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INTERNATIONAL OIL PRICE MOVEMENTS AND THE MARKET VALUE OF ORDINARY SHARES IN THE NIGERIAN CAPITAL MARKET

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Abstract:
This study explored the effect of international oil price movements on the market value of ordinary shares in the Nigerian capital market using monthly frequency data that cover the period from January,1997 to August 2020. It used the non-linear autoregressive distributed lag methodology for data analysis. The results of the empirical study suggest that oil price movements have positve and significant effect on the market value of the Nigerian capital market. They also suggest a long-run and asymmetric relationship between the two variables.The study recommends that Nigeria should devise strategies that can ensure stability in their capital markets .It can do this by vigorously pursuing pro-growth policies irrespective of the fluctuations in oil price and other macroeconomic variables..It advises market participants to target oil price movements as an important instrument for predicting the volatility of Nigeria's stock market returns.

Keywords: International oil price,Market value,Ordinary shares, Nigeria,NARD

1.Introduction

Abrupt changes in oil price are major contributors to the asymmetries found in the business cycle(Uzo-Peters,Laniran & Adenikinji,2018).According to Uzo-Peters et al.(2018),the historical highs in the world crude oil market generated a lot of worries concerning the likely drops in the economic performance of several developed economies.The declines that took placs in the international oil price compelled many oil exporting countries to cut down their national budgets .As a result of the uncertainty concerning the state of the world oil markets in the future and the possible economic consequences, a considerable body of empirical research have had to investigate the channels through which oil price changes affect economic variables in oil-importing, oil-exporting, developed and emerging markets. Although there are several empirical works concerning the oil price macro-economy relationship, only a handful of them have chanelled their attention towards the effect of oil price shocks on the stock markets.Even the few that have done so employed different methods and alternative data sources to explore the connection between oil price movements and stock market performance.However,they failed to arrive at uniform results. For instance, while the studies like Jones and Kaul (1996) and Sadorsky (1999) reported a significant negative nexus between oil price shocks and stock market returns, Huang,Musulis and Stoll (1996) observed a positive connection between the two variables. Apart from the disagreements in findings and conclusions, the earlier works on this subject=matter were mainly concentrated on developed economies like the United States of America and United Kingdom.However,since the internationalization of capital markets and it became obvious that emerging markets play some increasingly important role globally, researchers got enticed to explore the mechanism through which the international oil price affects stock markets in emerging markets.For example, Basher and Sadorsky (2006) carried out one of the earliest comprehensive works on the oil/stock market relationship. They reported a strong connection between oil price volatility and stock returns within emerging economies.The study of Babatunde,Adenikunji and Adenikunji (2013) focused on Nigeria, a leading producer of crude oil, and found that Nigerian stock market returns exhibit a positive response in the short run.but respond negatively in the long run.

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.Again, from day to day, the price of shares move up and down in an endless manner in response to news and information known and expected about the particular stocks in the Nigerian Stock Exchange(Afolabi & Dada,2014) The determination of share prices especially on the exchange and the trend of these prices has become an important issue and therefore call for attention in checking on the Nigerian Stock Exchange. (see Osaze, 1991)

. The purpose of this research paper was to ascertain whether oil price movements could be responsible for such oscillations in share prices/Specificallythis paper examined the effect of international oil price movements on the market value of ordinary shares in the Nigerian capital market. Nigeria is selected for this studyb as it is considered suitable to represent developing economies.It 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 international portfolio diversification.

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 regarded as largest producer of sweet oil.This is 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. They include Qua Iboe, Escravos blend, Brass River and Pennington Anfan.

However,Nigeria still relies on the importation of refined petroleum products to meet its domestic needs, despite its possession of four refineries. Therefore, 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 Nigeria's earnings while the budgetary process is conditioned on the prevailing oil price in the crude oil market.According to Akinwandu and Olotewo (2015), the high level dependence of the Nigerian economy on crude oil implies that any movements in the oil sector will have a significant impact on government revenue and the determination of Nigeria's financial policy.

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. Further,its importance is underscored by its envisaged ability to come up with 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 help companies in constructing portfolios and determining risk management strategies (Youssef & Mokni,2019;Akinlo,2014).
The study's contribution to knowledge is threefold. First,
it extends the work of Agbo and Nwankwo(2020) by focusing on one of the most active stock markets of oilexporting nations in Africa.. Secondly, the empirical inquiry made use of monthly data updated to August 2020 and NARDL approach which provides very robust findings. Third, this study contributes to the controversy and debate on the oil-stock connection and its policy implications.This could help capital market investors and fund managers in diversing portfolio, risk management and inflation hedging in the Nigerian capital market.
This work 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, it employed monthly frequency data.Secondly,it spans the period from January 1997 through August 2020 in the estimation and, by so doing, provides further empirical evidence.Thirdly, to the best of the researchers' knowledge , no other study has been carried out on this topic in Nigeria.

