



# **A CAUSAL EVALUATION OF THE INTERACTIONS AMONG CRUDE OIL PRICE, FOREIGN PORTFOLIO INVESTMENT AND CAPITAL MARKET PERFORMANCE IN NIGERIA**

**Nnenna Victoria Ohiaeri**

University of Lagos, Nigeria

nnenna\_ohiaeri1960@yahoo.com, nohiaeri@unilag.edu.ng

## **Abstract**

*The study examines causal interactions amongst foreign portfolio investment, oil price movement and capital market performance in Nigeria to ascertain the impact of crude oil price changes on foreign portfolio investment inflow through the Nigerian capital market. The study adopts ex post facto and descriptive research design using secondary annual time series data sourced from various federal government regulatory agencies including CBN statistical bulletin and world bank development database between 1970 and 2016. Vector auto-regression, granger causality and multi-regression econometric techniques are respectively applied in assessing time series data suitability for econometric analysis and findings revealed a uni-direction long run granger causality existing between foreign portfolio investment and capital market performance, between crude oil price and foreign portfolio investment respectively, significant at 10% significance level with no granger causality existing between capital market performance and crude oil price. The result partially aligns with some findings of previous literature and consequently recommends active participation of Nigeria in global oil market pricing decisions, review of foreign investment incentives and improved conditions for capital gain and profit repatriation to enhance flow of foreign portfolio investment channeled capital inflow to Nigerian economy.*

**Keywords:** Oil price, Foreign Portfolio Investment, Interaction, Equity Market, Nigeria



## INTRODUCTION

The scourge of inherited wealth and its macroeconomic impact on the economies have continued to take a center stage in most economic discourse of emerging countries as they keep grappling with dwindling economies in the mix of abundant natural resources.

According to Samuelson (2000), natural resources endowed nations have some obvious guaranteed privileges in terms of flow of exportable of tradable commodities with high revenue potentials at their disposal and these potential are clearly revealed from four key growth variables drivers which include natural resources, human resources ,capital formation and technology.

World trade report (2010), described natural resources as stocks of materials that exist in the natural environment which are both scarce and economically useful in production and consumption in their raw state or after a minimal processing. Studies over the years have argued that if the beneficial impacts of natural resources boom could be linked to the economic growth countries like Australia, Russia, Canada, China , Saudi Arabia and Botswana then Nigerian case couldn't have been different.

Hence, in Nigeria, significant levels of progress have been achieved in socio-economic terms over the past decades due to effect of natural resources boom. The natural resource boom from petroleum sector has provided the pivot that drove the economy in terms of its employment generation, foreign exchange earnings, government revenue, domestic savings industrialization and subsequent rise in gross domestic product.

Okonjo-Iweala (2012) noted that from 1970 to 2001, Nigeria earned more than US\$300 billion from crude oil and also borrowed abroad unwisely and unsustainable sum of US\$30 billion in debt from Paris Club of creditors. According to her, the great portion of these oil revenue and foreign loans were invested in the much needed infrastructure "White Elephant Project - WEP", that yielded no return to government purse while a significant part of the resources disappeared into hands of some top public and government officials.

It is however important to note that despite the natural resource oil wealth abundance and improved economic growth experienced during the oil boom eras of the 1970s and 1980s, Nigerian's economic woes have unabatedly been mounting with massive developmental challenges as a result of over dependency on one source of wealth ; the crude oil wealth at the expense of many other revenue sources. Income inequality gap and rising poverty level currently put at about 70% as at 2017 coupled with insecurity and inadequate infrastructural base all continue to pose serious threat to the sustainability of the capital market segment of the financial sector in Nigeria. It is also expected that with increased exposure to global oil market over the years, coupled with the increasing foreign exchange inflow into Nigerian

economy, the nation ought to have been well positioned as a better investment hub for foreign portfolio investors in the continent. Increased exposure to global oil market has tendency to drive the capital market buoyancy as well as foreign portfolio investment due to the financial intermediation roles of the capital market platform where these foreign portfolio investors operate.

The capital market provides the channels through which listed firms access long term funds for business expansion to boost industrial production in the economy. Ajaegbu (2008) ,notes that lack of accessible business funds through the stock market , can frustrate industrial production and expansion as firms are compelled to operate below installed capacity and it is . This consequently results in staff retrenchment which could results to high poverty level and income inequality gap that could cumulatively degenerate to adverse economic growth and development. The relative advantage of foreign capital investment as productivity enhancing package through the capital markets is now widely acknowledged in literature . Nigeria's crude oil pricing as a natural resource is presumed to be a factor and a key driving force behind foreign portfolio investors' appetite in Nigerian capital market. Alfaroa et al (2004) however opined that countries with well-developed financial market gain significantly from foreign based investment capital through its contribution to their economic growth level. According to Fosu and magnus (2006), foreign capital investment can stimulate local investment by increasing domestic savings through linked production chain. Hence, Dauda (2007) describes foreign investment as gross domestic product and real income generating avenue for host countries as it facilitates employment growth and increase in tax revenue . The adverse implication of natural resources based foreign capital and capital market performances as appraised by Hamilton (1983) revealed that seven out of eight post war recessions in the United State of America have been preceded by a dramatic rise in crude oil price. Ragof (2006) also found in his mainstream empirical evaluation of economies in 2003 and 2005 that oil price bubble cumulatively reduced the countries' output level by 1.5% .

