

1                   **IMPACT OF OIL PRICE CHANGES ON SELECTED MACROECONOMIC**  
2                   **VARIABLES IN NIGERIA**  
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5   **ABSTRACT**

6   *In this study, the impact of oil price changes on selected variables in Nigeria within the*  
7   *period, 1981-2016 had been evaluated. Adopting the ex-post facto research design with*  
8   *annual time series and using The Autoregressive Distributed Lag (ARDL) model; the*  
9   *results revealed that the change in oil price had a positive and significant impact on*  
10   *government revenue and government expenditure, but had no positive and significant*  
11   *impact on the domestic price level. It is therefore recommended that the monocultural*  
12   *economy should be omitted through well-planned and implementation diversification.*

13   **Keywords: Oil Price; Government Revenue; Government Expenditure; ARDL; Nigerian**  
14   **Economy.**

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16

UNDER PEER REVIEW

## 17           **1. Introduction**

18   The price of crude petroleum rose for the first time in Nigeria in 1973 from \$3 to \$11.6 per barrel  
19   in response to the uncertainties created by the Arab – Israel war, which erupted in October 1973.  
20   The resultant rise in the price of crude petroleum generated a total of N9.2 billion in revenue for  
21   Nigeria. In 1994 as the country exported 108 million tons of crude oil that year, the upsurge in  
22   crude oil and price and the resultant increase in the revenue for the country created the  
23   opportunity for industrial development and modernisation of the Nigeria economy.

24   Although the oil price increase in 1973 was short-lived, between 1979 and 1980, the price of oil rose in  
25   the international market between 135 and A\$40 a barrel from et \$14 level recorded in the early part of  
26   1978. the rise in crude oil price again was only mainly to the Iranian revolution. In responses, Nigeria  
27   produced 84.25 million barrels in 1979 and realised N9305.6 million in the prices “The Africa Guardian,  
28   1986, First Bank Business Report,1990” with the increased revenue derivable from oil sector the Nigeria  
29   economy became mono-cultural as emphasis shifted from the agriculture sector to the oil sector. Thus  
30   in 1980, the nation experienced a severe economic crisis which is traceable to the over-dependence a  
31   severer economic crisis which is traceable to the overdependence on the oil sector. The oil glut era of  
32   the 1980s created a serious problem for the industrial sector, as there was a decline in industrial output  
33   and the level of industrial employment. Ijeh, 2010). Odeyemi (2016)

34   Consequent upon the freezing, the country experienced a period of structural adjustment  
35   programme in 1986. This was accompanied by austerity measure of enormous proportion. By  
36   1990 a sign of relief was welcomed with the price of oil in the international market soaring as a  
37   result of the Gulf war between Iraq and Kuwait. Nigeria earning from crude oil export reached  
38   N106.62 million as against the targeted N38.62 million (Oyejide & Adewuyi, 2011),.

39   This windfall of N68 billion since the exchange rate was stabilised at N9 to 11 between  
40   September and December 1990. The revenue gained from the glut crises was however not  
41   translated to productive investment and increased manufacture productivity.

42   In the late 1990s and early 2000 crude oil maintained its position as the highest contributor to the  
43   federation account which was shown in the annual budget of 2003. Out of the estimated revenue of  
44   N1,819.0214 billion, a total of N120. 1789 billion (61.58%) was expected to be generated from oil. The  
45   projection was predicated on a crude oil price at \$21 per barrel: the answer to this question rests on the  
46   pattern of crude oil price volatility.

47   According to (Afolabi, 2011) the recent oil price shock (large fall in oil prices) has been attributed to  
48   the factors such as higher than expected supply, weakness in global demand for oil, driven largely by

49 improvements in production technology, particularly the shale technology in the United States, steady  
50 rise in production of countries not belonging to the Organisation of Petroleum Exporting Countries  
51 (OPEC), the faster than expected recovery of production in some stressed OPEC producers (Iran for  
52 instance); OPEC's November 2014 decision to maintain production level despite the sharp decline in  
53 prices, which clearly shows that the trend might not abate soon. Oil price volatility has been and will  
54 remain a subject of discourse among different scholars. It can be external when it comes from a large  
55 unanticipated change in world economic conditions which impacts upon a national economy. Oil shocks  
56 are of great concern to most economies because of its transmission effects on several spheres of  
57 economies of the world.

