

Effect of Crude Oil Price on Inflation in Nigeria (1982-2016)

Attamah, Nicholas

Department of Economics, Enugu State University of Science and Technology

Email: numanick@esut.edu.ng

ABSTRACT

Crude oil price is exogenously determine and given Nigeria's large dependence on proceeds from oil, a fall in crude oil price would have negative impact on the revenue of government, which also influences inflation in the country. Therefore, the study examined the impact of crude oil price fall on Inflation in Nigeria within a dynamic framework from the year 1982 to 2016. Adopting the error correction technique of the ordinary least square, the study revealed that oil price impacted significantly on inflation in Nigeria. Government should therefore, fast track its diversification programme of the economy to avoid dependence on oil revenue so that the economy can absorb the negative oil price shocks. Nigeria needs to invest more in infrastructure from which sustainable growth could be built. Government should come up with necessary reforms which are lacking in energy, agriculture and solid mineral. These would ensure and set the economy on a sustainable path of growth. , the results also reveals that the probability value of government revenue of 0.7446 implies that only about 26% of the changes in inflation is affected by government revenue. This could also be traced to the fact the low oil prices lead to low revenue for the government. There is therefore need, as a short term measure for government to boost oil production and also settle the crises in the Niger Delta region. This will in turn increase the level of oil exportation and also raise the level of government revenue. The Central Bank of Nigeria (CBN) should prop up the value of the naira which will lead to the drop in the parallel market exchange rate of the naira to the dollar and hence rise in the country's foreign reserve.

Keywords: Crude oil, inflation, price shock, financial crisis, Bonny Light

INTRODUCTION

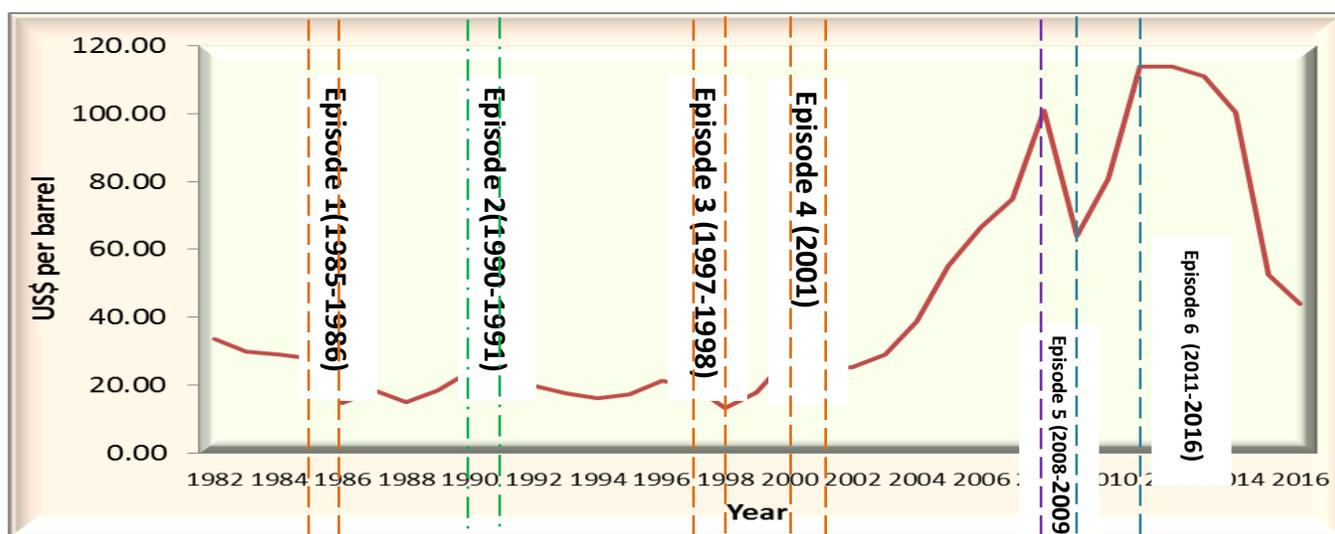
In recent times, the prices of crude oil in the international market has witnessed one of the largest fall in modern history. Particularly, the fall in price of oil which began in the last part of 2014 - 2015, likely brought to an end the four-year period of high and stable prices of above US\$100 per barrel experienced from the first quarter of 2011, after the world financial crises. The monthly average price of Nigeria's reference crude oil, The Bonny Light fell by US\$50 per barrel between June and December, 2014. This magnitude of price decline was the third largest in the last thirty (33) years since oil began trading in futures exchanges in 1984.