### **Statement of Problem**

The scourge of crude oil pricing and coupled with poor perception of the key roles of the capital market in sustaining the tempo of foreign based capital have been underestimated in the Nigeria. Sustainability of foreign based capital through the foreign portfolio investment in Nigeria demands capital market vibrancy to attract and retain the funds from foreign investor particularly during the "oil doom and boom periods". Experts suspect that stock price movements resulting in stock market performance could be a function of positive or negative impact of global crude oil pricing decisions. Consequently, there is huge uncertainties in continued reliance on

international crude oil market pricing policy to grow Nigerian's foreign based capital without an inclusive economic diversification packages. It is against this backdrop that the issue of diversifying the economy has continued to generate heated debate among various Nigerian governments including economic and finance experts. This explains the reasoning behind the financial market developmental strategies. Experts are however of the opinion that a holistic and inclusive economic growth can only be sustained with the existence of private sector participation which could be driven by the influx of foreign portfolio investors to the Nigerian capital market. It is expected that capital formation that is channeled into productive investment through foreign investors would lead to income and value accruing to consumers directly or indirectly. Hence the role of foreign portfolio investors in growing Nigerian economy through the Nigerian capital market cannot be over emphasized as it enhances private sector participation in Nigerian economy. It is against this backdrop that the need to explore the flow of interaction among capital market performance, crude oil pricing and foreign portfolio investment becomes necessary. Instructively however, despite the relevance of the subject matter of this study to economic growth strategy sustainability, previous works in this area have ignored instability of crude oil pricing and foreign portfolio investment impact on Nigerian capital market performance thereby creating a perceived gap in this area of study. Above all, this study seeks to bridge the perceived gap in data sampling range and scope evident in previous studies by extensively adopting a wider study scope and data sampling range for stronger and more robust investigation.

### **Objectives of the Study**

Basically the study aims at broadly appraising the interactions and directions of shocks among crude oil pricing, foreign portfolio investment and capital market performance focus variables in the Nigerian economic system by specifically:

1. examining the relationship existing between oil price movement and stock market capitalisation in Nigeria
2. appraising the relationship between foreign portfolio investment and oil price changes in Nigeria
3. ascertaining the causality flow amongst the foreign portfolio investment, stock market capitalisation and oil price movements in Nigeria.

Based on the afore stated objectives the study therefore seeks to proffer solutions to the following research questions:

- To what extent does oil price impact on gross domestic product ?
- What is the nature of connection between market capitalization and oil price movement ?

• What is the direction of causality among crude oil price , foreign portfolio investment and stock market performance in Nigeria?

Sequel to the above research questions, the following research hypotheses are hereby formulated and subsequently tested:

- H0 : Oil price has no significant link with the stock market capitalization in Nigerian stock exchange
- H0: There is no significant relationship between market capitalization and foreign portfolio investment.
- H0 : Oil price does not granger cause foreign portfolio investment in Nigeria .portfolio investment in Nigeria.

### **Significance of the Study**

The benefits of exporting to developing countries appear significant in light of growing tendencies towards protectionism by the developed countries at a period when developing countries are opening up their market under International Monetary Fund (IMF) and the World bank (WB) pressures. Payment arrangements are becoming increasingly liberalized in these countries and the non-tariff barriers (NTBs) erected in the 1960s and 1970s are coming down.

## **LITERATURE REVIEW**

### **Theoretical Framework**

Global economic factors have been identified in the literature as key drivers of foreign capital flows including foreign portfolio investment. Their volatility direction of flows still remain contentious particularly to the developing economies. Generally the major drivers of capital inflows in the literature have identified to include the GDP growth rate , countries per capita income , domestic inflation rate (INF), trade openness (OPNX) which measure as the ratio import plus export to real GDP), domestic interest rate (INTR) as well as stock market capitalization (MCAP) and its index returns respectively. In this study other variables representing international trade transmission channels like crude oil market prices as well as regional factors considered as among the factors driving capital flow in Nigeria which are based on the foregoing theories.

**Transaction Cost Theory:** This theory is used to explain refers to corporate governance component that addresses the tendency for cost to arise when someone else is engaged to render service .in this situation an institution that facilitates low transaction can boost economic growth. According to Kim (1999) financial market globalization effect on capital flow entails

mainstreaming transaction cost model as an important factor affecting international capital flows. Compared with the other flow model, the transaction cost model holds that the international capital flows are not only influenced by the interest rate differentials at home and abroad, but also restricted by the transaction cost of domestic and foreign investment markets respectively.

**The Monetary Analysis Theory:** Harry ((1972) postulated the Monetary Analysis theory to explain international capital flows, as well as changes in national reserves by addressing the external and internal components of capital flows to include money demand and supply dependency syndrome of the financial market which are essentially a monetary phenomenon and determined by domestic monetary policies and changes in the reserves that could generate favourable or unfavourable ground for foreign capital influx into an economy.