The rest of this paper is structured as follows. Section 2 reviews the related literature. Section 3 presents the data and the empirical model. Section 4 presents and discusses the empirical results,while Section 5 concludes the paper

2. Review of the Related Literature

2.1 Theoretical Underpinnings

Crude oil, is considered universally as one of the most essential production inputs.Most often, many consider it as a commodity that plays an essential role in the world economy(Heo, Yoo & Kwak, 2010; Difiglio, 2014; Le & Chang, 2015; cited in Yoshino,Rasoulinezhad & Chang,2019). Ironically,crude oil has been reported as one of the major causes of political tensions among nations.This is because of its economic advantage as an important production input in the post-industrial era and an indispensable item in the transport and electricity generation sectors. According to Namovsky(2018), as oil prices increase, international trade becomes more localized because countries begin to trade relatively more with their neighbors. On the other hand, when oil prices come downs , trade becomes more dispersed since the distance between countries becomes less relevant. Oil prices have been highly variable—twice as variable as those of other goods.
Arnold, Gourène and Mendy.(2018) report 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 influx of renewable and alternative energy sources, the level of world crude oil consumption has not changed.Rather, the rate of consumption of this energy source continues to be on the increase, especially among the developed and industrialized economies. 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). An oil price increase will bring about an increase in production costs, as oil is regarded as the most important production

input (Arouri & Nguyen,2010).According to Barro (1984) cited in Youssef and Mokni (2019), the rising 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. Reducing the consumption of crude oil will cause a cut down in production and, in return, increase unemployment (Brown & Yücel, 2001; Davis & Haltiwanger, 2001 in Youssef & Mokni,2019). Further, oil price changes affect stock markets due to the uncertainty they create for the financial sector. 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 effect on an asset price. Consequently authors such as Hamilton (1996), Sadorsky (1999), Arouri and Nguyen (2010) propose 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 likely to be accompanied by a reduction in stock prices.

There is ample evidence in literature that, since the 1970s, movements in the international oil prices have continued to attract a lot of attention.They have become a subject of debate and a considerable issue for several nations.This is more paticularly the case with the oil-exporting countries where public authorities tie their budgets to oil revenues. Their economic growth can be hit by these changes directly and indirectly. The same applies to oil-importing countries where petroleum is the raw material for producing goods and transportation

Stock markets are generally considered as the barometer or the mirror of the economic activity of a nation since they play an important role in capital accumulation, the productivity of capital, financing of innovations in technology as well as economic development (Schumpeter, 1912;Levine, 1997). Oil prices is theoretically connected with stock markets because oil price shocks affect stock markets through their impact on economic activity, corporate income, inflation, as well as monetary policy. Stock is a share in the ownership of a company. It represents a claim on the company asset and earnings(Afolabi & Dada,2014). Ordinary shares,Common shares or equity shares belong to one of the two major classes of shares.They represent ownership in a company and a claim (dividends) on a portion of profits. Investors get one vote per share in order elect the board members, who oversee the major decisions made by the management.Should a company go bankrupt and liquidate, the common shareholders will not receive money until creditors, bondholders and preferential shareholders are paid.

A an active stock market may be relied upon to measure changes in general economic activities using a stock market index. The performance of the stock market depends to a large extent on the performance of the economy. In a strong and growing economic environment, corporate profits will increase and this will translate into rising stock prices.Contrarily, in a slow economy or during recession, company earnings decline or losses are incurred;this situation causes stock prices to remain stagnant or plummet.

The literature on stock prices behaviour still provides inconclusive evidence in terms of the factors that determine stock price behavior(Osaze,1991). However,according to Alile andAnao(1996),the factors affect share prices include the theoretical basic economic principles of demand and supply, changes in dividend pay-out practices and changes in the top management of a company. Other factors could include the amount of funds available from public saving of the company and government fiscal policy.For Osaze (1991), such factors could be company-related, industry-related, economy-economy, political factor, volume of trading, money supply, earnings and dividends. Akinsulire (2008) also identified some distinct factors affecting pricing in the secondary market as comprising market forces, market hears say,corporate performance, economy and government policy.

Some school of thought assume that the market value of a firm as exemplified by its share price is related to its dividend policy.

Hence,P= e^i(1-b)k-br

When P= Market price per share

e^i= Current earnings

b= Rate of dividend policy

k= All equity firms cost of capital

r= Internal profitability

Dividend and the choice of dividend policy affect share price behaviour.

Consequently,

P= D+r(E-D)/K

Where P= Market price per shares

K= Capitalization rate

D= Dividend

r= Internal rate of return

Afolabi and Dada(2014) propose that share prices rise and fall on an ongoing basis and investors can lose or make money depending on when they sell and buy. It is therefore necessary for the investor to know why movement in stock prices occurs in order to make optimum investment decisions. The price of a stock move up or down depending on the supply and demand for the stock at any point in time. The supply and demand represents the quantity of the shares with investors and ready to buy or sell at a point in time. When there are more buyers than sellers of a stock, the price goes up. The reverse holds when sellers outnumber buyers. The quantity demanded or supplied of a stock is determined by internal factors,external factors, industry related factors,economic related factors, political factors andvolume of trading(Afolabi & Dada,2014).

The financial market in Nigeria, consists of money market and capital market. Money markets are the markets for debt securities that pay off in short-term (usually not more than one year). Capital markets on the other hand are markets that deal with long-term debts and for equity shares. The numbers of business firms listed on the Nigerian stock exchange has grown since inception.the same is the case with the securities traded on the exchange.

2.2 Empirical review

Jones and Kaul (1996) carried out some empiricalstudy for the US and Canada which are the world's largest oil producers and found that oil price shocks in the post-war period had an effect on real cash flows, which has an influence on stock prices.

