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# IMPACT OF BRENT PRICE VOLATILITY ON THE VOLATILITY OF THE MARKET VALUE OF SHARES TRADED IN NIGERIA

**Elias Igwebuike Agbo and Nwankwo, S. N.P.**
*Department of Accounting and Finance, Faculty of Management and Social Sciences, Godfrey Okoye University, Ugwuomu-Nike,Emene, Enugu State, Nigeria*

**Abstract:** *This study examines the effect of oil price volatility on the volatility of Nigeria's market value of shares traded usingmonthly frequency data that cover the period from January1997 to December 2016. It employs the EGARCH [1,1] methodology for data analysis .Average monthly exhange rates and inflation rates are introduced as control variables.The results of the study suggest that oil price volatility has a negative and significant effect on the volatility of market value of shares traded in Nigeria. The study advises market participants to target oil price movements as an important instrument for predicting the volatility of Nigeria's stock market returns.*

**Keywords:** *Nigeria, crude oil price, volatility, market value of shares traded..*

## 1.0 Introduction

Sharp oscillations in oil prices are generally seen as a major factor that contributes to asymmetries in the business cycle (Uzo-Peters,Laniran & Adenikinji,2018).Uzo-Peters et al. report that historical highs in the world crude oil market generated a lot of worries cocerning probable drops in the economic performance of the majority of developed economies.The declines that ensued in the world oil price pushed a number of oil exporting countries to trim down their national budgets recently. The uncertainty about the future states of the world oil markets and the possible economic consequences have, not surprisingly,pushed a considerable body of empirical research to investigate the channels through which oil price changes impact economic variables in oil-importing, oil-exporting, developed and emerging markets. Eventhough there are extensive studies about the oil price macro-economy relationship , a relatively few of them focus their interest on the effect of oil price shocks on the stock markets.The latter group of studies use different methods and alternative data sources to ascertain the relationship between oil price fluctuations and stock market performance without arriving at a concensus. For instance, while the studies such as Jones and Kaul (1996) and Sadorsky (1999) reports a significant negative nexus between oil price shocks and stock market returns, Huang,Musulis and Stoll (1996) observe a positive connection between the two variables. Apart from the conflicts in findings and conclusions, the earlier works on the correlation between oil prices and stock market returns were mainly concentrated on developed economies like the United States of America and United Kingdom.As a result of the internationalization of global capital markets and the increasingly important role of emerging markets globally, scholars have been motivated to investigate the mechanism through which the international oil price impact stock markets in emerging markets. Basher and Sadorsky (2006) carried out one of the earliest comprehensive studies on the oil/stock market relationship. They report a strong connection between oil price volatility and stock returns within emerging economies.The study of Babatunde,Adenikunji and Adenikunji (2013) focus on Nigeria which is a leading producer of crude oil and find that Nigerian stock market returns exhibit a positive response, but

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after some time, the respons becomes negative, depending on the nature of oil price change(see Uzo-Peters,Laniran & Adenikinji,2018).

This paper engages in a similar research. It examines the impact of Brent price volatility on the volatiliy of stock market performance indicators in Nigeria, with a particular focus on the market value of the shares traded in Nigeria. The cardinal objective of this paper is therefore to investigate the impact the Brent crude oil price on the market value of the shares traded stocks in the Nigerian Stock Exchange (NSE).Both average monthly exchange rate and inflation rate are introduced in the model to make the results of this study robust..

This study extends the existing literature in two distinct ways. First, the study provides, to the best of our knowledge, the first empirical inquiry on the impact of Brent oil price volatility on stock market activities in Nigeria, with emphases on the market value of shares traded on the Nigerian stock market. Second,like the recent study by Effiong (2014), this empirical study uses monthly, instead of quarterly or annual data, with the intention of reducing averaging biases and since it captures more data points.

**1.2 Nigeria and the oil market**

Since the early 1970s, Africa has been recognized internationally as a significant producer of crude oil.. Countries, such as Nigeria, Algeria, Libya, and Angola are all members of the Organization of Oil Producing and Exporting Countries(OPEC) and have become key players in world oil production(seeArnold,Gourene& Mendy,2018).Other oil producers pulling much weight at the African level include Gabon, Congo, and Chad..

Odularu (2008)reports that the genesis of oil exploration in Nigeria dates back to 1907. In that year, a company called Nigeria Bitumen Corporation commenced exploratory activity in Nigeria. However, she became one of the oil producing countries in 1958 when the first oil field in Oloibiri came on stream producing 5,100 barrels of crude oil per day. In 1960, a total of 847,000 tons of crude oil were exported. Between 1955 and 1962, licences were granted to some non-British firms (for instance, Mobil, Tenneco, Gulf oil, Chevron, Agip and Elf) to explore for oil in the onshore and offshore areas adjoining the Niger Delta region .

By the end of the Nigeria-Biafra war in 1970, there was a sudden rise in the world price of crude oil and Nigeria succeeded in generating huge revenue from its oil production. Consequently,Nigeria joined the Organization of Petroleum Exporting Countries (OPEC) in 1971 and established the Nigerian National Petroleum Company (NNPC) in 1977. The NNPC is a state-owned and controlled company and a major player in the upstream and downstream sectors of the Nigerian petroleum industry).