**Portfolio Diversification Theory:** On the basis of the portfolio theory, Branson (1968) analyzed international capital flows and believed that short-term capital flows are determined by imports, exports, interest rates and exchange rates, while long-term capital flows are determined by domestic income, interest rates and foreign interest rates. He also took these factors into the Markowitz Tobin model of investment diversification and concluded that the ratio of foreign assets to a given wealth is a function of domestic interest rate, foreign interest rate, risk and the stock of wealth.

**Economic Transmission Channel Theory:** Another important explanation of the nexus between oil price movement and economic and market performance as investigated by b Basher and Sanorsky (2016) through his two major economic transmission mechanism channels. The theory identified two major cash flow outlets as microeconomic and macroeconomic channels through which production process costs and revenue generation can be actualized. On the basis of the channels, oil price movement can influence economic activities as an input material that raise production cost incurred. The high or low production costs traceable to oil price input could affect domestic consumer goods price as well as their purchasing power of the citizenry which ultimately results to increased earnings for quoted companies and reduced average propensity to consume generally but stock market investors benefit from the increase dividend attributable to them due to the stock market boost in the stock market. On the macroeconomic channels, the increased corporate earnings then translate to increased market index return acting as. The enhanced market return acting as push or pull foreign investors' triggers for a long run economic boost spring board.

## Conceptual Framework

The study addresses the interactions subsisting among crude oil price capital market performance and foreign capital flow represented by foreign portfolio investment. It seeks to proffer answer to the question whether crude oil price movement could adversely or positively affect the activities of foreign investors and the capital market in one hand and national economic growth on the other hand. Previous authors have shown growing concern on this area isolating crude oil price changes as a key driver of consumer domestic food prices as well as capital market activities due to the benefit of low cost production available to firms during crude oil boom periods. It is assumed that global crude oil price changes could generate both positive and negative reactions in the prices of goods and services at the domestic market level which could translate to improved quoted firms earnings in the capital market. With the improved corporate earnings, market players including local and foreign investors are attracted to the capital market to take advantage of increased corporate earnings and returns as offered by the quoted firms in the stock. Consequently, improved corporate earnings has the tendency to boost capital market performance which in turn could have multiplier effect on the economy in general.

Studies have also confirmed that an enhanced market performance could significantly impact on the overall gross domestic product of nation in a larger perspective (Onyeukwu 2008). According to Bishop, Kent and Rayner, (2012) crude oil price changes in Australia have been linked to the boost in exchange rate, efficient reallocation of factors of production in Australian industrial sector. In their view, rising crude oil price is a key contributor to the relative smooth adjustment of the macroeconomic variables witnessed in the flexible exchange rate and inflation which timely acted as mechanism for facilitating the reallocation of labour and capital across industries generally. They concluded that during rising oil price seasons, inflation could be well anchored to ensure greater flexibility in the labour market capacity building and improved terms of trade in general.

Improved terms of trade could impact positively on local currency, domestic prices, corporate earnings improved consumers' purchasing power.

Conceptually, the impact transmission mechanism could be illustrated in a flow chart fashion depicting the connectivity among these focus variables as indicated in the figure 1.