Sadorsky (1999) did a study and found that changes in oil prices and stock returns were opposite. Papapetrou (2001) carried out a study and discovered that the rise of oil prices negatively affect stock prices in Greece.. Park and Ratti (2008) observed a negative relationship between oil prices changes and stock markets in oil exporting nations excluding Norway. Kilian and Park (2009) demonstrated 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 Talukdar and Sunyaeva (2011) analyzed the impact of oil prices shocks on the stock markets returns of 11 OECD member countries and found that the effects of rising oil prices on the stock markets differ depending on the idiosyncracies of the country. The results of the study carried out by Wang, Wu andYang(2013) proposed 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 to Ono (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. Polat(2020) used a Bayesian time-varying parameter vector autoregression (TVP-VAR) model to examine the time-varying transmission mechanisms between structural oil price shocks and Borsa Istanbul, Turkey's stock market (BIST). The data employed spanned the period February 1988 to December 2018, and included monthly West Texas Intermediate (WTI) spot crude oil prices, world crude oil production data, a measure of global real economic activity (the Kilian Index), and BIST data.

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,. Gupta and 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 .

Afolabi and Dada(2014)carried out a study centered on trends of share prices in Nigeria Stock market between 1988-2011.The result of the study showed that market capitalization and exchange rate are very good determinants of share prices movement, while inflation is not.The study also identified the factors and the various theories that are responsible in the changes of share prices over time

,Ekong and Ebong(2016) conducted a study that mainly focused attention on modelling the dynamic relationship that exists between crude oil prices, stock market indicators and the economic growth in Nigrria using vector autoregressive (VAR) model and cointegration analysis. Market Capitalization and Exchange Rate were employed as proxies for stock market indicators and economic growth. The series comprised monthly data points from 1995:1 to 2014:11 totaling up to 239 observations obtained from the Nigerian stock market and Central Bank of Nigeria bulletin. From the study, there exists a viable, long run and sustainable relationship among the series from the cointegration analysis. Two cointegrating equations were found to exist among the variables. The dynamic relationship that exists among these variables can be captured with a vector autoregressive model of order three (VAR(3)). Structural inference was carried with the VAR model and from the result it was noticed that the Nigerian stock market behavior and the economic growth can better be predicted when taking the past values crude oil prices into consideration.

Soyemi, Akingunola and Ogebe, (2017) found 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(Tussupor,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.

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3.0 Methodology

3.1 Data

This paper explored the effect of oil price(OP) movements on market value (MVAL) in the Nigerian capital market using monthly historical data that spanned the period from January 1997 to August 2020.Brent oil prices per barrel were retrieved from the US Energy Information Administration (EIA) short-term outlook. It was selected as the explanatory variable. Monthly data series covering the period from January 1997 to August 2020 were employed for estimation in line with the general preference of researchers for such data frequencies especially when investigating oil-stock-prices connection. The study covers the periods of some of the economic recession in Nigeria as well as the Covid-19 pandemic. The monthly Brent spot prices were denominated in US dollars while the monthly market value is denominated in Nigerian Naira. In order to check for robustness, pre-tests were conducted with other crude oil benchmarks such as West Texas Intermediate (WTI) and the OPEC spot prices. We confirmed that using those oil prices instead of the Brent spot prices would not significantly alter the results of our benchmark specifications. The monthly data on Nigeria's market value were retrieved from the Nigeria Stock Exchange (NSE), Stock Exchange House, 2-4 Customs Street, Lagos, Nigeria through contactcentre@nigerianstockexchange.com and www.nse.com.org.. Each of the two data series used for the work consisted of 284 observations. The data sets were fed into the computer as Excel files with two columns – one column for the date and theother for the corresponding information for the particular date. From the Excel, the data sets were trasferred to the Eviews 10 software in readiness for the regression analysis

3.2. Model specification

Several studies in the past were based on the conventional cointegration approach which examines relationships between changes in oil and stock prices.

Some author combined the Structural VAR model and the non-linear Autoregressive Distributed Lag (NARDL) model to determine the longrun and short-run asymmetric effects of structural oil price shocks.The results generated after using those different analytical techniques have tended to conflict with one another, partly because some methods considered only a short-run relationship while the others captured long-run associations(Kelikume and Muritala,2019)

Instead of aligning with the symmetric or linear theory developed by Hamilton(1983) , this study used the Nonlinear Autoregressive Distributed Lag(NARDL) model in line with other studies like Jungo and Kim (2019) that were based on the assumption of nonlinearity. To investigate the subject thoroughly, specific account was taken of the asymmetric effects of oil price changes in the modeling process.

We are motivated to use the NARDL, which is an a modified form of ARDL and introduced by Shin,Yu and Greenwood-Nimmo(2014), by the fact that it is said the simplest method available for modeling combined short- and long-run asymmetries(Allen &McAleer,2020).According to Paseran, Shin and Smith (2001), it employs the bounds testing framework and can be applied to both stationary and non-stationary time series vectors, or combinations of both so long as none of the data series is of the I(2) integration order.NARDL also accounts for asymmetry in stock data analysis which yields robust inferences(Ghosh & Kanjilal, 2016). Its very construction allows one to incorporate the possibility of asymmetric effects of positive and negative changes in explanatory variables on the dependent variable. Further, in addition to providing graphs of cumulative dynamic multipliers used to trace out the adjustment patterns following the positive and negative shocks to explanatory variables. NARDL model captures the nonlinear and asymmetric co-integration between variables. Further, it distinguishes between the short-term and long-term effects of the independent variables on the dependent variable.Further,just like is the case with ARDL.