By January 2015, the price of oil had declined steadily to US\$48.60 per barrel. Although it inched up to 64.74 per barrel in May, 2015, it was however, not sustainable as prices further dropped to US\$38.22 in December, 2015. The declining trend continued in 2016, with prices plummeting to US\$31.21 and US\$32.89 per barrel in January and February, respectively. Since then, crude oil prices remained below US\$50 per barrel through-out the year. A number of reasons had been provided to justify the persistent plunge in oil prices. They included: supply glut in the global oil market, arising from increased shale oil production in the USA and over production by some members of the Organization of Petroleum Exporting Countries (OPEC) beyond their production quotas, slowdown in economic growth in top consuming nations, especially China and the European Union (EU), thus reducing the demand for oil as well as the appreciation of the U.S. dollar, among others.

Though the factors cannot be clearly delineated, the supply-related factors have apparently played a dominant role much more than the demand factors and were expected to persist in the near to medium term. Since both the supply and demand related factors responsible for the decline are expected to linger for some times, oil prices are also likely to remain soft but volatile, with gradual recovery over a period of time. In other words, the development in the oil markets and moderate growth prospects in emerging and developing economies gave an indication that prices could remain soft in the next few years [1].

Five other episodes of oil price declines of 30 per cent or more in a seven-month period occurred after 1984, which coincided with major changes in the global economy and oil markets. They are as follows: 1985-1986; 1990-1991 and 2001; 1997-1998; and 2008-2009.

Figure 1: Trends in Crude oil Prices (Bonny Light) showing Major Episodes of price decline (1982-2016)



The 1985-1986 drop in oil price was mainly supply-driven mostly associated with strong expansion of supply from non-OPEC countries and a significant change in OPEC policy where OPEC members reversed earlier production cuts. The price decline during the 1990-1991 and 2001 period was due to the US economic recessions. The 1997-1998 drop was caused by the East Asian financial crises, while the 2008-2009 declines in oil prices was caused by the severe global financial crisis, global uncertainty and liquidity constraints which resulted to the severe collapse in demand.

Sustained low oil prices have subjected oil producing countries, the world over and particularly, Nigeria to serious economic pressure. Thus, questioning the sustainability of the alternative forms of energy production. It also weakens the fiscal stability of the country since it relies mostly on foreign exchange earnings from crude oil exports. There is a growing concern among policy makers that further sharp decline in crude oil price may pose severe threat to the economic and political stability of oil producing countries. However, there are expectations that lower oil prices are likely to have significant implications for growth and inflation.

The Nigerian economy is solely dependent on oil, this constitute greater part of the Government revenue and foreign exchange earnings into the country. However, the persistent decline in oil prices in the global oil market has implications on the Nigerian economy, especially the revenue profile of the Government, the exchange rate movements and inflation as currently experienced in the country. The magnitude of effect will be a proper guide for policy direction, thus, it is the aim of this paper to investigate the effect of low crude oil prices on inflation, exchange rate and government revenue in Nigeria. This will add to the existing literature in this area, especially for Nigeria where literature is not so robust.

LITERATURE REVIEW

Crude oil was initially discovered in commercial numbers in Nigeria in 1956, although actual production began in 1958; while it became Nigeria's leading resource in the mid-1970s [1]. According to [2], as cited by [3], after crude oil production began in Nigeria in 1958, its contribution to Gross Domestic Products (GDP) stood at 1.6 per cent in 1960, it then rose to 11 percent by the year 2001. Crude oil's contribution to GDP comprises of proceeds from oil export, local sale of crude oil for domestic refining as well as local sale of natural gas [3]. The contribution of crude oil to GDP has been limited by extensive amount of foreign investors' participation in the oil sector, and their subsequent repatriation of the sector's profits and dividends abroad in the form of factor payments, profits, dividends, interest, fees, and wages and salaries [4].