58 The current declining oil price and the daunting challenges it poses to the Nigerian economy, has  
59 brought to the fore, the need to reconcile theory with practical realities. Given that empirical  
60 literature on the recent decline in oil price, the finding of this study fills an important research  
61 gap by clarifying the direction of the transmission effects of declining oil prices on Nigerian  
62 economic indicators in terms of magnitude and impact. The permanent/transitory nature of the  
63 shock and most importantly, the symmetry of the shock. Because of the foregoing analysis of  
64 this research will focus on the impact of oil price changes on Government Revenue, Expenditure  
65 and Domestic Prices.

66 The main objective of this study was to investigate the impact of oil price changes on Nigeria's  
67 key macroeconomic variables. The study would specifically seek to: investigate the impact of  
68 changes in crude oil price on Government revenues; ascertain the impact of changes in oil prices  
69 on Government expenditure and to examine the impact of changes in oil price on Nigeria's  
70 inflation Nigeria represents the geographical settings for this study. It covered a period of 35  
71 years from 1981 to 2016 with a focus on the oil price changes and selected macroeconomic  
72 variables. The year 2016 was chosen as the endpoint period to ensure the currency of data and  
73 1981 to cover the period immediately before the introduction of the structural adjustment  
74 programme.

75 The results of this study would be significant for the stakeholders in the oil and gas industry and  
76 the Nigerian economy at large. It will help to further enrich the literature in this very important  
77 area of macroeconomics and finance in Nigeria. Economic planners, policymakers and  
78 macroeconomic managers will find this work as a valuable tool for improved economic planning.  
79 The rest of the paper is divided into four sections, section two present literature review. Section

80 three presents the methodology, followed by the results and discussion in Section four, and  
81 finally, section five presents the main conclusion and recommendations.

## 82 **2. Literature review.**

83 Nations that export oil is most likely to experience contributions to the economic conditions and  
84 well-being of the populace. There are positive and negative contributions. Among the positive  
85 contributions are source of revenue to the government (Jaida, 2002), transformation and addition  
86 to balance of payment (CBN, 2014), increase in external trade (NNPC report, 2006; Lewis,  
87 2001), increase in Gross Domestic Product (Aigbedion & Iyayi, 2007), source of employment  
88 (Odularu, 2007), transfer of technology (Oyejide & Adewuyi, 2011), provision of internal energy  
89 requirements (Oyejide & Adewuyi, 2011), increased income per capita (Husan, Arezki & Medas,  
90 2015), and development of the economy say by providing infrastructure, industry, health  
91 facilities, educational supports, transportation and agricultural development (Afolabi, 2011).

92 The negative contributions resulting from oil exploration and exports include Neglect of  
93 Agricultural sector and increased food import bills, urban congestion and oil spillage. Others are  
94 excess liquidity and its attendant consequences such as high rate of inflation and over-  
95 dependence on it to the detriment of strategic planning of the economy (Ijeh, 2010). Odeyemi  
96 (2016) observed the implications of the fall of oil price on the Nigeria economy. Among the  
97 consequences is the devaluation of the naira, depletion of external reserves in a bid to save  
98 devaluing naira, depletion of funds for Government business, economic recession and dwindling  
99 activities in the Capital Market.

100 Several theories guided thinking in this study. Among the theories are Mainstream Theory,  
101 Linear/Symmetric Theory, Renaissance Growth and Dutch Disease Theory. The principal theory  
102 upon which data were analysed was the Dutch disease theory. The mainstream theory postulates  
103 that economic growth results from production; and production refers to the transformation of  
104 matter in some way, and requires energy. Capital, labour and land are primary factors of  
105 production; and energy resources such as oil and gas, coal and fuel are categorised as  
106 intermediate inputs usually created during the production period and entirely used up during the  
107 production process. The mainstream theory downplays the role of energy resources in economic  
108 growth (Oriakhi& Iyoha, 2013).

109 The linear/symmetric theory asserts that oil price volatility has a linear relationship on the  
110 macroeconomic indicators. Thus fluctuations in say Gross National Product (GNP), and Gross

111 Domestic Product (GDP) are occasioned by frequent fluctuations in oil prices (Goodwin, 1985;  
112 Hooker, 1986, Laser, 1987; Hooker, 2002). The renaissance growth theory an off-shoot of the  
113 symmetric theory propounded that volatility/change in oil prices rather than oil price level that  
114 has a significant influence on economic growth (Lee, 1998).

115 The Dutch disease theory of economic growth states that higher oil prices, generally, change the  
116 industrial structure of the oil-exporting country making it more concentrated on the oil industry  
117 and non-traded sectors. The higher oil revenues lead to the appreciation of the local currency,  
118 which consequently causes an increase in imports of consumer goods. Thus, the high  
119 concentration on imports tends to reduce the competitiveness of the local producers. It follows  
120 according to the Dutch disease theory that an increase in oil prices is not a beneficial situation for  
121 the economy of an oil-exporting country (Corden & Neary, 1982).