. Nigeria's crude oil is rated mostly as light and sweet as the oil is largely without sulphur element. Among the OPEC members, Nigeria is the largest producer of sweet oil- the kind of oil which is claimed to be similar in composition to the petroleum extracted from the North Sea. This sweet crude is known as 'Bonny Light'. In addition, Nigeria produces other types of crude oil. Each of them is named according to its export terminals. They include Qua Iboe, Escravos blend, Brass River and Pennington Anfan.

To date,Nigeria still relies on the importation of refined petroleum products to meet its domestic needs, despite its possession of four refineries .Consequently, the Nigerian economy is unique as she doubles as both an oil exporter and importer(see Ekong & Effiong (2015), .Oil generates more than 90 per cent of her earnings while the budgetary process is conditioned on the prevailing oil price in the crude oil market. Akinwandu and Olotewo (2015) contend that the high level dependence of the Nigerian economy on oil implies that any volatility in the oil sector will have a significant impact on government revenue and the determination of Nigeria's financial policy.

## 2.0 **Theoretical underpinnings and Review of the Related Literature**

### 2.1 Theoretical Underpinnings

Arnold et al.(2018) assert that crude oil has been one of the most widely used commodities for several years as it is used in various forms in all sectors and at virtually all the strata of the economy of the universe.The authors affirm that despite the recent advent of renewable and alternative energies sources, the level of world crude oil consumption has not altered.Rather, the rate of consumption of this energy source continues to be on the increase, especially among the developed and industrialized nations. Crude oil is one of the most important commodities and has a significant impact on country's economic activity, whether it is an importer or an exporter of oil.Its prices depend on market demand,the quantity produced, the reserves available, the geopolitical situation, and a number of other factors(Arnold et al.,2018).

Oil price is considered by many researchers as representing information flow. Tabelsi (2017) cited in Youssef and Mokni(2019) opines that risky assets would be strongly correlated in the stressed periods and that such situation is capable of increasing the risk of collapse.In contrast,the situation will be different for an oil-importing country, as an increase in oil price will have a positive impact (see Hooker 1999). An oil price increase will bring about an increase in production costs, as oil is regarded as the most important production input ( see Arouri & Nguyen,2010).According to Hamilton (1988a, 1988b), and Barro (1984) cited in Youssef and Mokni (2019), the escalating cost of crude oil will affect consumer’s behavior, which will, in turn, decrease their demand and spending as a result of higher consumer prices. Decreasing consumption of crude oil will cause a cut down in production and, in return, increase unemployment (see Brown & Yücel, 2001; Davis & Haltiwanger, 2001 in Youssef & Mokni,2019). Further, oil price changes affect stock markets as a result of the uncertainty they create for the financial sector, depending on the forces that push up oil prices (demand-side or supply).

Any asset price is expected to be determined by its expected discounted cash flows ( Williams, 1938; Fisher,1930 in Youssef & Mokni,2019). Consequently, any factor that can change these discounted cash flows wll have a significant impact on an asset price. This line of reasoning prompted authors such as Hamilton (1996), Sadorsky (1999), Arouri and Nguyen (2010) to argue that an increase in oil price would result in a reduction in production as such a rise in oil price will make inputs more expensive and affect the level of inflation directly. Inflation is expected to cause a reduction in investors’ earnings expectations from the stock market. Hence, an increase in oil price is expected to be accompanied with a decline in stock prices.

Many empirical studies find exchange rate as having a negative and significant relationship with stock market capitalisation both in the long-run and in the short run(see Fosu &Korsah,2016).For instance,if a company conducts business in payables and has to be paid in the future, it can suffer from a big loss where its main currency depreciates.According to Ma and Kao(2008), there are cases where companies get lower sales in units when their home currency's rate appreciate;hence, exposure on company's revenue and debt. This situation can have an adverse impact on the company's stock value because it can be perceived as the declining trend of a company's performance by the prospective investors. With regard to exporting and importing companies, their domestic currency depreciation is associated with more competitive local firms, leading to an increase in their exports which eventually raises their stock prices(see Sangany, 2015 ; Ma & Kao ,2008). According to Ma and Kao (2008), the currency appreciation for a dominant export country reduces the competitiveness of export markets and has a negative effect on the domestic stock market.In contrast, a high currency value heralds a favorable transaction exposure and generates excess demands for local stocks.

The stock markets are generally considered as the barometer or the mirror of the economic activity of a nation as they play an important role in capital accumulation, the productivity of capital, financing of innovations in technology as well as economic development (see Hicks, 1969; Schumpeter, 1912;Levine, 1997). Oil prices have a theoretical connection with stock markets because oil price shocks affect stock markets through their influence on economic activity, corporate income, inflation, as well as monetary policy.

After employing the Discounted Cash Flows (DCF) approach to carry out a study, Huang,Musulis and Stoll (1996),observe that oil price shocks can affect the stock prices in different ways.First, since petrroleum is a commodity used virtually at all economic levels, an alteration in future oil prices will affect the expected cash flows of most companies directly; this holds sacrsanct especially for those that are heavily dependent on oil prices. Second, a change in oil prices leads to a change in the trade balance a nation , depending on whether the nation is an oil exporter or an oil importer,. These alterations to the trade balance impacts the exchange rate, which, in turn, affects the country's inflation rate. Since the expected inflation rate and the discount rate have a positive correlation, it will have a direct impact on stock prices (see Huang et al.,1996 :Mba ,2009).