According to [5] Crude oil contributes over 90 percent of foreign exchange earnings in Nigeria. [6], as cited in Alley et al. (2014) are of the opinion that Nigeria's oil sector is foremost in comparison to other sectors in providing export revenues as, it accounted for over 98 percent of Nigeria's total export in the year 2005.

Variations in oil price affect countries differently, depending on whether the country exports or imports crude oil. For an oil importer, a rise in price of oil, which is an input in the production process, raises the cost of production, and hence can lead to (cost-push) inflation, lower economic growth, and even recession[7]. [4], the US experienced this between 1948 and 1981. The reverse is the case, in case of a fall in the price of oil, production costs fall and inflation falls, it might even lead to deflation if oil price keeps falling.

[8] stated that, one impact of the oil price fall is currency depreciation induced inflation. According to [9], the consequence of the depreciation of the Naira will be that the price of goods and services will be more expensive; this has led to inflation in the Country. Inflation is so obvious in Nigeria during this period of oil price fall, thus the prices of goods, services and commodities have increased and still on a steady increase, if this oil price fall goes unhindered; importation becomes more and more expensive, because more Naira will be run after the limited available Dollars, this is not good for the Nigerian economy, which had been experiencing cost related deficits [8].

A decline in oil price negatively affects an oil exporting country like Nigeria in terms of decline in foreign revenue, economic recession, and sometimes political instability [4]. Nigeria is currently experiencing decline in foreign revenue since the oil price started to decline in the year 2015. As cited in [8], when the oil price falls, oil dependent nation suffers exchange depreciation, Nigeria is well-known as one of the major oil importer and exporter and it is experiencing oil price decrease. Thus flowing from this, it is reasonable to state that when the price of oil falls, the exchange rate in Nigeria will depreciate, this translates to the current depreciation of the Naira in this current era of oil price decline [8].

According to [8], financial scandals have also been recognized as one of the impacts of the oil price fall on Nigerian economy, since oil companies will like to sustain their lavish lifestyle during the oil price steady and also during the oil price crash era, which will in turn encourage the directors and executives of such oil companies to carry out conflicting activities to the firms' policies.

The case of AFREN Oil and Gas Company is one example of this in Nigeria of recent, which led to the firm sacking its Executive Directors and consequently being put under close supervision [8]. Hence, the current oil price fall offers such executives the freedom to swindle with companies accounts, in order to assign huge bonuses to themselves and their cronies [8].

According to [9], the oil price fall had also in actual fact affected the Nigerian economy by causing scarcity of funds for financial services, for banks recently revealed that a number of oil marketers owed them up to about ₦5 trillion.

According to [10], the fear of unrestrained inflationary spiral is the first lesion in economic management everywhere. The CBN is constitutionally empowered to keep inflation at best practice levels, usually below 2%, to sustain income values and consumer demand. However, the main driver of spiral inflation is undeniably excess money. He opines that money supply is inadvertently expanded every time CBN unilaterally substitutes naira allocations for dollar dominated revenue. Thus, the higher the dollar revenue, the greater will be Naira supply and the greater also will be the serious threat of unbridled inflation. Furthermore, it is not clear how CBN determines the exchange rate adopted for the Naira it substitutes for dollars, but the popular perception is that CBN adopts the current market rate, but the same CBN is guilty of consciously manipulating the exchange rate mechanism to favour dollar rather than Naira, for which it is both custodian and guardian. The CBN does this by directly substituting Naira allocations. The obviously perverse argument is that once constitutional beneficiaries accepted Naira allocations for their share of dollar revenue, they cannot turn around to also lay claim to the billions of dollars held back by CBN.

He suggested that the CBN should adopt dollar certificates for paying allocations of dollar dominated revenues, rather than unilaterally substituting Naira allocations.