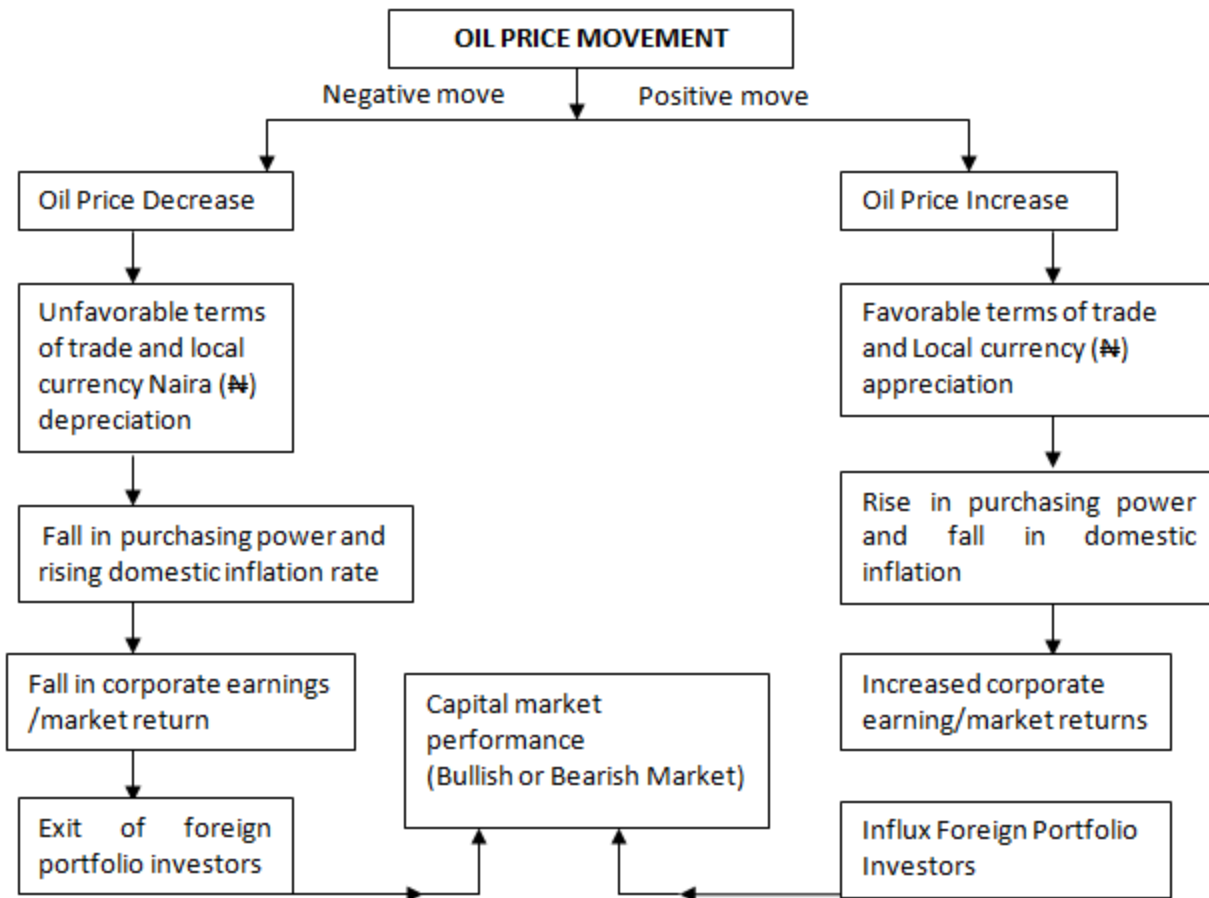


Figure 1. Conceptual framework of flow of interactions among oil price foreign portfolio investment and capital market performance in Nigeria

**Empirical Framework**

The crude oil price instability, capital market performance foreign portfolio investment have presented contentious challenges and debates in literature globally though with negligible emphasis on Nigeria. However a number of the extant literature have addressed the linkage between oil price shocks and stock returns with its multiplier impact on macroeconomic variables respectively ignoring the aspect connecting foreign portfolio investment implications of oil price movement as driven by capital market activities in Nigeria. This study therefore aptly presents a good and the unique forum for an instructive and expository study to bridge this gap.

The nexus of oil price instability and economic performance as captured by the United States energy performance reports in 2004, revealed some empirical supports for the energy sector higher roles in the equity market than in the actual economy. It was discovered that, although energy industry’s contribution to U.S.A gross domestic product in 2014 averaged at



1.4%, its stock market index performance, the S&P 500 index was higher at 6.5% same period. Therefore, indicating that the decline in energy stocks' price has a bigger impact on the stock market than on the underlying economy.

Recent empirical research has found evidence of a relationship between oil price movements and stock prices (Sadorsky, 2008). For instance, findings by Aloui and Jammazi (2009) show that rises in oil price play a significant role in determining both the volatility of stock returns and the probability of transition across regimes. According to Aloui and Jammazi (2009), if crude oil is a decisive determinant of economic growth, then increases in crude oil market prices will be significantly linked to the firm's expected earnings and consequently their stock price levels.

Joseph, Dan and Chandra (2015) corroborated this in his conclusion that because modern industries rely heavily on transportation to deliver raw materials to factories and to deliver finished products to customers, price of oil should have significant effect on the end price of virtually every physical products. This is possible due to door to door distribution of goods and services but the effect of price changes has a somewhat self-correcting mechanism from the point of view of the total economy.

Basher( 2004) in their analysis of how the crude oil price affects stock market found that in the case of the U.S.A that all sectors are not affected equally, or at the same time. They found that when oil price effect on cyclical stocks are the more negatively influenced than cyclical consumer goods and financial sector respectively .

Ono (2011) evaluated the impact of crude oil price on stock returns of Brazil, Russia India and China stock exchanges and found that stock returns responded positively higher to shocks in crude oil price in Russia, China and India than in Brazil with insignificant response revealed for Brazil crude oil price changes.

Yurtserver and Zahor(2007) studied the impact of oil price shocks on the stock returns in Netherlands. They found that oil shocks have a negative impact on stock returns of some industries and individual companies, whereas they have positive impact on oil and gas companies.

Chen (2008) investigated the impact of crude oil price in individual industrial firms and found that the electronic and rubber subsectors are highly correlated with oil price.

Mohamed El Hedi Arouri and Duc Khuong Nguyen (2008) oil price and stock market relationship in Europe over past decade from sector perspectives using weekly data running between Nov 2008 and Dec 2009 and found that the effect of the oil price shocks depends on sectoral activity level.

Ayadi ,Chaltere and Obi (2000) evaluated the effect of oil product shocks in Nigeria using VAR process over 1975 and 1992 period and discovered that the response of exchange rate to oil production shocks was positive.

Ayadi (2005) further extended the study from 1980 to 2004 to include during the banking sector consolidation period and also found that output, inflation and exchange rate respectively responded sluggishly to oil price shocks in Nigeria

Erygit (2009) investigated the effects of oil price changes on the sector indices of Istanbul Stock Exchange (ISE). He extended the market model by incorporating oil prices (in Turkish Lira), oil prices in dollars, and the Exchange rate between the dollar and the Turkish Lira to determine the effects of oil price changes on the sectoral indices. He found that while increase in oil price (Us dollar or lira) leads to growth in some sector indices, it causes a decline in others.