**2.2 Review of the Related Literature**

Soyemi, Akingunola and Ogebe, (2017) assert that the studies on the nexus between oil price and financial markets, especially with respect to stock market, are relatively a more recent issue and they end up with mixed results..This situation has been explained as arising from the difficult nature of evaluating stock market activities which did not gain currency until the 1990s. A greater number of the earlier studies centered their attention on determining the relationship of oil price changes with macroeconomic indicators like output, unemployment, interest rates, wages, aggregate, economic activities, etc( seeTussupor,2016).

However,the researchers that have shown interest in the nexus between stock markets and oil prices are many,though they focused mainly in developed nations.For instance,Papapetrou (2001) carried out a study and find that the rise of oil prices negatively affect stock prices in Greece. Sadorsky (1999) did a study and observes that changes in oil prices and stock returns were opposite. Kilian and Park (2009) demonstrate that the effect of oil prices shocks on US stock markets varied according to shocks on oil supply or demand.In addition the results of the study carried out by Malik and Hammoudeh (2007)affirm that the volatility of world oil prices generally influence almost all GCC stock markets.They point to the fact that the effect is greater on the Saudi Arabian stock market. In their study on the co-movement between oil prices, US, and 13 European stock markets, Park and Ratti (2008) observe a negative relationship between oil prices changes and stock markets in oil exporting nations excluding Norway. Talukdar and Sunyaeva (2011) analyzed the impact of oil prices shocks on the stock markets returns of 11 OECD member countries anddiscover that the effects of rising oil prices on the stock markets differdepending on the idiosyncracies of the country. The results of the study carried out by Wang, Wu andYang(2013) show that, whether they are importers or exporters, oil-exporting countries and countries in which oil played a significant role are those whose stock markets are most affected by alterations in oil prices. This influence alters depending upon whether the shock is prompted by demand or supply.According toOno (2011), the Brazilian stock market shows no statistically significant response to oil prices,a situation contrary the response of other BRICs stock markets which is positiveto changes in oil prices,In another dimension,Jones and Kaul (1996) observe that, for the US and Canada which are the world's largest oil producers, oil price shocks in the post-war period had an effect on real cash flows, which has an influence on stock prices.

In Africa, the majority of the studies that investigated the nexus between oil price actually concentrated their attention on the Nigerian stock market. Some of them includeAsaolu and Ilo (2012), Babatunde, Adenikinju.and Adenikinju (2013), Adebiyi. Adenuga, Abeng and Omanukwue (2009) and Ogiri, Amadi, Uddin and . Dubon (2013), who studied the impact of oil prices on the Nigerian stock market.However,.the study byChisadza, Dlamini,. Guptaand Modise (2013) was aimed at determining the influence of oil prices on the South African stock market. In Kenya, Gatuhi and Macharia (2013) investigated the correlation between diesel prices and stock market returns. Maghyereh (2004) studied the relationship between oil prices and 22 emerging stock markets in South Africa, Egypt, and Morocco.All in all,the results of the study of previous studies demonstrate that there is an absence of a consensus among researchers on the exact impact of oil price shocks on stock market returns .

In the face of the many alternative explanations of oil price shocks that took place in the recent past, it is obvious that earlier researchers have not succeeded in finding out the true position regarding the relationship between oil price shocks and stock price movement in the capital market -a situation which has left much gap in literature as to the need for continuous research into the area.

The main objective of this study is to examine the effect of oil price volatility on the market value of the shares traded on the Nigerian Stock Exchange(NSE).We consider Nigeria suitable to represent developing economies as she is not only one of the largest member of the Oil Mineral Producing and Exporting Countries(OPEC) and the largest net-exporter of oil in Africa, but also a highly promising economy for internationalportfolio diversification..The importance of this study is underscored by the need for investors and policy-makers to understand the link between oil price changes and stock market performance. In addition,its significance lies on its envisaged ability to generate results that will improve stock returns forecasting accuracy, provide relevant information for investors and policy makers, make available reference materials for researchers and the academia, as well as assist firms in constructing diversified portfolios and determining risk management strategies (see Youssef & Mokni,2019;Akinlo,2014).

This work has advanced knowledge as it differs from other studies in the past in a number of respects. Firstly,unlike those studies conducted in the past on Nigerian economy which employed annual or quarterly data, this study uses monthly frequency data.Secondly,it spans the period from January 1997 through December 2016 in the estimation and, by so doing, provides further empirical evidence as it covers the previous recession period that Nigeria went through. Thirdly, to the best of our knowledge , no other study has beencarried out on this topic in Nigeria.

The rest of this paper is structured as follows:-Section 2 presents a brief review of the literature on the relationship between stock markets and oil prices. Section 3 details the methodology used to study the impact of oil price volatility on the volatility of the market value of trade in the Nigerian stock market.Section 4 examines the data and empirical results, whileSection 5 concludes the paper.