Apart from theNARDL's flexibility of allowing both I(0) and I(1)in the model, its approach to cointegration provides several more advantages over other methods [Phong, Bao & Van.2017; Phong, Bao & Van,2018).Firstly, it can generate statistically significant result even with small sample size, while Johansen cointegration method requires a larger sample size to attain significance (Pesaran, Shin & Smith,2001). Secondly, while other cointegration techniques require the same lag orders of variables, it allows various ones.Thirdly, NARDL technique estimates only one equation by OLS method rather than a set of equations like other techniques. Finally, NARDL approach outputs unbiased long-run estimations, provided that some of the variables in the model are endogenous.

When cointegration is identified, the calculation procedure of NARDL is similar to that of the traditional ARDL(Phong et al.,2019),.The general ARDL model for one dependent variable Y and a set of independent variable $X_1,X_2,X_3,...,X_n$ is denoted asARDL(p_0 $p_1,p_2,p_3,...,p_n$), in which p_0 is the lag order of Y and the rest are respectively the lag orders of X_1, X_2, $X_3,...,X_n$.

ARDL(p_0, p_1, p_2, $p_3,...,p_n$)is written as follows: $Y_t=\alpha+p_0\sum i=1(\beta_0,i\cdot Y_{t-1})+p_1\sum j=0(\beta_1,j\cdot X_{1,tj})+ p_2\sum k= 0(\beta_2,k\cdot X_{2,t-k})+p_3\sum l=0(\beta_{3,1}\cdot X_{3,t-1})+...+p_n\sum m=0\ (\beta_{n,m}\cdot X_{n,t-m}) +\varepsilon t.(1)$

As is the case with ARDL, the NARDL methods begin with bound test procedure to identify the cointegration among the variables; in other words, the long-run relationship among the variables(Pesaran & Pesaran,1997). The Unrestricted Error Correction Model (UECM) form of ARDL is shown as:$\Delta Y_t=\alpha+p_0\sum i=1(\beta_{0,i}\cdot\Delta Y_{t-1})+ p_1\sum j=0(\beta_{1,j}\cdot\Delta X_{1,t-j})+p_2\sum k=0(\beta_{2,k}\cdot\Delta X_{2,t-k})+ p_3\sum l=0(\beta_{3,1}\cdot\Delta X_{3,t-1})+...+p_n\sum m=0(\beta_{n,m}\cdot\Delta X_{n,t-m}) +\lambda_0\cdot Y_{t-1}+\lambda_1\cdot X_{1,t-1}+\lambda_2\cdot X_2,t-1+\lambda_3\cdot X_{3,t-1}+...+\lambda_n\cdot X_{n,t-1}+\varepsilon t.(2)$

These hypotheses are tested to find the cointegration among the variables:

The null hypothesis H_0:$\lambda_0=\lambda_1=\lambda_2=\lambda_3=...=\lambda_n=0$: (no cointegration) against the alternative hypothesis H_1:$\lambda_{06}=\lambda_{16}=\lambda_{26}=\lambda_{36}=..._6=\lambda_{n6}=0$. (there exists cointegration among variables). The null hypothesis is rejected if the F statistic is greater than the upper bound critical value at standard significance level.However, if the F statistic is smaller than the lower bound critical value, H_0 cannot be

rejected.Assuming that the F statistic lies between the upper and lower bound critical values, there would be no conclusion about the null hypothesis.
After identifying the cointegration among variables, it is advisable to ensure that the NARDL model is stable and trustworthy by conducting a number of preliminarytests,such as Wald test, Ramsey's RESET test , Larange multiplier (LM) test, CUSUM (Cumulative Sum of Recursive Residuals) and CUSUMSQ (CumulativeSum of Square of Recursive Residuals), that allow some other essential examinations such as serial correlation, heteroscedasticity and the stability of residuals. After the NARDL model's stability and reliability have been confirmed,the short-run and long-run estimations can be carried out.

The NARDL model for this study was specified as follows:-

$$\Delta MVAL_t = \alpha_0 + \rho MVAL_{t-1} + \beta_1^{+}OP^{+}_{t-1} + \beta^{-}_2 OP^{-}_{t-1} + \sum_{t=1}^{-p} \alpha_1 \Delta MVAl_{t-1} + \sum_{t=0}^{-p} \alpha_2 OP^{+}_{t-1} \sum_{t=0}^{-p} \alpha_3 OP^{-}_{t-1} + \mu_{t.} \qquad ....(4)$$

In the NARDL equation as modeled above, αi represent short run coefficients while βi stand for the long term coefficients with i = 1....4th. While the short term analysis relates to the immediate effect of the independent variable on the dependent variable, the long term analysis reveals the speed of adjustment towards equilibrium. The variables $MVAL_t$ and OP_t in this model represent average monthly exchange rates and Brent spot oil prices respectively; t stands for time. Wald test is run to know the long run asymmetry $\beta=\beta+=\beta-$ and for short run asymmetry $\alpha=\alpha+=\alpha-$ for the selected variables

4. Empirical Results

4.1 Descriptive statistics

Impact of oil price changes on the market value of the Nigerian capital market

Table 1: Descriptive Statistics

	MVAL	OP
Mean	4.09E+10	57.72750
Median	3.22E+10	55.72500
Maximum	2.83E+11	133.9000
Minimum	90259789	9.800000
Std. Dev.	4.17E+10	32.16818
Skewness	1.797813	0.451290
Kurtosis	8.732216	2.149733
Jarque-Bera	541.8107	18.19500
Probability	0.000000	0.000112
Sum	1.16E+13	16394.61