### 122 **2.3 Empirical Review**

123 From related studies no other nations a mixed result was recorded. According to Ito (2012), the  
124 economy of Russia is highly sensitive to oil price changes. The results of the analysis showed  
125 that in a long-term period 1% increase in oil prices would increase GDP by 0.44%. Mendoza and  
126 Vera (2010) studied the asymmetric effect of oil price shocks on economic growth and found  
127 that the oil price shocks that occurred during the period (1984-2008) had a positive effect on the  
128 Venezuelan economy. The study showed that oil price increases were more significant and  
129 affected the economy more intensively than the oil price decreases. Salim and Rafiq (2013)  
130 investigated the impact of oil price volatility on six major emerging economies of Asia, namely  
131 China, India, Indonesia, Malaysia, Philippines and Thailand. The work measured quarterly oil  
132 price volatility with the realised volatility (RV) and made several findings. For China, it was  
133 reported that oil price volatility impacts output growth in the short run. And, for India and the  
134 Philippines, oil price volatility was found to impact both GDP growth and inflation before and  
135 after the Asian financial crisis. A related study in Nigeria, the Dutch disease theory seems  
136 evident. Olaokun (2000) showed that oil price increases exert a negative effect on the economies  
137 of Ghana and Nigeria, but has a positive effect on Russia, which like Nigeria is an oil-producing  
138 country. Olomola (2006) found out that oil price volatility is highly significant in explaining  
139 GNP growth and unemployment. Similarly, Oriakhi and Osaze (2013) examined the  
140 consequences of oil price volatility on the growth of the Nigerian economy within the period  
141 1970 to 2010 using quarterly data and employing the Vector Autoregression (VAR)

142 methodology. They found that oil price volatility impacted directly on real government  
143 expenditure, real exchange rate and real import, while real government expenditure impact on  
144 real GDP, real money supply and inflation. By implication, oil price changes determine  
145 government expenditure level, which in turn determine the growth of the economy thereby  
146 reflecting the dominant role of government in Nigeria.

147 Omisakin (2008) carried out a study on the impacts of oil price shocks on the macroeconomic  
148 performance in Nigeria using a Vector Autoregression (VAR) approach. The study found that oil  
149 price shocks significantly contributed to the variability of oil revenue and output. Thus, oil price  
150 shock does not have substantial effects on money supply, price level and government  
151 expenditure in Nigeria over the period covered by the study. The impact of oil price volatility on  
152 macroeconomic activity in Nigeria has also been examined by Apere and Ijeoma (2013) finds a  
153 unidirectional relationship between interest rate, exchange rate and oil prices. However, a  
154 significant relationship between oil prices volatility and real GDP was not found. The paper  
155 concludes that oil price volatility is an important determinant of real exchange rates and in the  
156 long run, while the exchange rate rather than oil price volatility affects output growth in Nigeria.

157 Oyeyemi (2013) confirms the positive relationship between oil price increases and economic  
158 situation; showing that during the periods of oil price decreases disruption effects occurred in the  
159 balance of payments and government finances. Moreover, it was mentioned that even a small  
160 shock in global oil prices will have a long-term effect on the economic growth of the country.

161 Similarly, Ani, Ugwunta, Iyiama and Eneje (2014) in a study on Oil price volatility and  
162 economic development: Stylised evidence in Nigeria investigated chiefly the causal relationship  
163 between oil prices and key macroeconomic variables 1980 to 2010. The findings indicate that  
164 there is a positive but insignificant relationship between oil price and the Nigerian GDP.  
165 Generally, oil prices have no significant impact on real GDP and exchange rate in Nigeria.

166 Most studies exploring the impact of oil prices on inflation rates employed the linear time-series  
167 model. Razmi [2016] applied the SVAR model intending to examine the impact of oil price on  
168 China's economy. The results revealed that increases in oil price have a positive impact on  
169 inflation, even though there is price control over domestic oil consumption and other  
170 commodities in domestic Markets.

