined whether or not co-integration exists, we applied the ECM to ascertain the speed of adjustment from the short-run equilibrium to the long-run equilibrium state. If co-integration is accepted, it suggests that the model is best specified in the first difference of its variables with one lag of the residual [ECM(-1)] as additional regressor. The (ECM) incorporates the variables at both side levels and first difference s and thus captures the short-run disequilibrium situations as well as the long-run adjustments between variables (Mukhtar et al, 2007).

In the spirit of Odhiambo (2008), we obtain the short-run dynamic parameters by estimating an error correction model associated with the long-run estimates. The equation, where the null hypothesis of no cointegration is rejected, is estimated with an error-correction term (Narayan and Smyth, 2006; Morley, 2006). The vector error correction model is specified as follows:

$$\Delta lnER_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i}\Delta lnER_{t-1} + \sum_{i=0}^{n} \beta_{2i}\Delta lnoilp_{1_{t-1}} + \sum_{i=0}^{n} \beta_{3i}\Delta lnm2_{2_{t-1}} + \sum_{i=0}^{n} \beta_{4i}\Delta lntbr_{3_{t-1}} + \sum_{i=0}^{n} \beta_{5i}\Delta lninfl_{4_{t-1}} + \sum_{i=0}^{n} \beta_{6i} extr_{4_{t-1}} + \beta_7 lnER_{t-1} + \lambda_2 ECM_{t-1} + \mu_{2t} \quad (9)$$

ECM_{t-1} is the error correction term obtained from the cointegration model. The error coefficients (λ_2) indicates the rate at which the cointegration model corrects its previous period's disequilibrium or speed of adjustment to restore the long run equilibrium relationship. A negative and significant ECM_{t-1} coefficient implies that any short run movement between the dependant and explanatory variables will converge back to the long run relationship.

4. Results and Discussion

Preliminary Results

Table 4.1.Unit Root Test Result.

VARIABLE	ORDER OF INTEGRATION
ER	1(0)
Oilp	1(0)
Infl	1(0)
M2	1(0)
Tbr	1(0)
extr	1(0)

Table 4.1 clearly shows that the daily equity return as obtained using equation (7) is stationary at level, that is, it is *1(0).* Same is also true of the rest of the economic variables in equation (6). Both Akaike and Schwarz information criteria for optimal lag selection suggest a lag length of one.

The results of the impact of oil price shock on stock return using EGARCH (1,1) are presented in table 4.2. The above results indicate that there is statistically significant negative relationship between stock return and oil price shock in t he Nigerian emerging stock market. ,This can be seen in the mean equation part of table 4.2. On the variance equation side, it is observed that while the intercept coefficient (C(2)) is statistically significant at 5% level, the arch effect (C(3)) is not. C(4) and C(5) indicate that there is statistically significant GARCH and Leverage effect respectively.

In the conditional variance equation, the estimated β coefficient (i.e. C4) is considerably greater than α_1 coefficient (i.e. C3) in the specification which implies that the market has a memory longer than one period and that volatility is more sensitive to its lagged values than it is to new surprises in the market values. The implication of this is that volatility is persistent. Furthermore, the sum of the estimated ARCH and GARCH effects (i.e., $\alpha_1 + \beta$) is high for the specification but still less than one which signifies that the GARCH process is mean reverting. The asymmetry parameter (γ) turned out to be negative and statistically significant. The implication of this is that there is leverage effect in the Nigerian Stock Exchange.

With respect to the impact of oil price shock and other macro economic variables on stock return, the estimated results are presented in table 4.3.

In tables 4.3 and 4.4, we present the result of the Wald's test. The high F-value which is greater than the critical value for k = 5 @ 5% (for unrestricted intercept '& no- trend) both for -the lower bound (2.62) and upper bound (3.79) clearly confirms the .existence of long-run relationship among the variables.

Table 4.2. Test of the effect of oil price (OILP) on stock return (ER) with EGARCH

Variable	Coefficient	Std. Error	z-statistic	Prob.
Mean Equation				
OP	-0.473691	0.066569	-7.115808	0
Variance Equation				
C(2)	-11.70602	2.002737	-5.84501	0
C(3)	0.02551	0.123347	0.206813	0.8362
C(4)	0.20101	0.091015	2.208538	0.0272
C(5)	-0.636007	0.280565	-2.266882	0.0234
R-squared	0.068581	Mean dependent var		0.00365
Adjusted R-squared	0.068581	S.D. dependent var		0.030325
S.E. of regression	0.029266	Akaike info criterion		-4.22889
Sum squared resid	0.16274	Schwarz criterion		-4.14375
Log likelihood	408.8591	Hannan-Quinn criter.		-4.19441

Table 4.3. Establishment of Existence of co-integration Dependent Variable: D(SR)