METHODOLOGY

The research design is an outline that specifies how data relating to the research will be collected and analyzed. It thus provides the procedural outline for the research [5]. This paper would employ the ex-post facto design in obtaining, analyzing and interpreting data relating to the objectives of the study. The ex-post facto design was chosen since this type of research design is a good explanatory instrument of changes that occur in the dependent variable. It thus, seeks to establish cause - effect relationships between dependent and explanatory variables [5]. The ex-post facto design also allows researchers the pleasure of observing variables over longer time periods [2].

To ensure proper collection and analyses of data in this study, we resolved to collect secondary data. This was aimed at making sure that all the relevant materials or information required for the study were acquired and utilized. We employed the Ordinary Least Square (OLS) technique. The choice of the method was necessitated by the need to predict the future value of the dependent variable based on the behavior of a set of explanatory variables.

The functional form of the model is specified as:

$$RINF_t = F (EXR_t, OPR_t, GR_t) \tag{1}$$

We would apply a semi-log model as the mathematical form:

$$INF_t = \beta_0 + \beta_1 OPR_t + \beta_2 \ln GR_t + \beta_3 EXR_t \tag{2}$$

The Econometric form of equation 2 is specified, thus:

$$INF_t = \beta_0 + \beta_1 OPR_t + \beta_2 \ln GR_t + \beta_3 EXR_t + \mu_t \tag{3}$$

(+)
(+)
(-)

Where: f = function, ln = natural log

(INF) = Inflation

(OPR) = Oil Price (Bonny light)

(GR) = Government Revenue

(EXR) = Exchange Rate

β_0 = intercept, β_1 to β_3 = Coefficients of the regressors, and μ_t = Stochastic error term. $\beta_1, \beta_2 > 0, \beta_3 < 0$.

The source of data was the Central Bank of Nigeria (CBN) statistical bulletin/financial reports.

RESULTS AND DISCUSSION

Table 1: Stationary Tests of the Variables

VARIABLE	ADF STAT (AT LEVEL)	CRITICAL VALUES		ADF STAT (1 ST DIFF)	CRITICAL VALUES		ORDER OF INTEGRATION
		1%	5%		1%	5%	
INF	1.49	-2.63	-1.95	-6.02	-3.65	-2.95	I(1)
EXR	2.77	-2.63	-1.95	-3.63	-3.65	-2.95	I(1)
OPR	-0.68	-2.63	-1.95	-5.12	-3.65	-2.95	I(1)
LGOVT	-2.33	-3.65	-2.95	-8.43	-3.65	-2.95	I(1)

ECM	-3.12	-3.64	-2.95	-	-	-	I(0)
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Source: E-views output

The stationarity test for inflation at levels revealed that it had unit root. However, at 1st difference; results showed that the ADF test statistics is greater (in absolute terms) than the 5% critical values. Therefore, we reject H_0 and accept H_1 , which implies that the variable (inflation) is integrated of order 1. The stationarity test for oil price at levels revealed that it had a unit. However, at 1st difference, results showed that the ADF test statistics is greater than the 5% critical values. Therefore, we reject H_0 and accept H_1 . This shows that the variable (oil price) is integrated of order 1. The stationarity test for government revenue at levels revealed that it had a unit. Nonetheless, at 1st difference, results showed that the ADF test statistics is greater than the 5% critical values. Therefore, Government Revenue is integrated of order 1. The stationarity test for exchange rate at levels revealed that it had a unit root at level form. However, after conducting the test at 1st difference, results showed that the ADF test statistics is greater (in absolute terms) than the 5% critical values i.e. exchange rate does not have a unit root, implying that the exchange rate is integrated of order 1.

Test for Cointegration

The need for us to conduct a co-integration test on this research is based on the works of Engle and Granger (1987). They recommended this test for any time series data that are stationary at I(1). Therefore, we say that a group of time series data are cointegrated if the ADF test statistics of their residual value is stationary at zero levels. The above results revealed that the ADF test statistics is greater (in absolute terms) than the 5% critical values at levels I(0). Therefore, there exists a cointegration or long run relationship between the variables.