171 Kilian [2009] applied the Bayesian VAR model to examine the impact of oil price and inflation  
172 in USA quarterly data from 1948:1 to 2011:2. They found that oil price fluctuations do not

173 necessarily spread and result in changes to overall inflation but rather are time-specific. Some of  
174 the subsequent researchers attempted to investigate further the argument that oil price can affect  
175 CPI but not economic activities. Hooker [2002] applied the USA monthly data ranging from  
176 1974:1 to 2014:7 and disaggregated the consumer price into five different components and  
177 compared the impact of oil price separately. The results revealed that oil price shock has  
178 significant positive effects on the energy-intensive CPI. While Basnet[2015] used the  
179 Autoregressive Distributed Lags (ARDL) method to study the pass-through effect of oil prices in  
180 Malaysia's consumer prices. The results indicated that oil prices and inflation have a positive  
181 relationship. On the contrary, Chou [2013] found that since 1980, oil price passthrough has  
182 become negligible. In a recent study by Lamotte [2013] the authors found that a fluctuation in oil  
183 price is absorbed and disappeared within the first five to six quarters after the shocks occurred.  
184 Notably, the shocks do not have any significant impact in the long-run, especially when the oil  
185 price is converted to domestic currency.

186 Ferrucci [2010] examined the long-run impact of oil export and food production on inflation in  
187 African OPEC member countries. Found that oil exports have positive and significant impact  
188 connected to inflation meanwhile increases in food production has a negative impact related to  
189 inflation.

190 Similar findings were reported in Lamotte [2013], where the authors investigated the asymmetric  
191 response of the gasoline price to changes in the oil price in France. In this study, they applied the  
192 ARDL method and found asymmetric relations with oil price changes, for which the gasoline  
193 prices gradually adjusted to a long equilibrium position. In this case, the adjustment was found to  
194 be faster when the crude oil price increases rather than decreases. In a separate study, the authors  
195 in Farzanegan [2009] found that Iran was greatly exposed to oil price changes that have  
196 asymmetric impacts on the economy. The study revealed that positive and negative oil price  
197 shocks significantly increase inflation, but the magnitude depends on the size of the shock. The  
198 authors in Ghosh [2013] showed that inflation was profoundly affected by oil price shocks and to  
199 some extent the impact was asymmetric. The authors confirmed this result by comparing the  
200 impact of a negative oil price shock to that of a positive shock that was noted in India. The  
201 authors in Çat [2013] applied a multivariate two-regime threshold VAR model to assess the  
202 impact of oil prices in Turkey and found that oil price changes have a significant effect on

203 inflation when the changes exceed the optimal threshold point and have the ability to adversely  
204 influence macroeconomic variables.

### 205 3. Methodology

206 The study adopted the *ex-post facto* research design given that it was a discourse on documented  
207 outcomes to draw conclusions and inferences. The choice of these research designs was based on  
208 the fact that this work was *after-the-fact research* the employed variables were such that the  
209 researcher cannot manipulate, Onwumere, (2009).

210 All the data to be utilised were time series, quantitative and sourced from secondary source  
211 basically, the 2017 Statistical Bulletin of Central Bank of Nigeria. They were time series data  
212 because they were ordered following a natural frequency (Brooks, 2014).

#### 213 Model specification

214 The Classical Linear Regression Model (CLRM) was employed for this study. The model,  
215 according to Gujarati (2011) and Brooks (2008) was expressed as follows:

$$216 Y_t = \alpha + \beta x_t + U_t \quad \text{_____ (Eq. 1)}$$

217 Where:

218 Y = dependent variable (explained variable)

219 X = independent variable (explanatory variable)

220  $\alpha$  = Constant term (i.e. value of Y when X is zero)

221  $\beta$  = Coefficient of the parameter estimates

222 U = error term (residual term)

223 t = (1, 2, 3, ..., n) denotes the number of observations.

224

225 Concerning (Eq. 1),  $\alpha$  and  $\beta$  are expressed as follows:

$$226 \beta = \frac{\sum (x_t - \bar{x})(y_t - \bar{y})}{\sum (x_t - \bar{x})^2} \quad \text{_____ (Eq. 2)}$$

$$227 \alpha = \bar{y} - \beta \bar{x} \quad \text{_____ (Eq. 3)}$$

228 The dependent variables are:

- 229 i. Government Revenue (GREV)
- 230 ii. Government Expenditure (GEXP)
- 231 iii. Inflation Rate (INFR) that proxied price level

232 The main independent variable in the model was the crude oil price, proxied by the change in  
233 Crude Oil Price (DCROP) that was the first difference of the level series crude oil price.

234 ARDL variant of regression was deployed in testing the hypothesis and is presented thus:

235 **Hypothesis one (Model 1)**

$$236 \text{ GREV}_t = \beta_0 + \beta_1 \Delta OP_t + \sum a_i OP_{t-i} + u_t$$

237 Where: GREV = Govt. Revenue,

238  $\Delta OP$  = Change in Oil Price (in absolute terms)

239 There was also the inclusion of the lagged values of the independent variables given that the  
240 model was lagged.