According to Bashar and Sadorsky (2006), extension of the law of demand and supply to oil price movements can generate increase and decrease in prices of stock market securities such that excess demand for oil leads to stock price rise while the reverse will create indirect effect on the stock price increases in the cost of non-oil producing companies' oil price volatility increases risk and uncertainty which negatively affect the stock price and reduces wealth and investment.

According to Ukwani (2011) the impact of falling oil prices on the stock market differs from countries to countries depending on the country's position in the market. For an oil supplier like Nigeria, the global oil price be used to improve international trade balance translating to positive balance of payment for the country as well improving the nation reserve. He therefore concluded that increased national reserve could result to increase in disposable income including corporate profitability which will subsequently buoy the domestic demand and investment in goods and services in the long run. But Abdulazeez et al (2008) and Ayadi (2005) on the other hand held that the trend for an oil importing economy as trade deficits are offset by sluggish economic growth and bearish stock market trend over time thereby resulting in economic distortions. Similarly, Ramos and Vega(2010) examined the asymmetrical effect of oil price fluctuation in international equity market and discovered that rise in oil prices spike depression in international stock market while a drop has no impact on the stock market.

Sumoye et al. (2009) carried out a study to find the determinants of share prices using five variables (earning per share, dividend per share, GDP, lending interest rate and foreign exchange rate). They analyzed using a total of 12 companies with a seven years data (2001-2007). Using a linear regression, they concluded that the forces of demand and supply had direct effect on stock price. They also discovered that the effect of the other factors (negative or

positive) was not static. For instance, lending interest rate effect could be positive or negative depending on the aim of the central Bank Nigeria (CBN) in deploying it as one of the tools for implementing monetary policy.

Smoye and Ilo (2008) examined the impact of oil price on Nigerian stock market performance and economic variables from 1985 to 2005 using a co integration analysis.

The study however, concluded that among the variables examined in the VAR model the price of the Nigerian crude oil, exchange rate and the rate of inflation are the most significant macroeconomic variables influencing the aggregate stock market returns in Nigeria.

Asaolu and Ilo (2012) investigated the relationship between Nigerian stock returns and crude oil price using co-integration and vector autoregression approaches between 1984 and 2007 and found that Nigerian stock market returns and oil prices move in tandem with oil price trend particularly in the long run.

Ojukutu, Onolemhem and Isehunwa (2017) evaluated crude oil price volatility and its impact on Nigerian stock market performance using ordinary least square estimates of time series data between 1985 and 2014 and found that fluctuation in oil price in Nigeria does not necessarily affect stock market performance.

Buthaina and Al-Assaf (2017) evaluated oil price fluctuations and its impact on Jordanian stock market returns using Asymmetrical cointegration and error correction models and found that oil price variations has significant effect on stock market behavior in Jordan.

But Fisher (2005) in his study of investment analysis argued that there is no credible cause and-effect relationship between oil and stocks, and so investors should buy good stocks and hold them irrespective of what he calls investor sentiment as measured by the investors intelligence data.

## **METHODOLOGY**

### **The study and the data**

The study relied on annual macroeconomic time series data between the periods 1970 to 2016. Selection of this time range is informed by the perceived scope gap in revealed in previous studies in this areas of study due to poor database accessibility.

However, this study scope and sample size adopted cover both the oil boom and oil glut eras respectively between 1970 and 2016. Information on foreign portfolio investment, oil price movement and capital market performance indicators including macroeconomic variables were sourced from various reports and publications of Central Bank of Nigeria Statistical Bulletins, Nigerian Stock Exchange, National Bureau for Statistics Security, Exchange Commission, IMF,

World Bank development indicators database of various issues, some Local and International Journals. Data on foreign portfolio investment (FPI) was a prorated figure of foreign direct investment for the period 1970 -1980 and averagely consisted money market lending as applied in (Mkpakan 2004) and as instructed by the balance of payment department of central bank of Nigeria. This is justified by the fact that most of foreign capital inflows within those periods were generally lumped together under foreign direct investment making it difficult to uniquely isolate the figures for foreign portfolio investment separately. Hence this study has gone beyond the period 1980 when the figures for FDI and FPI were fully reported to ascertain the actual figures for foreign portfolio investment by relying on balance of payment department of central bank of Nigeria in-house report.

**Model specification and estimation techniques**

***Relationship between oil price movement and stock market performance***

Multi-regression analysis as well as vector auto regression methods are respectively used to model the linkage between oil price and stock market performance, stock market capitalization (mcy) and global crude price (op) are proxies for capital market performance indicators and oil prices which are respectively indirectly affected by other macroeconomic indicators such as the gross domestic product, inflation rate trade openness interest rate respectively

$$MCY = f(fpi, op, int, inf, top, gdp) \dots\dots\dots 1$$

$$mcy = \alpha_t + \alpha \log op_t + \alpha \log inf_t + \alpha \log int_t + \alpha \log top_t + \alpha \log gdp_t + e_t \dots\dots\dots 2$$

***The Relationship between foreign portfolio investment and oil price***

The interaction of foreign portfolio investment with oil price movement is modeled such that , the foreign portfolio investment (fpi) stands as the dependent variable while oil price fluctuation and some macroeconomic indicators are used as the control variables as indicated below. This is because of the need to capture the indirect impact of these factors on the economy.