Sum Sq. Dev.	4.91E+23	292846.1
Observations	284	284

Table 1 presents the descriptive statistics for oil price and market value series as well as their stochastic properties. The monthly average oil price is 57.72USD and market value MVAL has an average of 4.09E+10. On a monthly basis, the market value(MVAL) and Oil Prices(OP) reach their maximum value of 2.83E+11 and 133.9USD respectively. The two series are positively skewed. MVAL has a peaked kurtosis. The Jarque-Bera test indicates the non-normality of MVAL and OP oil price series.The size of the standard deviation indicates the risk of the data series. MVAL has a positive skewness (1.797813) and a positive kurtosis (8.732216) Leptokurtic (greater than 3) OP has a positive skewness (0.451290) and a positive kurtosis platykurtic (2.149733). Excessive kurtosis would also explain the reason for the high Jarque-Bera statistic, which rejects the null hypothesis of normality for all return series.

4.2 ARDLUnit Root Test for Stationarity

Table 2.1a Unit Root Test for Stationarity for Oil Price (OP) (At level)

Null Hypothesis: OP has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.066324	0.2587
Test critical values:	1% level	-3.453400	
	5% level	-2.871582	
	10% level	-2.572193	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(OP)
Method: Least Squares
Date: 12/04/20 Time: 07:09
Sample (adjusted): 1997M03 2020M08
Included observations: 282 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

OP(-1)	-0.023666	0.011453	-2.066324	0.0397
D(OP(-1))	0.159905	0.058968	2.711706	0.0071
C	1.443707	0.757448	1.906014	0.0577

R-squared	0.036984	Mean dependent var	0.084787
Adjusted R-squared	0.030080	S.D. dependent var	6.254042
S.E. of regression	6.159262	Akaike info criterion	6.484372
Sum squared resid	10584.29	Schwarz criterion	6.523116
Log likelihood	-911.2965	Hannan-Quinn criter.	6.499909
F-statistic	5.357337	Durbin-Watson stat	2.036816
Prob(F-statistic)	0.005211		

The result of unit root test for OP (at level) in table 2.1a indicates that the t-statistic -2.066324 and the p-value is 0.2587.Since p-value is greater than 0.05, the null hypothesis that OP has a unit root was rejected .This implies that OP is not stationary at level.Consequently, the test was repeated with OP at first difference(table 2.1.b).

Table 2.1.b. Unit Root Test for Stationarity for Oil Price (OP) (at First Difference)

Null Hypothesis: D(OP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-14.40261	0.0000
Test critical values:	1% level	-3.453400	
	5% level	-2.871582	
	10% level	-2.572193	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(OP,2)
Method: Least Squares
Date: 12/04/20 Time: 07:10
Sample (adjusted): 1997M03 2020M08
Included observations: 282 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

D(OP(-1))	-0.850886	0.059079	-14.40261	0.0000
C	0.074333	0.368937	0.201480	0.8405

R-squared	0.425565	Mean dependent var	0.014681
Adjusted R-squared	0.423513	S.D. dependent var	8.159340
S.E. of regression	6.195120	Akaike info criterion	6.492468
Sum squared resid	10746.26	Schwarz criterion	6.518297
Log likelihood	-913.4380	Hannan-Quinn criter.	6.502826
F-statistic	207.4352	Durbin-Watson stat	2.029434
Prob(F-statistic)	0.000000		

The result of unit root test for OP at first difference shows that the t-statistic is -14.40261 while the p-valueis 0.0000.Since the p-value is less than 0.05, the null hypothesis that OP has a unit root was rejected in favor of the alternative hypothesis.This implies that OP is stationary at first difference

Table2. 2a: Unit Root Test for Stationarity for Market Value (MVAL) (At level)

Null Hypothesis: MVAL has a unit root
Exogenous: Constant
Lag Length: 4 (Automatic - based on AIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.665037	0.0815
Test critical values:	1% level	-3.453652	
	5% level	-2.871693	
	10% level	-2.572253	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MVAL)
Method: Least Squares
Date: 11/01/20 Time: 23:02
Sample (adjusted): 1997M06 2020M08
Included observations: 279 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MVAL(-1)	-0.137335	0.051532	-2.665037	0.0082
D(MVAL(-1))	-0.596951	0.070425	-8.476465	0.0000
D(MVAL(-2))	-0.403077	0.073385	-5.492650	0.0000
D(MVAL(-3))	-0.364589	0.070327	-5.184221	0.0000
D(MVAL(-4))	-0.212855	0.059040	-3.605284	0.0004
C	6.15E+09	2.75E+09	2.233149	0.0263

R-squared	0.369872	Mean dependent var	1.58E+08
Adjusted R-squared	0.358331	S.D. dependent var	3.68E+10
S.E. of regression	2.94E+10	Akaike info criterion	51.07032
Sum squared resid	2.37E+23	Schwarz criterion	51.14841
Log likelihood	-7118.310	Hannan-Quinn criter.	51.10165
F-statistic	32.04909	Durbin-Watson stat	1.998331
Prob(F-statistic)	0.000000		

The result of unit root test for MVAL at level(table 2.2a) shows that the t-statistic is -2.665037 and the p-value is 0.0815. With the p-value being greater than 0.05, would not reject the null hypothesis that MVAL has a unit root and it is not stationary. Hence, MVAL is not stationary at level. Table 2.2b shows the result of the unit root test at first difference. It indicates that, at first difference, t-statistic is -14.71410
While the p-value is 0.0000. Since the p-value is less than 0.05, we would reject the null hypothesis that MVAL has a unit root and it is not stationary.Therefore, MVAf is stationary at first difference i.e I(1) order integration.