Variable	Coefficient	Std. Error	t-statistic	Prob.
C	0.728584	0.101878	7.151545	0.0000
D(ER(-1))	-0.115476	0.077808	-1.484108	0.1396
D(OILP(-1))	0. 1 32525	0.317840	-0.416956	0.6772
D(INFL(-1))	-0.000187	0.000186	1.005802	0.3159
D(M2(-1))	-0.000873	0.000698	-1.251708	0.2123
D(TBR(-1))	-0.161281	0.094423	-1.708074	0.0894
D(EXTR(-1))	-0.279862	0.301047	-0.929629	0.3538
ER(-1)	-0.722774	0.100520	-7.190339	0.0000
OILP(-1)	0.038698	0.334854	0.115567	0.9081
INFL(-1)	-0.000374	0.000263	-1.422933	0.1565
M2(-1)	0.000769	0.000983	0.781739	0.4354
TBR(-1)	-0.003112	0.130721	-0.023808	0.9810
ER(-1)	0.204588	0.426250	0.479973	0.6318
R-squared	0.448415	Mean dependent var		0.000187
Adjusted R-squared	0.410807	S.D. dependent var		0.090108
S.E. of regression	0.069166	Akaike info criterion		-2.438323
Sum squared resid	0.841963	Schwarz criterion		-2.215346
Log likelihood	243.4215	Hannan-Quinn criter.		-2.347989
F-statistic	11.92336	Durbin-Watson stat.		2.005971
Prob. (F-statistic)	0.000000			

Table 4.4. WALD'S TEST.

Wald Test:

Equation: Untitled

Test statistic	Value	Df	Probability
F-statistic	10.70908	(6,176)	0.0000
Chi-square	64.25447	6	0.0000

Table 4.5. Short-run Equilibrium (or Error Correction) Test Result.

Variable	Coefficient	Std. Error	t-statistic	Prob.
C	-0.000167	0.005140	-0.032490	0.9741
D(ER(-1))	-0.110072	0.079201	-1.389785	0.1663
D(OILP(-1))	-0.273051	0.279409	-0.977242	0.0298
D(INFL(-1))	-0.000108	0.000135	-0.797007	0.4265
D(M_2(-1))	-0.000393	0.000492	-0.797890	0.4260
D(TBR(-1))	-0.119766	0.068932	-1.737443	0.0840
D(ER(-1))	-0.275467	0.217409	-1.267045	0.2068
ECT(-1)	-0.717779	0.102289	-7.017179	0.0000
R-squared	0.408073	Mean dependent var		0.000187
Adjusted R-squared	0.385181	S.D. dependent var		0.090108
S.E. of regression	0.070654	Akaike info criterion		-2.420647
Sum squared resid	0.903542	Schwarz criterion		-2.283430
Log likelihood	236.7511	Hannan-Quinn criter.		-2.365057
F-statistic	17.82589	Durbin-Watson stat.		2.011545
Prob. (F-statistic)	0.000000			

The result in table 4.5 indicates the existence of short-run equilibrium relationship between stock return and the macroeconomic variables, judging from the statistically significant ECT(-l) at *5%* level. Again, the coefficient of the error correction term is -0.717779 meaning that any disequilibrium on the short-run corrects at a speed of 71.78% on the long-run. We also found that oil price movement does not exert any significant impact on stock return in Nigeria.

5. Summary, Conclusion and Recommendations

5.1 Summary of findings

This paper examined the impact oil price volatility and selected macroeconomic indicators on stock return Nigeria for the period of 2000 to 2015 using Exponential Generalized Autoregressive conditional Heteroscedasticity (EGARCH) model for the volatility Error correction model for long and short dynamics. The results are in three folds: First, the results revealed that oil price volatility has a significant negative impact on stock returns in Nigeria. Second, the results also revealed that there were leverage and volatility persistence in the Nigeria Stock Market. Third, the study confirms co-movement between oil price shock and equity returns in Nigeria. There exists both long-run and short-run equilibrium relationship between stock return and oscillations in oil price in the Nigeria's emerging market. Any disequilibrium on short-run corrects at speed of 71.78% on the long-run.

Conclusion

The study examined the impact of oil price shock on stock market return using asymmetric Exponential Generalized Autoregressive Conditional Heteroscedasticity (EGARCH) model. The Autoregressive Distributed Lag (ARDL) Model was used to explore the impact of key macro-economic variables on stock market return in Nigeria. Data obtained from Central Bank of Nigeria statistical bulletin, the Nigeria Stock Exchange Factbook and annual reports over the period 2000 to 2015 were used. From the various tests and analysis conducted in the study, the following conclusions are reached. Firstly, oil price shock significantly impacted on stock return during the period. Secondly, the macro-economic variables included in the model were significant in explaining the variation in stock return in Nigeria. Thirdly, EGARCH(1,1) model adequately capture the asymmetric effect in stock return in Nigeria economy.

Recommendations

Based on the findings of this study, the following recommendations are necessary:

1) The Federal Government of Nigeria should carefully monitor developments in the world oil market and seek out ways for economic diversification to minimize the effects of shocks or volatility in crude oil prices on the economy in general and on stock returns in particular.

2)The financial market regulatory authorities should allow market information to flow and aggressive trading on a wide range of securities be encouraged to increases market depth.

3)Non-oil sectors particularly the solid minerals, agricultural and stock sub-sectors must be developed adequately. This will enhance risk management portfolio selection; investment decisions; improved revenue base; and market performance.

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