## 3.0 Methodology

### 3.1 Data

This study examines the asymmetrical effects of oil price fluctuations on the Nigerian value of shares traded. We choose monthly data spanning the period of January 1997–December 2016. Monthly frequency data are employed as many empirical studies have shown preference for high-frequency data when investigating oil-stock-prices correlation(see Cheikh et al.,2018). In order to check for robustness, another crude oil benchmark such as West Texas Intermediate (WTI) has beencompared with the Brent crude price. . We find that using the WTI price type does not significantly alter the results of our benchmark specifications. Oil prices are denominated in US dollars and available from the US Energy Information Administration (EIA).Inthe crude oil market, there are various types and qualities of oil for difference purposes. The price of oil highly depends seriously on in its grade, factors such as specific gravity, its content as well as location. 160 different blends of oil have been identified. However, the three primary benchmarks are WTI, Brent and Dubai. Prices are quoted in different markets all over the univere. In allignment with Alikhanov and Nguyen (2011), we select Europe Brent for the oil exporting country that we intend to investigate.

The oil price volatility is computed using the historical method. The end month data for market value of shares traded are obtained from the Central Bank of Nigeria Statistical Bulletins of the relevant period. The average monthly data on Nigeria's official exchange rate and inflation rate are retrieved from the CBN publications of the relevant years. The variables of the study include the historical prices of Brent spot crude oil(OP) used as independent variable and market value of shares traded (MVAL) employed as the dependent variable. The Nigerian official exchange rates (OER) which are the Nigerian naira exchange rates against the US$ and inflation rates (INF) are employed as control variables.Literature recognizes inflation rates and exchange rates as part of those macroeconomic variables that affect stock market significantly( see Fama,1963). In addition, according to Ahkhanov and Nguyen (2011), exchange rate has a significant effect on stock return for exporting country just as industrial production has significant effect on a country engaged in production. Gther studies such as Chen, Roll and Ross (1986),Wongbangpo and Sharma (2002) cited in Alikhanov and Nguyen(2011)emerged with results that suggest a negative relationship between exchange rate and stock market performance.

A wide range of descriptive statistics are desplayed in table1.The table demonstrates that all the variables selected for the study have positive mean values.

#### 3.1.1 Descriptive statistics

Table 1 presents the summary statistics of the data series. The average monthly series for all the variablesare positive. OER has the highest average monthly data (131.3484), while MVAL has the lowest average monthly data ( 3.16E+10). The size of the standard deviation indicates the risk of the data series. OER has the highest standard deviation( 52.08417),while MVAL has the lowest standard deviation ( 3.36E+10). MVAL has a positive skewness (2.1782) and a positive kurtosis (14.542) Leptokurtic (greater than 3) OP has a positive skewness (0.4584) and platykurtic (1.9113)OER has a positive skewness (0.285226) and a positive kurtosis (5.911730). INFhas a positive skewness (0.248519) and a positive kurtosis (3.143751)..

All the variables exhibit excessive kurtosis, a fairly common occurrence in high frequency financial time series data, and suggest that this excessive kurtosis may be due to heteroscedasticity in the data, which the EGARCH models maycapture. Excessive kurtosis would also explain the reasoning for high Jarque-Berastatistics, which reject the null hypothesis of normality for all return series.

**Table 1 : Deswcriptive Statistics**

| | MVAL | OER | OP | INF |
|---|---|---|---|---|
| Mean | 3.16E+10 | 131.3484 | 57.48429 | 11.47804 |
| Median | 1.86E+10 | 130.3400 | 50.31000 | 11.38500 |
| Maximum | 2.83E+11 | 321.5451 | 133.9000 | 24.10000 |
| Minimum | 90259789 | 21.88610 | 9.800000 | 0.900000 |
| Std. Dev. | 3.36E+10 | 52.08417 | 34.55795 | 4.202081 |
| Skewness | 2.178203 | 0.285226 | 0.458444 | 0.248519 |
| Kurtosis | 14.54204 | 5.911730 | 1.911314 | 3.143751 |
| Jarque-Bera | 1521.969 | 88.03586 | 20.25920 | 2.677119 |
| Probability | 0.000000 | 0.000000 | 0.000040 | 0.262223 |
| Sum | 7.59E+12 | 31523.63 | 13796.23 | 2754.730 |
| Sum Sq. Dev. | 2.69E+23 | 648349.7 | 285426.2 | 4220.139 |
| Observations | 240 | 240 | 240 | 240 |

**Source: Researcher's computation**

**3.1.2 Test of normality using jarque bera statistic**

We test for the normality ofthe data series usingJaque Bera statistic(see Fig.1).We observe thatthe Jarque Bera statistics for MVAL is 1521.969 and that it has a p-value of 0.00000; This means that MVAL is not normally distributed since the p-value is less than 0.05 . Further, we find that the Jarque Bera statistics for INF is 2.677119 and it possesses a p-value of 0.262223; This means that INF is equally not normally distributed since the p-value is less than 0.05. The Jarque Bera statistics for OER is 88.03586 and it has a p -value of 0.00000; This means that OER is not normally distributed since the p-value is less than 0.05 .Finally, we discover that the Jarque Bera statistics for OP is 20.25920 and that OP has a p-value of 0.000040;implying that OP is not normally distributed since the p-value is less than 0.05 )