Table 2.2b. Unit Root Test for Stationarity for Market Value (MVAL) (At First Difference Form)

Null Hypothesis: D(MVAL) has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on AIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-F2.uller test statistic		-14.71410	0.0000
Test critical values:	1% level	-3.453652	
	5% level	-2.871693	
	10% level	-2.572253	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(MVAL,2)
Method: Least Squares
Date: 11/01/20 Time: 23:06
Sample (adjusted): 1997M06 2020M08
Included observations: 279 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MVAL(-1))	-2.848173	0.193568	-14.71410	0.0000
D(MVAL(-1),2)	1.144727	0.158529	7.220950	0.0000
D(MVAL(-2),2)	0.662521	0.111582	5.937546	0.0000
D(MVAL(-3),2)	0.242002	0.058660	4.125477	0.0000
C	5.12E+08	1.78E+09	0.287107	0.7742

R-squared	0.779653	Mean dependent var	549165.9
Adjusted R-squared	0.776436	S.D. dependent var	6.30E+10
S.E. of regression	2.98E+10	Akaike info criterion	51.08884
Sum squared resid	2.43E+23	Schwarz criterion	51.15391
Log likelihood	-7121.893	Hannan-Quinn criter.	51.11494
F-statistic	242.3730	Durbin-Watson stat	2.008845
Prob(F-statistic)	0.000000		

4.3 Bound Test

Table .3 presents the result of the bound test.The result indicates that the F-Statistic is 6.303714 With the Critical Value of the lower bound I(0) being 3.1 at 5%,
We had to reject the Null hypothesis that there is no cointegration among the variables, since 6.303714 is greater than critical values of I(0).Hence,there is cointegration among the variables which implies that there is long run relationship between the variables.
:Table3.a Short and long term relationship: bounds test
ARDL Long Run Form and Bounds Test
Dependent Variable: D(LMVAL)
Selected Model: ARDL(4, 0, 2)
Case 2: Restricted Constant and No Trend
Date: 11/11/20 Time: 04:44
Sample: 1997M01 2020M08
Included observations: 280

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	7.414252	1.508159	4.916094	0.0000
LMVAL(-1)*	-0.346542	0.071082	-4.875220	0.0000
LOP_POS**	0.415606	0.111096	3.740968	0.0002
LOP_NEG(-1)	0.329745	0.105371	3.129380	0.0019
D(LMVAL(-1))	-0.361915	0.074853	-4.834997	0.0000
D(LMVAL(-2))	-0.153061	0.072100	-2.122890	0.0347
D(LMVAL(-3))	-0.164662	0.058423	-2.818419	0.0052
D(LOP_NEG)	-0.468131	0.381968	-1.225578	0.2214
D(LOP_NEG(-1))	-0.584901	0.393430	-1.486668	0.1383

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOP_POS	1.199295	0.220737	5.433136	0.0000
LOP_NEG	0.951528	0.252297	3.771465	0.0002
C	21.39495	0.231469	92.43103	0.0000

EC = LMVAL - (1.1993*LOP_POS + 0.9515*LOP_NEG + 21.3949)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	6.303714	10%	2.63	3.35
K	2	5%	3.1	3.87
		2.5%	3.55	4.38
		1%	4.13	5
			Finite Sample: n=80	
Actual Sample Size	280			
		10%	2.713	3.453
		5%	3.235	4.053
		1%	4.358	5.393

Long run asymmetric effect: the response of market value to positive and negative changes of oil price

Testing for Long-Run and Short-run Asymmetries
We had to determine if the difference between the coefficient of the POS and NEG changes is significant. If we should find to be significant, we would conclude that the relationship between MVAL market value and Oil Price LOP is asymmetric.

Long-Run Asymmetric Test using Wald Test

The Wald test result in table 4 shows that both positve and negative changes in LOP have significant impact on MVAL.We had to go further to find out whether the two impacts of the same magnitude (symmetric effect) or are different (asymmetric effect)? Result shows that there is evidence of long run asymmetric (non linear) relationship between market value and oil price since the posittive and negative changes in oil price LOP do not have the same effect on market value MVAL.Hence, there is asymmetric effect.

Table 4:Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
t-statistic	5.766361	273	0.0000
F-statistic	33.25091	(1, 273)	0.0000
Chi-square	33.25091	1	0.0000

Null Hypothesis: -C(3)/C(2)=-C(4)/C(2)
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
-C(3)/C(2) + C(4)/C(2)	0.269289	0.046700

Delta method computed using analytic derivatives.

