

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

6   *In this study we evaluated the impact of oil price changes on selected variables in*  
7   *Nigeria within the period, 1981-2016. 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 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   *of the economy should be killed through well-planned and implementation*  
13   *diversification.*

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

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17

UNDER PEER REVIEW

18 **1. Introduction**

19 The price of crude petroleum rose for the first time in Nigeria in 1973 from \$3 to \$11.6 per barrel  
20 in response to the uncertainties created by the Arab – Israel war, which erupted in October 1973.

21 The resultant rise in the price of crude petroleum generated a total of N9.2 billion in revenue for  
22 Nigeria. In 1994 as the country exported 108 million tons of crude oil that year, the upsurge in  
23 crude oil and price and the resultant increase in the revenue for the country created opportunity  
24 for industrial development and modernization of the Nigeria economy.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

110 The linear/symmetric theory asserts that oil price volatility has linear relationship on the  
111 macroeconomic indicators. Thus fluctuations in say Gross National Product (GNP), and Gross  
112 Domestic Product (GDP) are occasioned by frequent fluctuations in oil prices (Goodwin, 1985;  
113 Hooker, 1986, Laser, 1987; Hooker, 2002). The renaissance growth theory an off-shoot of  
114 symmetric theory propounded that volatility/change in oil prices rather than oil price level that  
115 has significant influence on economic growth (Lee, 1998).

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

### 123 **2.3 Empirical Review**

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

141 consequences of oil price volatility on the growth of the Nigerian economy within the period  
142 1970 to 2010 using quarterly data and employing the Vector Auto regression (VAR)  
143 methodology. They found that oil price volatility impacted directly on real government  
144 expenditure, real exchange rate and real import, while real government expenditure impact on  
145 real GDP, real money supply and inflation. By implication, oil price changes determine  
146 government expenditure level, which in turn determine the growth of the economy thereby  
147 reflecting the dominant role of government in Nigeria.

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

158 Oyeyemi (2013) confirms the positive relationship between oil price increases and economic  
159 situation; showing that during the periods of oil price decreases disruption effects occurred in  
160 balance of payments and government finances. Moreover, it was mentioned that even a small  
161 shock in global oil prices will have a long-term effect on the economic growth of the country.  
162 Similarly, Ani, Ugwunta, Iyama and Eneje (2014) in a study on Oil price volatility and  
163 economic development: Stylized evidence in Nigeria investigated chiefly the causal relationship  
164 between oil prices and key macroeconomic variables 1980 to 2010. The findings indicate that  
165 there is a positive but insignificant relationship between oil price and the Nigerian GDP.  
166 Generally, oil prices have no significant impact on real GDP and exchange rate in Nigeria.

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

172 Markets.

173 Kilian [2009] applied the Bayesian VAR model to examine the impact of oil price and inflation  
174 in USA quarterly data from 1948:1 to 2011:2. They found that oil price fluctuations do not  
175 necessarily spread and result in changes to overall inflation but rather are time specific. Some of  
176 the subsequent researchers attempted to investigate further the argument that oil price can affect  
177 CPI but not economic activities. Hooker[2002] applied the USA monthly data ranging from  
178 1974:1 to 2014:7 and disaggregated the consumer price into five different components and  
179 compared the impact of oil price separately. The results revealed that oil price shock has  
180 significant positive effects on the energy-intensive CPI. While Basnet[2015] used the  
181 Autoregressive Distributed Lags (ARDL) method to study the pass-through effect of oil prices in  
182 Malaysia's consumer prices. The results indicated that oil prices and inflation have a positive  
183 relationship. On the contrary, Chou [2013] found that since 1980, oil price passthrough has  
184 become negligible. In a recent study by Lamotte [2013] the authors found that a fluctuation in oil  
185 price is absorbed and disappeared within the first five to six quarters after the shocks occurred.  
186 Notably, the shocks do not have any significant impact in the long-run, especially when the oil  
187 price is converted to domestic currency.

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

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

203 authors in Çat [2013] applied a multivariate two-regime threshold VAR model to assess the  
 204 impact of oil prices in Turkey and found that oil price changes have a significant effect on  
 205 inflation when the changes exceed the optimal threshold point and have the ability to adversely  
 206 influence macroeconomic variables.

### 207 3. Methodology

208 The study adopts the *expost facto* research design given that it is a discourse on documented  
 209 outcomes for the purpose of drawing conclusions and inferences. The choice of these research  
 210 designs is based on the fact that this work is an *After-the-fact research* the employed variables are  
 211 such that the researcher cannot manipulate, Onwumere, (2009).

212 All the data to be utilized are time series, quantitative and sourced from secondary  
 213 sources basically, The 2017 Statistical Bulletin of Central Bank of Nigeria. They are time series  
 214 data because they are ordered following a natural frequency (Brooks, 2014).