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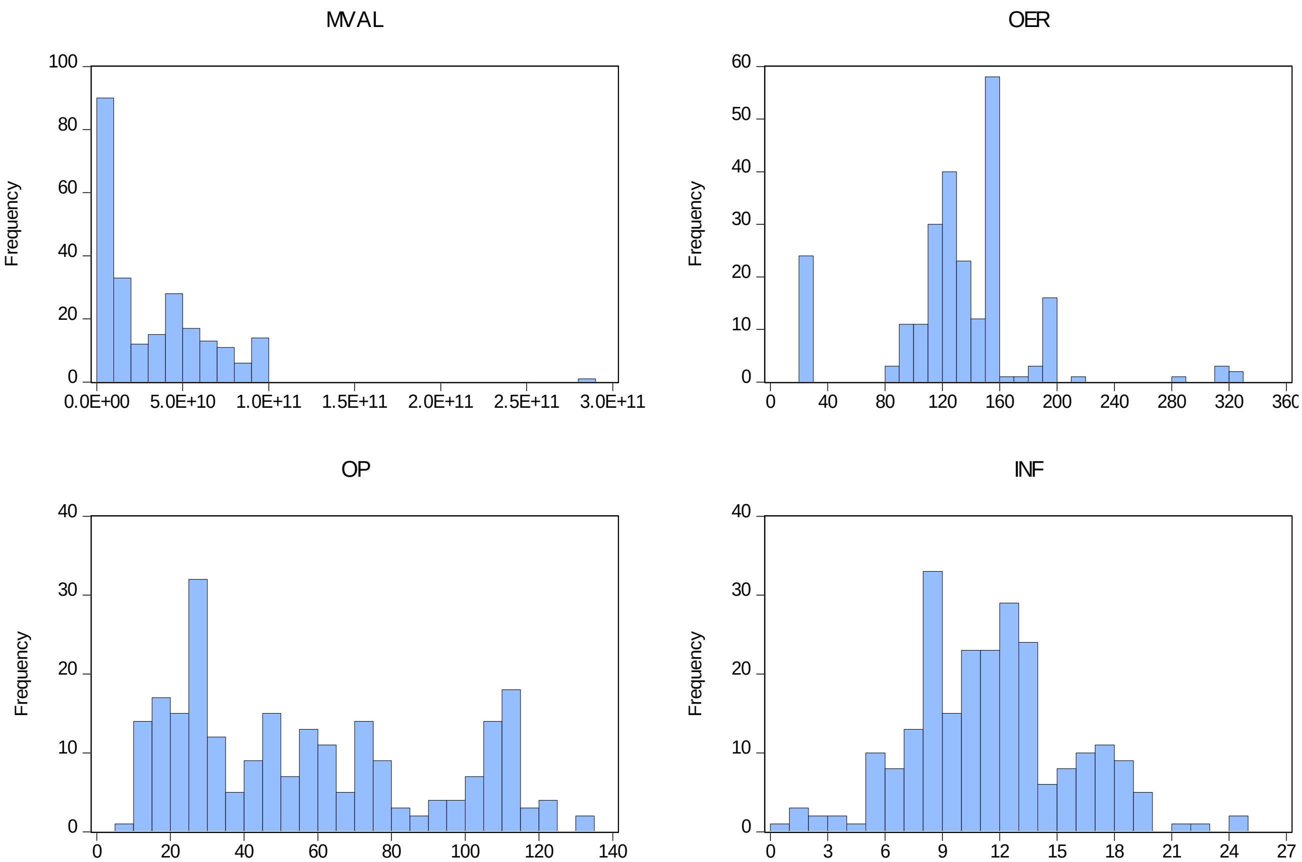


**Fig.1 : Histograms**

**Source: Researcher's computation**

### 3.1.3 Unit Root Tests

We investigate the properties of our key variables by checking for stationarity. We test for the presence of unit roots in their levels(I,0) and first differences of oil prices andmarket value of shares traded. Since our study'sscope covers periods of high fluctuations in oil and stock markets,we expect that structural changes would occur in the oil price and market value series.

The summary results of these statistical tests(Tables 2 &3) for both oil price and market value series are reported in tables 3a and 3b. Our findings show that the null hypothesis of a unit root cannot be rejected for some of the variables across levels.The non-stationarity of some of the seies at their levels,[ I,0], implies that the application of Ordinary Least Squares technique will invariably produce a spurious regression whose estimates will be both unreliable and misleading. According to Asaolu and Ilo (2012),modern econometric techniques have demonrated that a linear combination of two variables that are each I(1), (containing stochastic trends) can be achieved through appropriate methods such that their residuals become I(0) or stationary.; if y and x are I(1), then, the residuals from the regression of those series would be I(0); if they are not, they are cointegrated(see Adam,1992 in Asaolu & Ilo,2012). Consequently, we difference the series to achieve in order to find out if the series is stationary at first difference. We observe that for the variables in first log differences, all unit root tests suggest that we should reject the null hypothesis of nonstationarity.

Since the Augmented Dickey Fuller test in table 2a shows a significant result ( p-value is 0.0000),wereject the null hypothesis. This means that DOP does not have a unit root [ it is stationary].