Table 3.2:Dynamic Estimation of NARDL

Dependent Variable: LMVAL
Method: ARDL
Date: 11/11/20 Time: 04:41
Sample (adjusted): 1997M05 2020M08
Included observations: 280 after adjustments
Maximum dependent lags: 4 (Automatic selection)

Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): LOP_POS LOP_NEG
Fixed regressors: C
Number of models evalulated: 100
Selected Model: ARDL(4, 0, 2)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LMVAL(-1)	0.291542	0.059313	4.915351	0.0000
LMVAL(-2)	0.208855	0.060367	3.459764	0.0006
LMVAL(-3)	-0.011601	0.060184	-0.192758	0.8473
LMVAL(-4)	0.164662	0.058423	2.818419	0.0052
LOP_POS	0.415606	0.111096	3.740968	0.0002
LOP_NEG	-0.468131	0.381968	-1.225578	0.2214
LOP_NEG(-1)	0.212975	0.582838	0.365411	0.7151
LOP_NEG(-2)	0.584901	0.393430	1.486668	0.1383
C	7.414252	1.508159	4.916094	0.0000

R-squared	0.839356	Mean dependent var	23.65597
Adjusted R-squared	0.834614	S.D. dependent var	1.570568
S.E. of regression	0.638714	Akaike info criterion	1.972895
Sum squared resid	110.5560	Schwarz criterion	2.089728
Log likelihood	-267.2053	Hannan-Quinn criter.	2.019757
F-statistic	176.9950	Durbin-Watson stat	2.066826
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

The results at table3.1 show that one unit increase in oil price (LOP_POS) is associated to 1.19929 or (119%) increase in market value. This increase in oil price has a significant effect on the market value since the p-value is 0.0000. The p-value is less than 0.05,. Consequently we had to reject the null hypothesis that there is non- significant effect of oil price increase on market value.In addition, the results in table 3.1 indicate that one unit decrease in oil price (LOP_NEG) is associated to 0.95152 or (95%) decrease in market value. This decrease in oil price does have a significant effect on the market value since the p-value is 0.0002. The p-value is less than 0.05,.As a result, we had to reject the null hypothesis that there is non- significant effect of oil price decrease on market value. i.e. There is a significant effect of oil price decrease on market value.In summary, the results of the NARDL estimation show that oil price movements have positve and significant effct on the market value of the Nigerian capital market. They aso suggest a long run and asymmetric relationship between the two variables.

4.5 Heteroskedasticity Test

Table 4 presents the results of Heteroskedasticity Test.

. It indicates that the p-value is 0.4067. This implies that we accept the null hypothesis which states that residual is homoskedastic.It means that the residual is not heteroskedastic.

Table 4:
4Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.039272	Prob. F(8,271)	0.4067
Obs*R-squared	8.334593	Prob. Chi-Square(8)	0.4015
Scaled explained SS	24.88687	Prob. Chi-Square(8)	0.0016

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/11/20 Time: 06:35
Sample: 1997M05 2020M08
Included observations: 280

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.136274	2.356916	-0.057819	0.9539
LMVAL(-1)	-0.034689	0.092692	-0.374236	0.7085
LMVAL(-2)	-0.024527	0.094340	-0.259983	0.7951
LMVAL(-3)	0.134001	0.094055	1.424721	0.1554
LMVAL(-4)	-0.053023	0.091303	-0.580733	0.5619
LOP_POS	0.235454	0.173618	1.356157	0.1762
LOP_NEG	0.395057	0.596930	0.661815	0.5087
LOP_NEG(-1)	-1.056368	0.910846	-1.159766	0.2472
LOP_NEG(-2)	0.932584	0.614844	1.516781	0.1305

R-squared	0.029766	Mean dependent var	0.394843
Adjusted R-squared	0.001125	S.D. dependent var	0.998729
S.E. of regression	0.998167	Akaike info criterion	2.865823
Sum squared resid	270.0076	Schwarz criterion	2.982656
Log likelihood	-392.2153	Hannan-Quinn criter.	2.912685
F-statistic	1.039272	Durbin-Watson stat	1.772393
Prob(F-statistic)	0.406670		

4.6 Serial Autocorrelation LM Test

This result of this test(table 5) shows that the F-statistic has a p-value of 0.0211.Consequently,we had to reject the null hypothesis which states thatt the residuals exhibit no serial auto correlation.This means that the residual exhibit serial autocorrelation

Table 5:Serial Autocorrelation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	3.915648	Prob. F(2,269)	0.0211
Obs*R-squared	7.920935	Prob. Chi-Square(2)	0.0191

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 11/11/20 Time: 06:37
Sample: 1997M05 2020M08
Included observations: 280
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMVAL(-1)	0.797453	0.291207	2.738443	0.0066
LMVAL(-2)	-0.236250	0.207515	-1.138473	0.2559
LMVAL(-3)	-0.201512	0.105729	-1.905926	0.0577
LMVAL(-4)	-0.017390	0.075794	-0.229443	0.8187
LOP_POS	-0.393821	0.194669	-2.023026	0.0441
LOP_NEG	-0.066166	0.380294	-0.173986	0.8620
LOP_NEG(-1)	0.338330	0.595589	0.568060	0.5705
LOP_NEG(-2)	-0.574338	0.440092	-1.305042	0.1930
C	-7.309215	3.350871	-2.181288	0.0300
RESID(-1)	-0.834275	0.298161	-2.798069	0.0055
RESID(-2)	0.004266	0.195484	0.021822	0.9826

R-squared	0.028289	Mean dependent var	-4.94E-15
Adjusted R-squared	-0.007834	S.D. dependent var	0.629490
S.E. of regression	0.631951	Akaike info criterion	1.958484
Sum squared resid	107.4284	Schwarz criterion	2.101279
Log likelihood	-263.1877	Hannan-Quinn criter.	2.015759
F-statistic	0.783130	Durbin-Watson stat	2.005652
Prob(F-statistic)	0.645091		