$$FPI = f(op, mcy, inf, int, top, gdp) \dots\dots\dots 3$$

Transforming equation five into its intensive form, we have

$$fpi_t = \partial_t + \partial \log mcy \partial \log inf_t + \partial \log int_t + \partial \log top_t + \partial \log gdp_t + \partial \log op_t + e_t \dots\dots\dots 4$$

### **Causality among oil price , foreign portfolio investment and capital market**

Vector Autoregressive approach is used to model the direction of flow of shocks among the variables based on the condition of their stationary i.e. if they are integrated of order I(0) or I(1). If order I(1), is revealed by the Unit root test , Johansen's procedure will be used to determine whether any co-integration vector among variables exists or not then the forecast vector error correction model is considered appropriate here to investigate the interrelationship and granger causality thus the vector auto-regression model is estimated as follows;

$$\Delta 1mcy_t = \beta_0 + \sum_{i=1}^k \beta_1 \Delta 1mcy_{t-i} + \sum_{i=1}^k \beta_2 \Delta 1fpi_{t-i} + \sum_{i=1}^k \beta_3 \Delta 1op_{t-i} + \beta_4 ECM_{2t-1} \dots \dots 5$$

$$\Delta 1fpi_t = \alpha_0 + \sum_{i=1}^k \alpha_1 \Delta 1fpi_{t-i} + \sum_{i=1}^k \alpha_2 \Delta 1mcy_{t-i} + \sum_{i=1}^k \alpha_3 \Delta 1op_{t-i} + \alpha_4 ECM_{1t-1} \dots \dots 6$$

$$\Delta 1opi_t = \delta_0 + \sum_{i=1}^k \delta_1 \Delta 1op_{t-i} + \sum_{i=1}^k \delta_2 \Delta 1fpi_{t-i} + \sum_{i=1}^k \delta_3 \Delta 1mcy_{t-i} + \delta_4 ECM_{3t-1} \dots \dots 7$$

#### **Definition of the variables in the model**

**Oil price (OP):** Real oil price data are used are the annual average crude oil price in Nigeria valued in US dollars per barrel. This is necessary because as a major export commodity in Nigeria, crude oil transactions are perfected on global oil market in foreign currencies such as dollars. Hence the study based its evaluation on annual average price of crude oil in US dollars per barrel as declared by the central bank of Nigeria for the period under consideration.

**Economic growth (GDP):** The real GDP is proxy measure of economic growth and it measures the value of goods and services generated by the citizens residing at home and abroad as disclosed by the CBN statistical bulletin

**Foreign portfolio investment (FPI):** This variable is included so as to capture net inflows of foreign portfolio investments (equity and bonds instruments) through the Nigerian capital market. The figure excludes all the over the counter transactions occurring in the Nigerian financial market in equity and bond.

**Market capitalization (MCY):** This is a proxy for capital market performance indicator. It captures total outstanding shares of the listed equities multiplied by their relevant daily market price. A bullish market will reflect an increase in the market capitalization.

Parameters  $\Delta$ ,  $\alpha$  and  $\delta$  are used to measure the magnitude of responses and changes generated among the series examined.

## ANALYSIS AND RESULT

### Descriptive Statistical Test Result

The descriptive statistics of the data series provide information about the series in terms of the mean, median, minimum and maximum values; and the normalization of data distribution of the sample measured by the skewness, kurtosis and the Jaque-Bera statistics.

The table captures the result this test and reveals that the values of mean and median are very close aligning with the position of Karmel and Polasek (1980) which holds that when a distribution is perfectly symmetrical, the mean, median and mode must converge; and in the cases of near symmetry, the three measures are necessarily very close..

Skewness, Kurtosis and the Jarque –Berare results test provide useful information about the symmetrical nature of the probability distribution of various data series as well as the thickness of the tails of these distributions respectively. .

The test result suggests that all annual data series, except the seasonally generated ones, are normally distributed thereby rejecting the null hypotheses of absence of normality going by the

Table 1: Descriptive statistics of annual time Series (1970-2017)

	logMC	logFPI	logOp	LogXR	logINT	logINF	Loggdp
Mean	2.708	7.330	7.58	2.433	2.6888	2.5789	13.309
Median	2.538	7.085	7.49	2.979	2.827	2.4849	13.185
Maximum	9.856	13.582	10.590	5.13	3.3945	4.2877	18.374
Minimum	-6.1658	3.2280	6.249	-0.59	1.7917	0.5007	8.571
Std. Dev.	4.288	3.4456	1.1752	2.347	0.3709	0.8409	2.9317
Skewness	-0.099	0.305	-0.212	-0.152	-0.248	-0.3488	0.0555
Kurtosis	2.0963	1.5515	2.205	1.3126	2.1828		1.6195
Jarqu-Bera	1.426	4.1191	1.32001	4.776	1.722	0.10728	3.596
Prob	0.489	0.127	0.516	0.0917	0.422	0.0009	.150513
Sum	148.23	309	343.18	94.9	120.99	116.05	19.5226
Sum Sq. Dev.	697.3	463.09	52.48	209.4	6.056	31.116	154.213
Obs.	47	47	47	47	47	47	47

### Unit Root Test Result

Table 2 below presents the results of unit root tests results disclosed by Augmented Dickey Fuller test.