#### 215 Model specification

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

$$218 Y_t = \alpha + \beta x_t + U_t \quad \text{_____ (Eq. 1)}$$

219 Where:

220 Y = dependent variable (explained variable)

221 X = independent variable (explanatory variable)

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

223  $\beta$  = Coefficient of the parameter estimates

224 U = error term (residual term)

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

226  
 227 With respect to (Eq. 1),  $\alpha$  and  $\beta$  are expressed as follows:

$$228 \beta = \frac{\sum (x_t - \bar{x})(y_t - \bar{y})}{\sum (x_t - \bar{x})^2} \quad \text{_____ (Eq. 2)}$$

$$229 \alpha = \bar{y} - \beta \bar{x} \quad \text{_____ (Eq. 3)}$$

230 The dependent variables are:

- 231 i. Government Revenue (GREV)
- 232 ii. Government Expenditure (GEXP)

233 iii. Inflation Rate (INFR) that proxied price level

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

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

237 **Hypothesis one (Model 1)**

$$238 \text{ GREV}_t = \beta_0 + \beta_1 \Delta OP_t + \sum a_i OP_{t-i} + u_t$$

239 Where: GREV = Govt. Revenue,

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

241 There is also the inclusion of the lagged values of the independent variables given that the  
242 model is a lagged model.

243 **Hypothesis two (Model 2)**

$$244 \text{ GEXP}_t = \beta_0 + \beta_1 \Delta OP_t + \sum a_i OP_{t-i} + u_t$$

245 Where:

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

247 **Hypothesis three (Model 3)**

$$248 \text{ INFR}_t = \beta_0 + \beta_1 \Delta OP_t + \sum a_i OP_{t-i} + u_t$$

249 Where: INFR = Inflation Rate

250 **3.6 Methods of Data Analyses**

251 The basic steps followed were:

- 252 - Standard tests
- 253 - Regression Analyses

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

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

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

- 264 1. Small Sample size is involved
- 265 2. When there is a combination of different stationarity properties in the datasets
- 266 3. There is the need to guard against autocorrelation.

267

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

269 **4.1: Data Presentation**

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

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

273

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

274 *Source: Central Bank Statistical Bulletin 2016.*

275 **Where:**

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

277 INFR = Inflation Rate

278 GREV = Government Revenue

## 279 **4.2 Data Description**

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

281 **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

282 *Source: Author's Computation*

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

287 The stationarity properties of the series which is a test for the unit root of the variables under  
288 study are shown below:

## 289 **4.3 Tests for Stationarity Properties of the Series**

290 **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)

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

292 For the purposes of selecting a suitable model for the analyses and tests, it is interesting to note  
293 that ARDL was chosen because it tolerates a combination of I(1) and I(0) variables. The unit  
294 root tests indicate that the variables combine the I(1) and I(0) features.

295

## 296 **Hypothesis One**

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

298 **H<sub>01</sub>**: Changes in Oil Price do not have positive and significant impact on Government Revenue.

299 **H<sub>a1</sub>**: Changes in Oil Price have positive and significant impact on Government Revenue

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

### 301 **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

302 **Source: ARDL Estimates**

303

## 304 **Interpretation of Estimates**

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

311 Given that the pvalue is less than 0.05, we reject the null hypothesis and accept the alternate  
312 hypothesis and conclude that crude oil price volatility positively and significantly impacts on  
313 government revenue.

## 314 **Test of Hypothesis Two**

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

316 **H<sub>02</sub>**: Changes in Oil Price have no positively significant impact on Government Expenditure.

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

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

319 **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	

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

321

### 322 Interpretation of Estimates

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

329 Given that the pvalue 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 **H<sub>03</sub>**: Changes in oil price do not have positive and significant impact on Price level..

335 **Ha<sub>3</sub>**: Changes in oil price have positive and significant impact on 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				

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

339

340 **Interpretation of Estimates**

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

346 Given that the pvalue is greater than 0.05, we refuse to reject the null hypothesis and conclude  
 347 that crude oil price changes positively and non-significantly impacts on price level.

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349 **5. CONCLUSION**

350 In this study we evaluated the impact of oil price changes on selected variables in Nigeria within  
 351 the period, 1981-2016. Adopting the ex-post facto research design with annual time series and  
 352 using The Autoregressive Distributed Lag (ARDL) model; the results revealed that change in oil  
 353 price had a positive and significant impact on government revenue and government expenditure,  
 354 but had no positive and significant impact on the domestic price level. As the world continues to  
 355 explore alternative energy sources Government must in like manner sit up to diversify 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 impact of oil price changes on different variants of inflation including a comparative study of the  
 361 impact of positive oil price shocks and negative oil price shocks on all oil producing African  
 362 Countries.

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