4.7 Stability Test

The CUSUM test graph(Fig1) lies within the 5% significance boundary. This implies that the NARDL model is stable

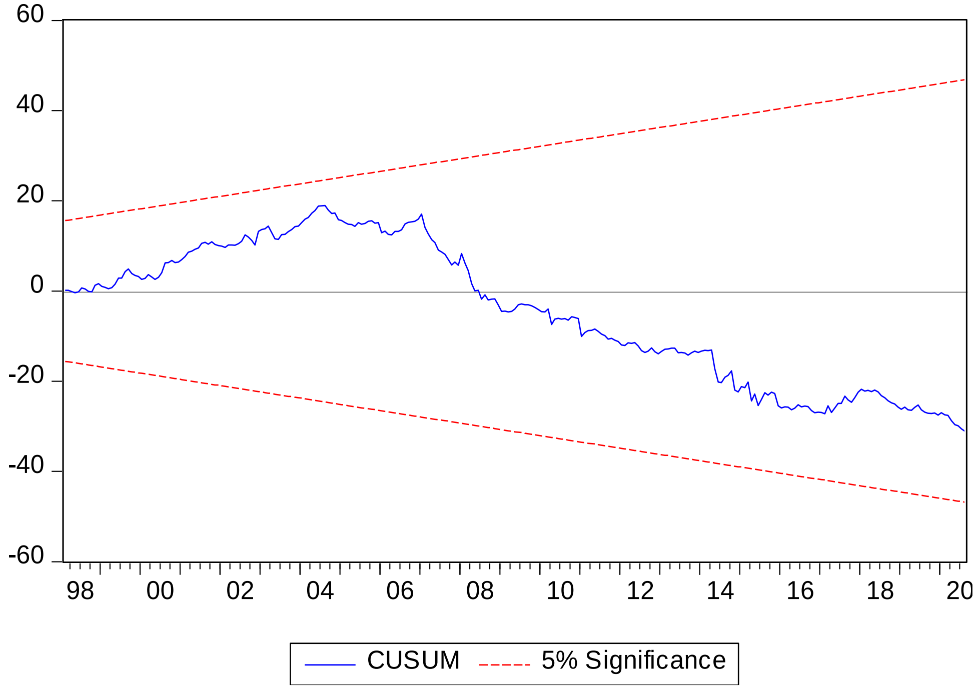

Fig.1: Stalility test

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4..8 Discussion of findings

This study investigated the effect of international oil price movements on the market value of ordinary shares in the Nigerian capital market.It used the Nonlinear autoregressive lag model to capture the possible short-, medium-, and long-term causal effects between the variables of the study as well as the asymmetric nature of their relationship. The NARDL estimation was done after identifying the summary characteristics of the variables and ensuring their stationarity. In addition,some preliminary tests were carried out to establish the serial correlation,find out the status of the data series, the short and lungrun relationship among the variables, the homoeskedasticity or heteroskedasticity of the date series, long run stability and asymmetry of the relationship as well as the suitability of NARDL for analysis. The NARDL equation was estimated with oil price as exogenous variable to trading vollume. . The results of the study show that oil price movements have positve and significant effect on the market value of the Nigerian capital market. They aso suggest a long run and asymmetric relationship between the two variables.These results are in conformity with a priori expectation for an oil exporting country like Nigeria that an increase or decrease in the international oil price should have positive effect on Nigeria;s stock market performance. The results are inline with the findings of several empirical studies that propose a positve relationship between oil price and stock market return such as Alsharif(2020),Agbo and Nwankwo(2020), Asaolu and Ilo (2012) and Akinlo (2014).but disagree with Kelikume and Muritala(2019), Miller and Ratti(2009)that suggest negative connections between the two variables. The disagreement among results could have arisen because the causal effects between oil and stock markets depend heavily on whether research is conducted using aggregate stock market indices, sectorial indices, or firm-level data and whether stock markets operate in net oil-importing or net oil-exporting countries. In addition, conclusions vary depending on whether studies use symmetric or asymmetric changes in the price of oil, or whether they focus on unexpected changes in oil prices(Degiannakis,Filis & Arora,2018).Furthermore, such disagreements of results might have arisen partly because some methods considered only a short-run relationship as against the others which captured long-run associations(Kelikume and Muritala,2019) A policy implications of the findings of this study is that investors should not diversify in both oil and stock markets since that will not create benefits for someone holding the portfolio because the two markets itergrate (Anoruo and Mustafa ,2007)

5. Conclusion and policy implications

This study explored the effect of international oil price movements on the market value of ordinary shares in the Nigerian capital market using monthly frequency data that cover the period from January,1997 to August 2020. It used the non-linear autoregressive distributed lag methodology for data analysis The results of the the empirical analysis show that oil price movements have positve and significant effect on the market value of the Nigerian capital market. They aso suggest a long run and asymmetric relationship between the two variables.Our study has important implications. Since oil price shocks have a significant impact on the BIST returns, policymakers need to build an effective regulatory framework to monitor oil price fluctuations. In this respect, modern commodity price risk management tools could be helpful. The results are also valuable for a potential stakeholder such as a global investor in an emerging market who can benefit from the short-term oil price movements, yet those type of capital flows might be speculative and in the long-term negative for the emerging country.

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