Table 2: Result of Unit root Test: Augmented Dickey Fuller Test

Series	Level	First Diff	Remark
<i>Log(mcp)</i>	-0.20	-5.02	I(1)
<i>Fpi</i>	0.16	-3.11	I(1)
<i>logop</i>	-0.26	-9.83	I(1)
<i>Int</i>	-1.69	-10.51	I(1)
<i>Inf</i>	-3.59	-2.96	I(0)
<i>Exr</i>	0.57	-5.97	I(1)
<i>Log(gdp)</i>	0.16	-5.088	1(1)

### Co-Integration Test Result

The outcome of the unit root test aimed at ascertaining the stationarity of the study data or otherwise calls for the co-integration tests to determine the variables that have equilibrium conditions either in the short or long run with possibility of convergence if co-integration among the variables is established by applying the maximum likelihood approach as used in (Johansen and Julius 1990).

Table 3: Co-integration Test (Trace Value)

Hypothesized	0.05			
No. of CE(s)	Eigen value	Trace Statistic	Critical Value	Prob.**
None *	0.540061	35.0272	29.79707	0.0114
At most 1	0.318846	12.504	15.49471	0.1343
At most 2	0.046109	1.368967	3.841466	0.242

Table 4: Co-integration Test (Max –Eigenvalue)

Hypothesized	0.05			
No. of CE(s)	Eigenvalue	Max-Eigen Statistic	Critical Value	Prob.**
None *	0.530021	22.4322	21.13162	0.0305
At most 1	0.317646	11.13503	13.2646	0.1153
At most 2	0.046100	1.268967	3.84147	0.324

Trace and Max –Eigenvalue indicates 1 co-integrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\* MacKinnon-Haug-Michelis (1999)

The results of the co-integration affirms that at least one co-integration relationship among the macro-economic variables included in the model. Specifically, the result of the co-integration

test suggests that capital market performance , has equilibrium condition with foreign portfolio investment at 5% level of significance, which keeps them in proportion to each other in the long run. This evidence of co-integration among the variables rules out spurious correlations and implies that a direction of influence can be established among the variables.

Table 5: Multi Regression Results

SERIES	R-SQUARE	F-STAT	P- VALUE	DB.WATSON
<i>FPI</i>	76 %	20.4952	0.00000	2.28423
<i>OLP</i>	44%	4.0944	0.0000	2.13023
<i>MCAP</i>	85%	30.899	0.0000	1.668

Summary of the result of multi-regression tests to ascertain the relationship among the focused variables and macroeconomic factors disclosed that the independent variables in models could explain 76% of changes in foreign portfolio investment in Nigeria while 24% are accounted for by other factors not included in the model. Similarly 44% and 85% of changes in oil price and market capitalization in Nigeria are driven by the macroeconomic factors while the 56% and 15% respectively are accounted for by both global and other factors not in the model .

Table 6: Granger Causality Test Result

$\alpha_1 = \alpha_2 = 0$	$\chi^2$	<i>p</i> – value	Remark
<i>mcy</i> → <i>fpi</i>	16.8600	0.016*	Causality
<i>fpi</i> → <i>mcy</i>	2.0900	0.148	No Causality
<i>mcy</i> → <i>OP</i>	2.2830	0.130	No Causality
<i>OP</i> → <i>mcy</i>	2.24344	0.1193	No Causality
<i>fpi</i> → <i>OP</i>	0.1333	0.716	No Causality
<i>Op</i> → <i>fpi</i>	3.057	0.0800**	Causality

Summary of the granger causality test result indicates no directional causality between oil price and market capitalisation in one hand, a unidirectional granger causality existing between foreign portfolio investment and oil price flowing from oil price to foreign portfolio investment on the other hand at 10% significant level. The result also revealed a unidirectional flow of causality from market capitalisation to foreign portfolio investment as shown on table 6 above significant at 10% level of significance .



In the case of shocks flowing between foreign portfolio investment and oil price, the test results reveal a unidirectional flow running from oil price to foreign portfolio investment in the long run significant at 10 per cent level of significance.

## SUMMARY OF FINDINGS

In a bid to unravel the interrelationship among the variables under investigation, the study adopted descriptive statistical test, unit root tests, co-integration multi-regression and vector auto-regression and granger causality tests respectively to address each of the research objectives and questions respectively.

The outcome of the multiregression test to validate the existence of relationship among the focus variables; foreign portfolio investment, oil price and market capitalization respectively existence of high and positive R-square of 76% and 85% respectively for crude oil prices and capital market performance while foreign portfolio investment reveal positive but lower R-Sq of 44% indicating a collective effect of each OLS model test for relationship existing among the focused variables. This result further revealed that some other macroeconomic factors other than the ones captured by the OLS model could also influence changes in crude oil price in Nigeria. Most important is the fact that crude oil price changes is mostly driven by global oil market policy decisions and regulations that control the supply of the product available to the global commodity market. The lower R-square disclosed for foreign portfolio investment in Nigeria further confirms the fact that Nigeria's dependency on crude oil revenue at the expense of other foreign revenue sources coupled with her macroeconomic variables' performance in do not drive foreign portfolio investment in Nigeria thus signaling critical revision of economic policy that could address the imbalance. On the other hand, the result further confirms that policies that could move foreign portfolio investment and capital market performance in Nigeria could be both endogenously and exogenously driven; such policy changes that could trigger a bullish trend in the capital market both in short and long runs.