ESTIMATION OF THE PARAMETERS

Table 2: Regression Result

DEPENDENT VARIABLE: DINF				
VARIABLE	COEFFICIENT	STANDARD ERROR	T - STATISTIC	PROBABILITY
C	4.377028	3.592538	1.218367	0.2329
DEXR	0.122772	0.187557	0.654584	0.5179
DOPR	0.479026	0.233332	2.052986	0.0492
DGOVT	7.406850	22.51928	0.328912	0.7446
ECM(-1)	-0.346948	0.154458	-2.246226	0.0325
R-Squared	0.319409			
Adjusted R-Squared	0.225535			
F-Statistic	3.402514			
Prob(F-Statistic)	0.021255			
Durbin Watson Stat	1.379009			

Source: E-views output

Results from the table above shows that if exchange rate increases by 1 unit, inflation will increase by about 0.123 unit. The exchange rate has no statistical significance on the result

because its probability value is 51.79% which is above the 5% level of significance. The coefficient of oil price shows that if oil price increases by 1 unit, inflation will increase by 0.4790 unit and vice versa. The probability value of 4.92% which is below the 5% level of significance, which implies that oil price has statistical significance on inflation level. Changes in inflation due to government revenue shows that as government revenue increases by 1 per cent, inflation also increases by about 7.407 units. Government revenue, however, has no statistical significance on the dependent variable because its probability value is 74.46%, which is above the 5% level of significance.

The result from the error correction term (residual) reveals that it corrects the disequilibrium of the variables annually by 34.69% and it appears to be significant at 3.25% level which is less than the 5% significance level. Results from the lower end of the table shows an R-Squared value of 0.319409 which implies that about 32% of the changes in inflation is explained by the independent variables. While the remaining 68% is explained by the error term, indicating that there were other important variables that were not included in the model. This could be an area for further empirical research.

CONCLUSION AND RECOMMENDATIONS

An economy more dependent on oil for foreign exchange or fiscal revenue, or with a higher share of the oil industry in the overall economy, would be expected to suffer a stronger direct impact. The ability for an economy to redeploy resources across sectors in response to a shock would be expected to contribute to resilience.

From the results, only oil price appears to be significant determinant of inflation in Nigeria, with a probability value of 0.0492, which also conform to the a priori expectation. This further implies that about 95% of changes in the prices of oil would directly affect inflation rate in Nigeria. This is because the country is largely dependent on the proceeds from the sale of crude oil. The price of oil is exogenously determined as the country cannot influence the price of oil in the international market. This situation places the country as a price taker, which impacts negatively of the revenue when prices fall. Therefore, government should fast track its diversification programme of the economy to avoid dependence on oil revenue so that the economy can absorb the shocks from low oil prices or oil price fluctuation. Nigeria needs to invest more in infrastructure from which sustainable growth could be built. Government should come up with necessary reforms which are lacking in energy, agriculture and solid mineral. These would ensure and set the economy on a sustainable path of growth.

It is also worthy of note that despite the huge disparity in the exchange rate of the Naira to the US dollar, the probability value of exchange rate of 0.5179 reveals that it has about 49% influence in determining the behaviour of inflation in Nigeria. Though it appears to be higher than the 5% level of significance, it is also necessary for government to reduce the wide gap in the exchange rate through boosting the manufacturing industry in Nigeria, which in turn will reduce the level of consumption of foreign goods in the country.

On the other hand, the results also reveals that the probability value of government revenue of 0.7446 implies that only about 26% of the changes in inflation is affected by government revenue. This could also be traced to the fact the low oil prices lead to low revenue for the government. There is therefore need, as a short term measure for government to boost oil production and also settle the crises in the Niger Delta region. This will in turn increase the level of oil exportation and also raise the level of government revenue.

The Central Bank of Nigeria (CBN) should prop up the value of the naira which will lead to the drop in the parallel market exchange rate of the naira to the dollar and hence rise in the country's foreign reserve.

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