**Table 2a : Unit Root test for DOP**

Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=14)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -8.620566 | 0.0000 |
| Test critical values: | 1% level | -3.457865 | |
| | 5% level | -2.873543 | |
| | 10% level | -2.573242 | |

*MacKinnon (1996) one-sided p-values.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DOP)
Method: Least Squares
Date: 06/04/19 Time: 14:35
Sample (adjusted): 4 240
Included observations: 237 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| DOP(-1) | -0.742573 | 0.086140 | -8.620566 | 0.0000 |
| D(DOP(-1)) | -0.166106 | 0.064700 | -2.567305 | 0.0109 |
| C | 0.118816 | 0.397821 | 0.298666 | 0.7655 |

| | | | |
|---|---|---|---|
| R-squared | 0.458697 | Mean dependent var | 0.039030 |
| Adjusted R-squared | 0.454070 | S.D. dependent var | 8.286513 |
| S.E. of regression | 6.122662 | Akaike info criterion | 6.474448 |
| Sum squared resid | 8771.955 | Schwarz criterion | 6.518348 |
| Log likelihood | -764.2221 | Hannan-Quinn criter. | 6.492143 |
| F-statistic | 99.14494 | Durbin-Watson stat | 2.001256 |
| Prob(F-statistic) | 0.000000 | | |

**Source:Researcher's computation**

**3.1.4 Unit Root Test to test for Stationarity for DMVAL using Augmented Dickey fuller Test**

The series is differenced to achieve its first difference. i.e. DMVALThe intentionis to find out if the series is stationary at first difference. D(MVAL). The null hypothesis states that the series has a unit root (meaning that the series is non-stationary). **Null Hypothesis**: DMVAL has a unit root Since the Augmented Dickey Fuller test statistic shows a significant result, P = 0.000; we reject the null hypothesis. This means that DMVAL does not have a unit root ( It is stationary)

**Table 2b : Unit Root Test for DMVAL**

Null Hypothesis: DMVAL has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=14)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -13.08929 | 0.0000 |
| Test critical values: | 1% level | -3.458104 | |
| | 5% level | -2.873648 | |
| | 10% level | -2.573298 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DMVAL)
Method: Least Squares
Date: 06/04/19 Time: 15:42
Sample (adjusted): 5 239
Included observations: 235 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| DMVAL(-1) | -2.802915 | 0.214138 | -13.08929 | 0.0000 |
| D(DMVAL(-1)) | 1.082217 | 0.176090 | 6.145826 | 0.0000 |
| D(DMVAL(-2)) | 0.622505 | 0.124091 | 5.016537 | 0.0000 |
| D(DMVAL(-3)) | 0.220804 | 0.064445 | 3.426263 | 0.0007 |
| C | 4.93E+08 | 1.74E+09 | 0.283486 | 0.7771 |

| | | | |
|---|---|---|---|
| R-squared | 0.787471 | Mean dependent var | 68515763 |
| Adjusted R-squared | 0.783774 | S.D. dependent var | 5.73E+10 |
| S.E. of regression | 2.66E+10 | Akaike info criterion | 50.86942 |
| Sum squared resid | 1.63E+23 | Schwarz criterion | 50.94302 |
| Log likelihood | -5972.156 | Hannan-Quinn criter. | 50.89909 |

| | | | |
|---|---|---|---|
| F-statistic | 213.0508 | Durbin-Watson stat | 2.055902 |
| Prob(F-statistic) | 0.000000 | | |

**Source: Researcher's computation**

**3.1.5 Johansen Cointegration Test MVAL,OP,INFandOER**

Tables 3a and 3b show the outcomes of co-integration tests**.** From the Trace and Maximum Eigen Value test outputs, the null hypothesis is that there is no cointegration among the variables; that is that.none of the variables are co- integrated. We accept the null hypothesis since p-value is 0.3068 (greater than 0.05).This means that in the long run, the variables will not be cointegrated or there is no long run association between the variables.

After differencing OP, MMVAL, OER and INF, they have become DOP, DMVAL, DOER and DINF respectively.

**Table 3a : Trace test**

Date: 06/23/19 Time: 17:04
Sample (adjusted): 6 240
Included observations: 235 after adjustments
Trend assumption: Linear deterministic trend
Series: MVAL OP OER INF
Lags interval (in first differences): 1 to 4

Unrestricted Co-integration Rank Test (Trace)

| Hypothesized No. of CE(s) | Eigenvalue | Trace Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None * | 0.168370 | 73.17086 | 47.85613 | 0.0000 |
| At most 1 * | 0.098699 | 29.84452 | 29.79707 | 0.0494 |
| At most 2 | 0.022402 | 5.424240 | 15.49471 | 0.7622 |
| At most 3 | 0.000426 | 0.100016 | 3.841466 | 0.7518 |

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

**Source: Researcher's computation**

**Table**
**3b**
**Unrestricted Cointegration Rank Test (Maximum Eigenvalue)**

| Hypothesized No. of CE(s) | Eigenvalue | Max-Eigen Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None * | 0.168370 | 43.32633 | 27.58434 | 0.0002 |
| At most 1 * | 0.098699 | 24.42028 | 21.13162 | 0.0166 |
| At most 2 | 0.022402 | 5.324224 | 14.26460 | 0.7005 |
| At most 3 | 0.000426 | 0.100016 | 3.841466 | 0.7518 |

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

**Source: Researcher's computation**

**3.1.6 Stability Test For The Model For Dmval As The Dependent Variable (Dmval, Dop,Doer and Dinf)**

The classical Chow (1960) structural stability test, was carried out to spot out evidence of potential structural break (see Zivot.& Andrews, 1992).. Though most of the residuals are within their confidence interval limits or bounds, the CUSUM squared result presented in Figure 6 rejected the hypothesis of coefficient stability at five per cent significance. This suggests thepresence of structural change in the model. Structural breaks potentially occur in the model at 2008M12 and lasted through 2011M07 during which point the residuals drifted upward. This break point period coincided with the global financial crisis, which though noticed in 2007 only had impact on the Nigerian economy from the end of 2008.