241 **Hypothesis two (Model 2)**

$$242 \text{ GEXP}_t = \beta_0 + \beta_1 \Delta OP_t + \sum a_i OP_{t-i} + u_t$$

243 Where:

244 GEXP = Govt. Expenditure and the other terms are as defined above

245 **Hypothesis three (Model 3)**

$$246 \text{ INFR}_t = \beta_0 + \beta_1 \Delta OP_t + \sum a_i OP_{t-i} + u_t$$

247 Where: INFR = Inflation Rate

248 **3.6 Methods of Data Analyses**

249 The basic steps followed were:

- 250 - Standard tests
- 251 - Regression Analyses

252 This served as preliminary tests to ascertain the data behaviour and their goodness towards  
253 employing them for model estimation. These tests include basic descriptive statistics such as the  
254 mean, median, mode, variance, standard deviation, skewness, kurtosis and normality.

255 Stationarity implied that the 'mean' and 'variance' were constant over time and the value of the  
256 covariance between two periods depends only on the distance or lag between the two periods and  
257 not the actual time at which the covariance was computed. In this study, therefore, the  
258 Augmented Dickey-Fuller Unit Root Test was employed to test for the presence or otherwise of  
259 the unit root.

260 In this work, the Autoregressive Distributed Lag Model was used because of its relative  
261 advantages over other regression methods. These include

- 262 1. The small Sample size is involved

- 263 2. When there is a combination of different stationarity properties in the datasets  
 264 3. There is a need to guard against autocorrelation.

265

266 **4. Presentation and Analyses of Data**

267 **4.1: Data Presentation**

268 Table 1. contains the proxies for the variables under period spanning the period 1970 to 2015 in  
 269 their level series form.

270 **Table 1. Crude Oil Price and Selected Macroeconomic Variables 1981 to 2016**  
 271

YEAR	CRUDEPRICE	GOVT EXP	GOVT. REV	INFR
1981	29.10	1225.9660	1023.2410	14.0
1982	21.60	337.2176	325.1440	29.3
1983	26.10	701.0594	597.2821	6.9
1984	19.50	428.2152	351.2623	8.5
1985	12.80	487.1134	353.7241	10.0
1986	16.20	160.8932	90.6226	57.0
1987	15.10	27.7495	15.5886	38.3
1988	26.10	701.0594	597.2821	6.9
1989	19.50	428.2152	351.2623	8.5
1990	28.20	13.0411	10.0014	5.5
1991	18.50	22.0187	16.1290	10.2
1992	64.60	4605.3900	3629.6070	18.9
1993	14.20	16.2237	7.9694	5.4
1994	16.00	191.2289	126.0712	57.2
1995	38.70	1426.2000	1253.6000	15.0
1996	52.65	4988.8640	3431.0710	18.3
1997	21.60	337.2176	325.1440	29.3
1998	15.10	27.7495	15.5886	38.3
1999	29.20	9.9276	7.2672	39.6
2000	29.10	1225.9660	1023.2410	14.0
2001	15.10	27.7495	15.5886	38.3
2002	38.70	1426.2000	1253.6000	15.0
2003	43.70	5185.3180	4031.8280	18.6
2004	63.30	4712.0620	3553.5430	21.6
2005	61.80	3452.9910	2642.9820	21.0
2006	63.30	4712.0620	3553.5430	21.6
2007	18.60	41.0283	25.8936	40.9
2008	29.10	1225.9660	1023.2410	14.0
2009	17.40	248.7681	249.7681	72.8
2010	63.80	4194.5770	3089.1750	21.6
2011	38.70	1426.2000	1253.6000	15.0
2012	21.60	337.2176	325.1440	29.3
2013	12.80	487.1134	353.7241	10.0
2014	64.60	4605.3900	3629.6070	18.9
2015	20.00	92.7974	53.2649	44.5
2016	16.00	191.2289	126.0712	57.2

272 *Source: Central Bank Statistical Bulletin 2016.*

273 **Where:**

274 CROP = Crude Oil Price (US Dollar per barrel)

275 INFR = Inflation Rate

276 GREV = Government Revenue

## 277 **4.2 Data Description**

278 Table 2 below shows basic descriptive statistics of the series under study.

279 **Table 2 Basic Descriptive Statistics**

Variable	Mean	Median	Standard deviation	Skewness	Kurtosis
DROP	0.99	0.32	14.50	1.32	14.50
GEXP	838.57	54.62	1441.57	1.29	3.10
GREV	2106.84	170.89	1774.38	1.41	3.48
INF	27.34	15.30	15.92	4.70	5.71

280 *Source: Author's Computation*

281 The basic aggregative averages like mean, median and mode for all the observations were shown  
282 in the table. The spread in the observations was also shown by their respective standard deviation  
283 which lies between the minimum and the maximum. Kurtosis and skewness were also shown  
284 which showed the degree of peakedness and degree of symmetry of the given series.

