## RESEARCH ARTICLE

## CAUSAL RELATIONSHIP BETWEEN DROP IN OIL PRICE, FOREIGN DIRECT INVESTMENT AND INFLATION: A COMPARATIVE STUDY OF NET EXPORTER AND NET IMPORTER OF OIL.

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| *Manuscript Info* | *Abstract* |
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We explored a comparative analysis of the causal relationship between drop in oil price, FDI and inflation using India and Nigeria as case net importer of oil and net exporter of oil respectively. Granger Causality Test analytical method was employed using a regression model. Findings revealed that drop in oil price has not significantly caused the increase in consumer spending in India and Nigeria and that drop in oil price has not significantly caused the drop in foreign cash inflow in India while it was found to have caused a drop in foreign cash inflow in Nigeria. It was recommended that Nigeria as a mono-product economy should start adjusting to exploit other natural resources in the nation to cushion the economic hassle overdependence on oil have forced it into

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## Introduction:-

Crude oil prices measure the spot price of various barrels of oil, most commonly either the West Texas Intermediate or the Brent Blend (Amadeo, 2016), the OPEC (Organization of the Petroleum Exporting Countries) basket price and the NMEX (Northern Minerals and Exploration Ltd.) futures price are also sometimes quoted. The price depends upon its grade, location and the content of sulfur present in it. The price of oil can be determined with the help of balance between its demand and supply. Oil Prices play an important role in the global economy. As oil is a global commodity with high demand, there is always a possibility that the large fluctuations in the prices may have a powerful impact on the global economy. The major factors which have direct impact on the Oil Prices are market sentiment, market forces of demand and supply. When the supply decreases, the demand increases and the price of oil goes up and vice versa. Oil supply depends on tax, legal framework, geological discovery, political situation of the oil producing companies and the cost of extracting the oil. The oil demand depends on the macroeconomic conditions of the globe and as such shouldn't be relied upon by any economy as a pillar of revenue generation.

Oil has been a dominant factor in the economy of Nigeria since its discovery in commercial quantities in the year 1958 (Sala-i-Martin & Subramanian, 2003) which since then has been major source of revenue by the Nigerian Government. Oil accounts for up to 90% of Nigeria's total exports, 25% percent of Gross Domestic Product (GDP) and over eighty percent of government revenue. The effective combination of these factors implies that even a minor change in the prices of oil can have a significant effect on the country's economy (Sala-i-Martin, & Subramanian, 2003). This factor finds evidence from the one-dollar increase in oil prices, which took place in the beginning of the

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1990s, which resulted in improving the level of Nigeria's foreign exchange earnings by over six hundred and fifty million US Dollars.

During the course of this time, Nigeria's public revenues increased to more than three hundred and twenty million US Dollars annually (Sala-i-Martin & Subramanian, 2003). The overdependence of Nigeria on oil as a major source of revenue generation has severe economic implications especially in this time where the price of oil has globally dropped, causing some negative shakeups in the economy of Nigeria, value of Naira weakens continuously causing a rise in the general price level of goods and services and foreign direct investment decline.

The recent variations in the prices of oil within the global economy have come to integrate a nature that is as rapid as it is unprecedented (Sala-i-Martin, & Subramanian, 2003). These changes have resulted from the increases in demand by countries such as India. While these changes integrate a positive nature, the current wave and effects of the global economic crisis have resulted in the sudden counteracting of the increasing oil prices (Sala-i-Martin, & Subramanian, 2003).

During the initial period of the of the global economic crisis, the prices of oil fell below $40 per barrel on the world market, thus resulting in detrimental consequences for the fiscal budget of Nigeria and the downward evaluation of the budget oil standard prices (Aliyu and Usman, 2009). Recent times are increasingly becoming noteworthy for the fluctuation of oil prices between $60 and $45 per barrel. Oil prices is anticipated to rise as high as the mid-$60s per barrel by the end of 2017 according to a new analysis from Citigroup (Cunningham, 2017). Global benchmark Brent crude price has fallen from $111.80 per barrel in June 2014 to $46.58 per barrel in August 2015 which leaves oil-importing economies like India at advantage. Approximately 85 percent of Indian refineries' throughput requirement is met through imports, the price of the Indian basket of crude too has fallen by 57 per cent during the said period reflecting the global trend. This has impacted not only the Indian refining industry but also the up-stream oil and gas industry as well as the Indian economy as a whole (Singh, 2016).