**3.2 Methods**

**3.2.1 Research Design**

This work employed the *ex post facto* research design for determining the influence of oil prices shock on market capitalization..

**3.2.2 Model Specification**

Several studies find the presence of nonlinear connections between oil and economic activity (see Mork, 1989; Hamilton, 1996 ). Those studies suggest that oil price increases are much more influential than oil price decreases, implying an asymmetric relationship between oil price and output level. In the recent times, several papers have examined the potential asymmetric relationships between the crude oil market and other asset prices, such as stock prices or stock returns. For instance, Bittlingmayer (2005) observes that oil price fluctuations arising from war risks, and those related to other causes, display asymmetric effects on stock price dynamics. Cheikh,Naceur,Kanaan and Rault (2018) contend that ignoring non-linearity can lead to problematic results, just as Balcilar et al. (2015) argue that using a linear framework would result in mixed results,

In this paper, we carry out the econometric estimation with the Exponential GARCH (EGARCH) - a model which Soyemi et al, (2017) assert has been used in recent studies to measure volatility (See Lux, Segnon & Gupta, 2015, in Soyemi et al., 2017; Lawal, Somoye & Babajide, 2016; Eagle, 2017), among others.We consider this approach as a better means for accounting for the size effect of oil price movements on the dependent variable and allowing for movements in the conditional variance (see Manasseh & Omeje, 2016; Lawal et al., 2016).Proposed by Nelson (1991),the EGARCH model is important in capturing asymmetry, which is the different impacts on conditional volatility of positive and negative shocks of equal magnitude, and possibly also leverage, which is the negative correlation between returns shocks and subsequent shocks to volatility.One advantage of the EGARCH model over the basic GARCH ( 1,1) specification is that it is an asymmetric model that specifies the logarithm of conditional volatility and avoids the need for any parametric constraints Exponential GARCH has some form of leverage effects in its equation. Accoding to Sardrsky (1999),many authors have suggested that oil price volatility shocks may play an essential role in explaining economic activity. Some authors consider volatility of price changes as an accurate measure of the rate of information flow in financial markets. Mokni and Mansouri(2017) report that such models are able to capture different volatility stylized facts that are often observed in financial time series,such as volatility clustering , heteroskedasticity and long memory, all at the sametime.

The EGARCH[p,q] model is specified as follows: -

$$\log(h_t) = \alpha_0 + \sum_{j=1}^{q} \beta_j \log(h_{t-j}) + \sum_{i=1}^{p} \alpha_i \left| \frac{u_{t=i}}{\sqrt{h_{t=i}}} \right| + \sum_{k=1}^{r} \gamma_k \frac{u_{t-k}}{\sqrt{h_{t-k}}}$$

**(conditional variance equation)....................................................(2.1)**

For this study, the conditional mean and variance equations for testing the hypothesis is presented as follows:-

LOG(GARCH) = **C(1) + C(2)*DOP ........................................................................(2.2)**

LOG(GARCH) = C(3) + C(4)*ABS[RESID(-1)/@SQRT{GARCH(-1)}] + C(5)*RESID(-1)/@SQRT(GARCH(-1)) + C(6)*LOG{GARCH(-1)} + C(7)*DOP …………………………(2.3)

LOG (GARCH) is the conditional variance of the residual; it is the dependent variable. C (3) stands for the constant which indicates the last period (t-1) volatility. C(4) is the constant representing theimpact of a magnitude of a shock (size) /arch effect / spillover effect . It indicates the impact of long term volatility. At five percent level of significance, if C(4) has a p-value not higher than 0.05, the implication is that it is significant and there seems to be an impact of long term volatility..C (5) is the gamma (γ) or leverageterm. The gamma parameter measures the asymmetry or the leverage effect. If gamma = 0 , then the model is symmetric. When gamma < 0 , then positive shocks ( good news) generate less volatility than negative shocks ( bad news). When gamma > 0 , the implication is that positive innovations are more destabilizing than negative innovations.C (6) re[resents the GARCH effect. That is the alpha. Its parameter represents a magnitude effect or the symmetric effect of the model.Beta ( the GARCH term) measures the persistence in conditional volatility irrespective of anything happening in the market. When beta is relatively large, then volatility takes a long time to die out following a crisis in the market (see Alexander,2009). C (7) is DOP ( (the explanatory variable),The statistics for the hypotheses are shown in tables 11 – 16. The decision is base on 5% level of significance. According to Brooks (2014), the model above, which is based on the assumption of normal gaussian distribution, captures the asymmetric volatility through the variable gamma(γ). The sign of the gamma determines the size of the asymmetric volatility and whether the asymmetric volatility is positive or negative.

The null hypothesis is that oil price shock had no positive and significant effects on the market value of trade.. The model for testing this hypothesis is presented respectively :as follows:-

DMVAL = C(1) + C(2)*DOP ………..……………………………………………….( 2.4)

LOG(GARCH) = C(3) + C(4)*ABS[RESID(-1)/@SQRT{GARCH(-1)}] + C(5)*RESID(-1)/@SQRT{GARCH(-1)} + C(6)*LOG{GARCH(-1)} + C(7)*DOP……………………(2.5)

Where DASI stands for the Nigerian all share index and DOP represents oil price both in their first difference forms.