285 The stationarity properties of the series which was a test for the unit root of the variables under  
286 study were shown below:

## 287 **4.3 Tests for Stationarity Properties of the Series**

288 **Table 3 Summary of Unit Root Tests Results**

Variables	ADF Stat	Critical Values @1%	Critical Values @5%	Critical Values @10%	P-value	Order of Integration
DCROP	-7.32	-4.18**	-3.52**	-3.19**	0.0000	I(0)
INFR	-3.50	-3.58	-2.93**	-2.60**	0.0100	I(0)
GREV	-4.43	-5.18**	-3.52**	-3.19**	0.0000	I(1)
GEXP	-7.22	-3.98*	-3.52**	-3.19**	0.0000	I(1)

289 **\*\*Stationary at the stated level of significance**

290 To select a suitable model for the analyses and tests, it was interesting to note that ARDL was  
291 chosen because it tolerates a combination of I (1) and I (0) variables. The unit root tests indicated  
292 that the variables combine the I (1) and I (0) features.

293

## 294 **Hypothesis One**

### 295 **Restatement of Hypothesis in Null and Alternate Form**

296 **H<sub>0</sub>1:** Changes in Oil Price do not have a positive and significant impact on Government  
297 Revenue.

298 **H<sub>a</sub>1:** Changes in Oil Price have a positive and significant impact on Government Revenue

299 **Test Statistics:** Autoregressive Distributed Lag (ARDL) Model

### 300 **Table 4: Summary of the ARDL Estimates for Hypothesis 1**

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
DCROP	20.886537	1.778577	11.2994	0.0000

R<sup>2</sup> 90%, Adjusted R<sup>2</sup> 89%, F-Stat 873.92(0.000), DW Stat 1.90

301 *Source: ARDL Estimates*

302

## 303 **Interpretation of Estimates**

304 The overall regression was significant as the probability of F-stat was less than 5% (0.05). There  
305 was also the goodness of fit as the R<sup>2</sup> was reasonably high at 90% indicating that 90% of the  
306 changes in government revenue (GREV) are accounted for by the lagged values of government  
307 revenue and the principal explanatory variable which was oil price volatility (DCROP). Also  
308 there was also no suspicion of autocorrelation as the Durbin statistics (1.90) by the rule of thumb  
309 is approximately equal to 2. The model was hence certified fit for meaningful analyses.

310 Given that the p-value was less than 0.05, the null hypothesis had been rejected and accepted the  
311 alternate hypothesis and concluded that crude oil price volatility positively and significantly  
312 impacts on government revenue.

## 313 **Test of Hypothesis Two**

### 314 **Restatement of Hypothesis in Null and Alternate Form**

315 **H<sub>0</sub>2:** Changes in Oil Price have no positively significant impact on Government Expenditure.

316 **Ha<sub>2</sub>**: Changes in Oil Price positively and significantly impact on Government Expenditure.

317 **Test Statistics**: Autoregressive Distributed Lag (ARDL) Model

318 **Table 5: Summary of the ARDL Estimates for Hypothesis 2**

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOG(GEXP(-1))	0.959279	0.059170	16.21218	0.0000
DCROP	0.008609	0.003647	2.360891	0.0232
C	0.286522	0.135096	2.120877	0.0402
R <sup>2</sup>	93%, Adjusted	803.54(0.00	DW	Stat
R <sup>2</sup>	99%,F-Stat0),		2.3	

319 *Source: Extract from the ARDL Estimates in Appendix 5B*

320

### 321 Interpretation of Estimates

322 The overall regression was significant as the probability of F-stat was less than 5% (0.05). There  
323 was also the goodness of fit as the R<sup>2</sup> was reasonably high at 90% indicating that 93% of the  
324 changes in government expenditure (GREV) are accounted for by the lagged values of  
325 government revenue and the principal explanatory variable which was oil price volatility  
326 (DCROP). Also there was no suspicion of autocorrelation as the Durbin statistics (2.3) by the  
327 rule of thumb was approximately equal to 2. The model was hence certified fit for meaningful  
328 analyses.

329 Given that the p-value is less than 0.05, we reject the null hypothesis and accept the alternate  
330 hypothesis and conclude that crude oil price volatility positively and significantly impacts on  
331 expenditure.