While falling crude oil price is negative for oil-producing countries, India, being a net importer, stands to benefit significantly. India's macro-economic fundamentals such as inflation, fiscal deficit and current account deficit have improved meaningfully over the last couple of years, a large part of which can be attributed to falling crude oil prices (Kumar, 2016).

Lower crude oil prices have also helped in reducing inflation in India which has been one of the biggest concerns a couple of years back. Apart from direct impact in the form of lower prices of petroleum products, decline in crude oil prices also have an indirect positive impact through lower transportation costs. According to macro experts, a $10/bbl dip in crude oil prices helps reduce India's retail inflation by 20bps, other things remaining the same (ENL, 2016).

Positives apart, there are a few downside risks also associated with lower oil prices. Oil producing countries are facing severe economic challenges as their incomes have fallen significantly due to the sharp fall in crude oil prices. This economic slowdown has hurt global trade and investment demand. India's exports have also taken a hit. A decline in crude oil prices is positive for many industries which use oil and its derivatives as input costs such as downstream oil, automobiles, paint, aviation and fast moving consumer goods (FMCG). However, it is negative for upstream oil companies in India as it directly hurts their realizations. While drop in oil price gave rise to a drop in FDI in Nigeria from $4.7billion in 2014 to $3.1billion in 2015, India's FDI improved significantly from the $34.6billion in 2014 to $44.0billion in 2015.

We are constrained on this background to research the comparative impact of falling oil prices on a net-exporter (Nigeria) of oil and a net-importer (India) using selected macroeconomic variables.

**Theoretical Review:-**
The standard growth theories focus on primary inputs such as; Capital, labour & land, while failing to recognize the role of primary energy inputs such as; oil deposits. However, natural scientists and some ecological economists have made efforts at evolving some theories which capture the role of oil price volatility on eco its availability and volatility and economic growth.

The Mainstream theory of economic growth postulates that production is the most important determinant of growth of any economy, and production which is the transformation of matter in some way, requires energy. This theory categorizes capital, labour and land as primary factors of production; these exist at the beginning of the production period and are not directly used up in production (though they can be degraded or added to). While energy resources (such as; oil and gas, fuels, coal) are categorized as intermediate inputs, these are created during the production period and are entirely used up during the production process. In determining the marginal product of oil as an energy resource useful in determining economic growth, this theory considers in one part its capacity to do work, cleanliness, amenability to storage, flexibility of use, safety, cost of conversion and so on it also considers other attributes such as; what form of capital, labour or materials it is used in conjunction with. The theory estimates the ideal price to be paid for crude oil as one that should be proportional to its marginal product Oriakhi and Osazee (2013)

The Asymmetry-in-effects theory of economic growth used the U.S economy as a case study. The theory posits that the correlation between crude oil price decreases and economic activities in the U.S economy is significantly different and perhaps zero. Mark et al. (1994), members of this school in a study of some African countries, confirmed the asymmetry in effect of oil price volatility on economic growth. Ferderer (1996) explained the asymmetric mechanism between the influence of oil price volatility and economic growth by focusing on three possible ways: Counter-inflationary monetary policy, sectorial shocks and uncertainty. He finds a significant relationship between oil price increases and counter-inflationary policy responses.

**Review of empirical Studies:-**
Akide (2007) investigated the impact of oil price volatility on economic growth indicators in Nigeria using quarterly data from 1970 to 2000. He found out that within the period of study oil price shocks did not affect output and inflation in Nigeria, but significantly influenced real exchange rate. Ani, Ugwunta, Oliver and Eneje, (2014) investigated oil price volatility and economic development, for the period 1980 – 2010, the results suggest that in the short run, changes in the gross domestic product (GDP) is not influenced by oil price volatility, nor do we find evidence of influence on key macroeconomic variables. Again the findings indicate that there is a positive but insignificant relationship between oil price and the Nigerian Gross domestic product. Overall oil prices have no significant impact on real GDP and exchange rate in Nigeria. The result suggests that Nigeria has a special case of the Dutch Disease, where a country seems good fortune proves ultimately detrimental to its economy.

Igberaese (2013) attempts to answer the question of, if the volatility of global oil prices is directly linked with the volatility of economic growth in Nigeria and uses GDP as the key variable for economic growth. An exploratory data analysis is employed using secondary data to examine the relationship between oil and GDP and the effect it has had on Nigeria's growth since 1961. The research found that there is a significant and positive relationship between oil dependency and economic growth in Nigeria.