**4.0 Empirical results**

As equation estimation(3.1 and 3.2) represents, we model the volatility of crude oil returns with an AR(1)-EGARCH(1,1) specification. Table 4 presents the test results. All parameter estimates of the EGARCH(1,1) model are highly statistically significant. We use the sum of$\beta 1$ to measure the persistence in volatility and $\alpha 1$ in the GARCH model is closer tounity for each period.

The econometric results in table show that with a p-value of 0.0000, the impact or magnitude of shock of oil price on market value of shares traded in Nigeria is significant and there seems to be impact of long term volatility.

The leverage coefficient ( Gamma) is negative(-0.351388) and significant( p-value = 0.0000) ,implying that an asymmetric behavior is present.This also means that there is leverage effect: bad news has more impact than good news of the same size.In addition.The GARCH (beta) term has a value of 0.935031 and a p-value of 0.0000. This means that it is significant and there is volatility persistence.

Oll price volatility has a p-value of 0.00000 .This means that its impact on the volatility of market value of trade in Nigeria is significant and the volatility or shocks in oil price volatility can affect the volatility of the market value. The negative coefficient of oil price volatility( -0.071669) means that its impact on the volatility of the market value is in the negative direction.

The result of the EGARCH estimation indicates that the coefficient of oil price shock is negative and the p-value is significant. It shows that a unit increase in oil price causes some decrease in market value of the shares traded.This result is slightly inconsistent with Onodugo(n.d) that finds the rrelationship between oil price and Nigerian stock market value as positive. However,the negative connection between oil price and Nigerian market value of trade is explicable by the fact that, though Nigeria is an oil- exporting country, the import bill is significantly over and above what is exported at the moment ( see Adaramola,2012)..

**Table 4 :Running the EGARCH model for DMVAL as the dependent variable with normal gaussian distribution type**

Dependent Variable: DMVAL
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 11/18/18 Time: 14:50
Sample (adjusted): 2 239
Included observations: 238 after adjustments
Convergence achieved after 63 iterations
Presample variance: backcast (parameter = 0.7)
LOG(GARCH) = C(3) + C(4)*ABS(RESID(-1)/@SQRT(GARCH(-1))) + C(5)
*RESID(-1)/@SQRT(GARCH(-1)) + C(6)*LOG(GARCH(-1)) + C(7)*DOP

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | 19042840 | 2.26E+08 | 0.084359 | 0.9328 |
| DOP | 29611387 | 75967261 | 0.389791 | 0.6967 |
| | Variance Equation | | | |
| C(3) | 2.347087 | 0.814630 | 2.881170 | 0.0040 |
| C(4) | 1.270866 | 0.090268 | 14.07876 | 0.0000 |
| C(5) | -0.351388 | 0.056936 | -6.171615 | 0.0000 |
| C(6) | 0.935031 | 0.016864 | 55.44504 | 0.0000 |
| C(7) | -0.071669 | 0.004884 | -14.67398 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | -0.002824 | Mean dependent var | 1.98E+08 |
| Adjusted R-squared | -0.007073 | S.D. dependent var | 3.29E+10 |
| S.E. of regression | 3.30E+10 | Akaike info criterion | 49.72576 |
| Sum squared resid | 2.57E+23 | Schwarz criterion | 49.82789 |
| Log likelihood | -5910.366 | Hannan-Quinn criter. | 49.76692 |
| Durbin-Watson stat | 2.994274 | | |

**Source : Researcher's Computation**

**Estimation Equation:**
=========================
**DMVAL = C(1) + C(2)*DOP** **- - - (3.1)**

**LOG(GARCH) = C(3) + C(4)*ABS(RESID(-1)/@SQRT(GARCH(-1))) + C(5)*RESID(-1)/@SQRT(GARCH(-1)) + C(6)*LOG(GARCH(-1)) + C(7)*DOP - - - (3.2)**

**4.0 Conclusion and policy implications**

This study has examined the impact of oil price volatility on the volatility of themarket value of shares traded in the Nigerian stock market. We used an EGARCH methodology to study this impact. The results of the the empirical analysis show that an asymmetric behavior is present and that there is volatility persistence.The results also indicate that the impact of oil price volatility on the volatility of the market value of the shares traded in Nigeria is negative and significant In addition, itimplies that a unit increase in oil price causes some decrease in market value of the shares traded.The negative connection between oil price and Nigerian market value of trade is explained by the fact that, though Nigeria is an oil-exporting country, the import bill at the moment is significantly over and above what is exported ( see Adaramola,2012).The results of this study are relevant for optimal portfolio diversification strategies as well as policy making. Fof instance, the integration,in the long run,of market value with oil prices means that Nigeria's stock market does not react immediately to oil price volatilities. This long-run integration provides an opportunity for diversifying capital by financial agents connected to the world oil market in the short and medium run. The volatility persistence period could enable Nigerian authorities to better react to the volatility of oil prices as well as their possible negative effects on stock market and on trade finance. All the same, if the volatility persist, the stock market, although not reacting automatically, might eventually feel these impacts. To be proactive, the Nigrian government should take some measures to diversify her sources of energy and take steps to enhance renewable energy in primary, industrial and domestic units.According to Arnold et al.(2018), this could result in making her stock prices more independent of oil price fuctuations. In addition, the Nigerian government should also empower her local financial institutions which are prominent players in promoting trade finance in her territory.

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