### 332 Test of Hypothesis Three

#### 333 Restatement of Hypothesis in Null and Alternate Form

334 **Ho<sub>3</sub>**: Changes in oil price do not have a positive and significant impact on the Price level.

335 **Ha<sub>3</sub>**: Changes in oil price have a positive and significant impact on the Price level.

336 **Test Statistics**: Autoregressive Distributed Lag (ARDL) Model

337 **Table 6: Summary of the ARDL Estimates for Hypothesis 3**

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
DCROP	-0.072966	0.145126	-0.502779	0.6180
C	13.07844	3.884168	3.367116	0.0017

R<sup>2</sup> 41%, Adjusted R<sup>2</sup> 34%, F-Stat 5.47(0.000), DW Stat 1.9

338 *Source: Extract from the ARDL Estimates in Appendix 5C*

339

### 340 **Interpretation of Estimates**

341 The overall regression was significant as the probability of F-stat was less than 5% (0.05). There  
342 is a less fit as the R<sup>2</sup> is reasonably high at 41% indicating that 41% of the changes price level was  
343 accounted for by the principal explanatory variable which was oil price (DCROP). There was  
344 also no suspicion of autocorrelation as the Durbin statistics (1.9) by the rule of thumb was  
345 approximately equal to 2. The model was hence certified fit for meaningful analyses.

346 Given that the p-value was greater than 0.05, the study refused to reject the null hypothesis and  
347 conclude that crude oil price changes positively and non-significantly impacts on the price level.

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### 349 **5. CONCLUSION**

350 The impact of oil price changes on selected variables in Nigeria within the period, 1981-2016  
351 had been evaluated in this study. Adopting the ex-post facto research design with annual time  
352 series and using The Autoregressive Distributed Lag (ARDL) model; the results revealed that the  
353 change in oil price had a positive and significant impact on government revenue and government  
354 expenditure, but had no positive and significant impact on the domestic price level. As the world  
355 continues to explore alternative energy sources Government must encourage diversifying the  
356 economy for improved revenue efficiency and effectiveness.

357 It is further recommended that the mono-cultural of the economy should be killed through well-  
358 planned and implementation diversification.

359 It is believed that this study will open vistas of opportunities for further research in such areas as  
360 the impact of oil price changes on different variants of inflation including a comparative study of  
361 the impact of positive oil price shocks and negative oil price shocks on all oil-producing African  
362 Countries.

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## Reference

1. Afolabi, K. (2011) Impact of Oil Export on Economic Growth in Nigeria, *Journal of economic and behavioural studies*, 2(3), 92 -96.
2. Aigbedion, I. and Iyayi, S. E. (2007) Diversifying Nigeria's Petroleum Industry, *International journal of physical sciences*, 2(10), 263-270.
3. Ani, W., Ugwunta, D., Inyiama, O. and Eneje, B. (2014) Oil Price Volatility and Economic Development: Stylized Evidence in Nigeria, *Journal of Economics and International Finance*, 6(6), 125 – 133.
4. Apere, O. T. and Ijeoma, A. M. (2013) Macroeconomic Impact of Oil Price Levels and Volatility in Nigeria, *International Journal of Academics and Research in Economicfor Management Sciences*, 2(4), 15-25.
5. Basnet, H.C.; Upadhyaya, K.P. Impact of oil price shocks on output, inflation and the real exchange rate: Evidence from selected ASEAN countries. *Appl. Econ.* **2015**, 47, 3078–3091.
6. Çat, A.N.; Önder, A.Ö. An asymmetric analysis of the relationship between oil prices and output: The case of Turkey. *Econ. Model.* **2013**, 33, 884–892.
7. Central Bank of Nigeria (1990) *Annual Report and Statement of Account*, Vol. 12, Abuja: CBN Publications.
8. Chou, K.-W.; Lin, P.-C. Oil price shocks and producer prices in Taiwan: An application of non-linear error-correction models. *J. Chin. Econ. Bus. Stud.* **2013**, 11, 59–72.
9. Corden, W. and Neary, J. (1982) Booming Sector and De-Industrialisation in a Small Open Economy, *Economic Journal*, 92(368), 825-848.
10. Farzanegan, M.R.; Markwardt, G. The effects of oil price shocks on the Iranian economy. *Energy Econ.* **2009**, 31, 134–151.
11. Ferrucci, G.; Jiménez-Rodríguez, R.; Onorante, L. Food Price Pass-Through in the Euro Area: The Role of Asymmetries and Non-Linearities; ECB Working Paper No. 1168; European Central Bank: Frankfurt/Main, Germany, 2010.
12. Ghosh, S.; Kanjilal, K. Oil price shocks on Indian economy: Evidence from Toda Yamamoto and Markov regime-switching VAR. *Macroecon. Financ. Emerg. Mark. Econ.* **2013**, 7, 122–139.