In the short-run, Nigeria was able to have increasing, yet volatile growth because of the high global oil prices, but in the long-run, the inconsistency of oil prices and lack of diversification of the productive base has had a negative effect on Nigeria's economic growth.

Aremo, Orisadare and Ekperiware (2012) examined that oil prices have significant effect on fiscal policy in Nigeria within the study period of 1980 to 2009. They found out that oil price volatility affects Government Revenue and Gross DP first before reflecting on fiscal expenditure. Thank-God and Maxwell (2013) established that there is a unidirectional relationship existing between the interest rate, exchange rate and oil prices, with the direction from oil prices to both exchange rate and the interest rate. However, a significant relationship between oil prices and real GDP was not found.

Obasi (2016) evaluated the oil price fall and the impact on the nigerian economy and the need for diversification, he stated that the impact of the oil price fall is greatly affecting the Nigerian economy, causing inflation, unstable economy, Naira crash and loss of jobs. He further stated that there is an urgent need for the government to initiate tailored policies to take care of this menace and save the Nigerian economy; hence the call for diversification of the economy is fundamental to keeping the economy momentarily and permanently stable, immune and sustainable amidst prevailing and future oil price falls, because such sectors will produce alternative goods and goods that can be exported to make up for the yearning or deficit for imported goods.

**Knowledge Gap:-**
Much academic work has been done on drop in oil price and its impact on economies, but there has been no comparative study on drop in oil price, involving a net importer and net exporter of oil using the selected economic growth and development variables adopted in this study.

## Research Methodology:-
The research design employed by the researcher is ex post-facto research which aims at determining or establishing or measuring the relationship between one variable and another or the impact of one variable on another (Onwumere, 2009).

The nature of data for the analysis of this study is secondary accessed from the Central Bank of Nigeria Statistical Bulletin, 2015, World Bank Database, and OPEC from 2006 to 2015.

A regression model has been employed, the essence of regression is to use a mathematical equation to express the nature of the relationship existing between variables and ultimately to use this equation to predict the of value one variable given a specific value of the other variable (Ugbam, 2001).
The following is a simple regression model
$Y = b_0 + b_1 X + \mu$.
Where:
Y = the variable we are trying to predict;
$b_0$ = the intercept;
$b_1$ = the slope;
X = the variable we are using to predict Y;
$\mu$ = the error term.

The intercept ($b_0$) is the value of the dependent variable when the independent variable is equal to zero while the slope of the regression line ($b_1$) represents the rate of change in Y as X changes. Because Y is dependent on X, the slope describes the predicted values of Y given X.

The above model can thus be applied in this study as:
$IndCPI = b_0 + b_1 OilP + \mu$ ………………………………... Eqn. (1)
$NigCPI = b_0 + b_1 OilP + \mu$ …..…………..………………. Eqn. (2)
$IndFDI = b_0 + b_1 OilP + \mu$…………………..………………... Eqn. (3)
$NigFDI = b_0 + b_1 OilP + \mu$…..…………………..………... Eqn. (4)
Where:
IndCPI – Consumer Price Index in India (proxy for inflation)
NigCPI – Consumer Price Index in Nigeria (proxy for inflation),
IndFDI– Foreign Direct Investment in India
NigFDI – Foreign Direct Investment in Nigeria
OilP – Global Price oil (proxy for drop in oil price)

**Techniques of Data Analysis:-**
The Techniques of data analysis employed by the researchers is the Granger Causality using Statistical Package for Social Sciences (SPSS) version 22.0. The aim of using this method is to estimate the extent to which the past values of x (independent variable) causes y (dependent variable), i.e. to determine if there exists a causal relationship between x and y.

**Population of the Study:-**
The population for this study comprises all the economic variables and all tax revenue generated by the Federal Government of Nigeria and Indian from 2006 to 2015.

**Sample of the Study:-**
The variables adopted for the study are Consumer Price Index (CPI), Foreign Direct Investment (FDI), and Oil Price from 2006 to 2015. These data were used because it was available and accessible.

**Data Analysis:-**
We chose the unidirectional granger causality test because it is of matter of relevance to this study. The causality of the dependent variable on the independent is not considered in this study hence the nonparallel method of analyses.