The result of the granger causality test that reveal a unidirectional causality flowing from crude oil price to foreign portfolio investment in one hand and from market capitalisation on the other hand is indicative of the conceptual framework flowchart earlier captured in this study. Shocks from crude oil price and market capitalisation, individually can influence the flow of foreign investment in various magnitude based on the country's position as either crude oil importer or exporter. Consequently, Nigeria being a crude oil exporter stands to benefit from a positive movement in the price of crude oil which could translate to increase in her national reserve as a result to favorable terms of trade and appreciation of its local currency among other benefits. Similarly, an improved foreign reserve boost the gross domestic product which is

adjudged to be a long run key driver capital market performance and foreign portfolio investment in most economies. Hence it is recommended that government economic policy designers as well as capital market regulators respectively need to closely monitor likely global crude oil market (OPEC) policy impact on foreign portfolio investment and capital market performance respectively since such policies have the tendencies to trigger multiplier effect on the foreign portfolio investment, capital market performance and economic conditions in general .

## CONCLUSION

This paper sought to throw more light on the connectivity of the crude oil price movement with foreign portfolio investment and capital market performance in Nigeria using the vector auto regression models and Granger causality tests respectively .

The study has been able to establish the fact that Nigerian crude oil price changes is not endogenously driven as domestic factors accounted for 44% of the oil price changes while 56% was accounted for by exogenous variables such as global oil market policies. The study also found that domestic resources, business environment and macroeconomic factors are all fundamental to the growth of the foreign portfolio investment and domestic capital market performance as 76% and 85% of the performance of the stock market and inflow of foreign portfolio investment are respectively accounted for by macro and microeconomic activities.

The study corroborates the conceptual flowchart on the connectivity of capital market performance , foreign capital flow with oil price changes in the economy. This further affirms level the foreign portfolio investment can significantly be driven by long run economic growth as measured by stock market capitalization gross domestic product and even movement in crude oil revenue base respectively.

The outcome of our investigation revealed a uni-direction long run granger causality flow between foreign portfolio investment and capital market performance at 10% significance level under the V A R framework. However, a complete absence of direction of flow of impact was revealed in the case of capital market performance and crude oil price awhile revealing a unidirectional causality between oil price and foreign portfolio investment in Nigeria. Thus aligning with the findings of previous works thereby corroborating the fact that the benefits of foreign portfolio investment could generate long-term effects superseding short run adverse impacts in the economy. It also implies that long-term gains of foreign portfolio investment can outweigh its short-term ill effects as it generates real growth and development in the domestic financial markets and the economy in general. The study also reveals the existence of interrelationship among the macroeconomic variables used in the model to address the study objectives. Hence the study concluded that stable crude oil prices, exchange rate policies as

well as all the fiscal and monetary policies geared towards regulation of the economy should be vigorously monitored to checkmate adverse inflationary trend on the purchasing power of consumers of goods and services in short run which might translate to fluctuating revenue for the quoted manufacturing firms as well as poor returns on investment for foreign portfolio investors participating in Nigerian capital market.

## RECOMMENDATIONS

In view of the afore highlighted findings, this study therefore recommends that:

1. That government policy designers should actively participate in the global crude oil market decision making process to ensure that favourable crude oil supply and pricing decisions relating to Nigeria's crude oil sector are well articulated to avoid situations that could force foreign investor out of Nigerian economy due to adverse impact on capital market operations .
2. There should be a comprehensive adoption and implementation of appropriate investment incentives to attract crude oil sector and foreign portfolio driven foreign capital flow , as well as into the economy which could ultimately strengthen industrial production base, boost domestic savings and inflow of foreign capital infrastructure development in Nigeria. Economist have argued that poor infrastructural facilities among other factors, could drive potential investors away to other markets or economies that offer better business environment and higher return. This also tend to frustrate foreign portfolio investment driven private sector participation through the equity market in Nigeria to the detriment of the whole sectors of the economy. Such incentives could trigger fund shifting from the money market based investment instruments to the infrastructure based companies already operating in the capital market in Nigeria. This is also in line recent call the amendment of policies pertaining to the ease of doing business in Nigeria which should be all inclusive measures that could divert foreign based capital through foreign portfolio investment who could benefit from Initial Public Offerings (IPO) of the power and energy firms that are yet to be listed in the Nigerian capital market .
3. That foreign portfolio investment driven private sector participation in government projects should be considered by the various levels of governance in Nigeria so as to encouraged effective utilization, allocation and diversification of foreign capital flows into the system to ensure adequate and inclusive spread of foreign revenue sources the which presently is currently majorly skewing towards crude oil and some non -oil export revenue driven.

## SUGGESTION FOR FURTHER STUDIES

A study of this nature has relied heavily on historical time series data spanning through both the periods of crude oil boom , crude oil doom , political trends and economic recessions in

Nigeria using vector auto-regression model hence it is suggested that a study using more sophisticated model that could isolate and cater for systemic breaks in economic performance in Nigeria be carried out to assess the result of the impact the systemic breaks in the economy.

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