- 395 13. Goodwin, H. (1985) Oil Price Changes and its Economic and Social Reactionary Effect: An  
396 Appraisal, *Switz Journal of Social Economics*, 4(2), 50-53.
- 397 14. Hooker, M. (2002) Are Oil Shocks Inflationary? Asymmetric and Non-Linear Specifications  
398 versus Changes in Regime, *Journal of Money, Credit and Banking*, 34(2), 540-561.
- 399 15. Husan, A. M., Arezki, R. and Medas, P. (2015) Global Implication of Lower Oil Price.  
400 *Economic analysis working papers*, 10(7), 50-45.
- 401 16. Ijeh, C. A. (2010) Assessing the Impact of Overdependence on Oil Revenue to Nigeria  
402 Economy, *Journal of business management and economics*, 2(4), 164-170.
- 403 17. Ito, K. (2012) The Impact of Oil Price Volatility on Macroeconomic Activity in Russia,  
404 *Economic Analysis Working Papers*, 9 (5), 10-25.
- 405 18. Kilian, L. Not all oil price shocks are alike: Disentangling demand and supply shocks in the  
406 crude oil market. *Am. Econ. Rev.* **2009**, 99, 1053–1069.
- 407 19. Lamotte, O.; Porcher, T.; Schalck, C.; Silvestre, S. Asymmetric gasoline price responses in  
408 France. *Appl. Econ. Lett.* **2013**, 20, 457–461.
- 409 20. Laser, Y. (1987) Interest, Inflation, Growth and the Direction of the Hong-Kong Economy,  
410 *Chinese Economic Reviews*, 120(8), 19-33.
- 411 21. Lee, K. (1998) Oil Price Changes and Volatility; A Correlation Analysis on the Economy of  
412 China, *Scholarly writers' publications*, 15(4), 44-49.
- 413 22. Mendoza, O. and Vera, D. (2010) The Asymmetric Effects of Oil Shocks on an Oil  
414 Exporting Economy, *Cuadernos de Economía*, 47(135), 3-13.
- 415 23. Odeyemi, L. (2016) Ten Ways the Falling Oil Prices is Affecting Nigerians. [Online].  
416 Available from: <http://bizwatchnigeria.ng/10-ways-the-falling-oil-prices-is-affectingnigerians/>.
- 417
- 418 24. Odularu, G. O. (2007) Crude Oil and the Nigeria Economic Performance. *African Economic*  
419 *Journal*, 4(20), 225 -230.
- 420 25. Olaokun, O. (2000) Oil Price Shock Effects on Economies of African Nations, *African*  
421 *Economic Journal*, 3(10), 30-39.
- 422 26. Olomola, P. (2006) Oil Price Shocks and Aggregate Economic Activity in Nigeria, *African*  
423 *Economic and Business Review*, 4(2), 40-45.
- 424 27. Omisakin, A. O. (2008). Oil Price Shocks and the Nigerian Economy: A Forecast Error  
425 Variance Decomposition Analysis, *Journal of Economics Theory*, 2(4), 124-130.

- 426 28. Oriakhi, D. E. and Osaze, I. D. (2013) Oil Price Volatility and its Consequences on the  
427 Growth of the Nigerian Economy: An Examination (1970-2010), *Asian Economic and*  
428 *Financial Review*, 3(5), 683-702.
- 429 29. Oyejide, T. A. and Adewuyi, A. O. (2011) Enhancing Linkages of Oil and Gas Industry In  
430 Nigeria Economy, *Trade policy research*, 8(10), 10-21.
- 431 30. Oyeyemi, A. M. (2013) The Growth Implications of Oil Price Shock in Nigeria, *Journal of*  
432 *Emerging Trends in Economics and Management Sciences*, 4(3), 343-349.
- 433 31. Razmi, F.; Azali, M.; Chin, L.; Shah, H.M. The role of monetary transmission channels in  
434 transmitting oil price shocks to prices in ASEAN-4 countries during pre- and post-global  
435 financial crisis. *Energy* **2016**, 101, 581–591.
- 436 32. Salim, R. and Rafiq, S. (2013) The Impact of Crude Oil Price Volatility on Selected Asian  
437 Emerging Economies, *Journal of Development Economics*, 51(11), 1-33.

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