**First Hypothesis:-**
Drop in oil price has not significantly caused the increase in consumer spending:-
a.    Drop in oil price has not significantly caused the increase in consumer spending in India
The P-value on which basis to reject the null hypothesis that drop in oil price has not significantly caused the increase in consumer spending in India is 0.3815. Since the P-value>.05, we cannot reject the null hypothesis and state affirmatively that drop in oil price has not significantly caused the increase in consumer spending in India.

b.    Drop in oil price has not significantly caused the increase in consumer spending in Nigeria
The P-value on which basis to reject the null hypothesis that drop in oil price has not significantly caused the increase in consumer spending in Nigeria is 0.8578. Since the P-value>.05, we fail to reject the null hypothesis and state agreeably that drop in oil price has not significantly caused the increase in consumer spending in Nigeria.

The outcome of the above hypotheses testing infers that econometric factors other than oil price and its irregularities could have contributed to the increase in consumer spending in a larger quota in both states under our scrutiny, hence other successive researchers in this line of interest should consider using econometric variables whose impact could be enormous to consumer spending.

**Second Hypothesis:-**
Drop in oil price has not significantly caused the drop in foreign cash inflow
a.    Drop in oil price has not significantly caused drop in foreign cash inflow in India
The P-value on which basis to reject the null hypothesis that drop in oil price has not significantly caused the drop in foreign cash inflow in India is 0.5474. Since the P-value>.05, we fail to reject the null hypothesis and state affirmatively that drop in oil price has not significantly caused the drop in foreign cash inflow in India.

b.    Drop in oil price has not significantly caused the drop in foreign cash inflow in Nigeria
The P-value on which basis to reject the null hypothesis that drop in oil price has not significantly caused the increase in consumer spending in Nigeria is 0.0141. Since the P-value<.05, we reject the null hypothesis and state strongly that drop in oil price has significantly caused the drop in foreign cash inflow in Nigeria.

## Discussion of Findings:-
The outcome of the above hypotheses testing infers that econometric factors other than oil price and its irregularities could have contributed to the decline in foreign cash inflow in India, where drop in oil price is found to have led to a decline in foreign cash inflow in Nigeria. This result is found to be practically true since Nigeria's economy solely depends on exportation of oil as a major contributor to its national revenue.

## Conclusion and Recommendation:-
We summarize the findings by stating that for an economy whose major source of income is oil, global drop in oil price will significantly cause a drop in foreign cash inflow and for an economy who exploits sources other than oil for its national revenue, drop in oil price cannot significantly cause a drop in foreign cash inflow hence.

Nigeria as a mono-product economy should start adjusting to exploit other natural resources in the nation to cushion the economic hassle overdependence on oil have forced it into.

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**Appendix:-**

| Year | I.FDI | I.CPI | Oil Price (Per Bar.) | N.FDI | N.CPI |
|------|-------|-------|----------------------|-------|-------|
| 2006 | 20,029,119,267.14 | 69.87 | 61.08 | 4,854,416,867.47 | 67.05 |
| 2007 | 25,227,740,886.68 | 74.32 | 69.08 | 6,034,971,231.03 | 70.66 |
| 2008 | 43,406,277,075.81 | 80.53 | 94.45 | 8,196,606,673.15 | 78.84 |
| 2009 | 35,581,372,929.66 | 89.29 | 61.06 | 8,554,840,768.97 | 87.94 |
| 2010 | 27,396,885,033.78 | 100.00 | 77.45 | 6,026,232,041.28 | 100.00 |
| 2011 | 36,498,654,597.86 | 108.86 | 107.46 | 8,841,113,286.95 | 110.84 |
| 2012 | 23,995,685,014.21 | 119.00 | 109.45 | 7,069,934,204.80 | 124.38 |
| 2013 | 28,153,031,270.32 | 131.97 | 105.87 | 5,562,873,605.74 | 134.92 |
| 2014 | 34,576,643,694.14 | 140.75 | 96.29 | 4,655,849,169.78 | 145.80 |
| 2015 | 44,009,492,129.53 | 147.66 | 49.49 | 3,128,591,678.86 | 158.94 |

*Source: World Bank Database, OPEC database*

**Eviews Output –** *Granger Causality Test*

| **Pairwise Granger Causality Tests** **Date: 01/25/17 Time: 10:52** **Sample: 2006 2015** **Lags: 2** | | | |
|---|---|---|---|
| *Null Hypothesis:* | *Obs.* | *F-Statistic* | *Prob.* |
| OILPRICE does not Granger Cause I_CPI | 8 | 1.35185 | 0.3815 |
| OILPRICE does not Granger Cause N_CPI | | 0.16145 | 0.8578 |
| OILPRICE does not Granger Cause I_FDI | 8 | 0.74167 | 0.5474 |
| OILPRICE does not Granger Cause N_FDI | | 24.2343 | 0.0141 |