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CORRUPTION AND ECONOMIC GROWTH ANALYSIS IN NIGERIA: AN ARDL MODEL APPROACH

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ABSTRACT

The study examined the effect of corruption on the economic growth of Nigeria. It utilized time series data set from 1983 to 2019. The result of the unit root preliminary tests revealed mixed integration at level and first difference necessitating the deployment of the Autoregressive Distributive lag (ARDL) method in the short and long-run regression estimations. The findings revealed the absence of nexus between corruption and economic growth in Nigeria. On the long-run however, positive relationship existed in Nigeria at 5% level of significance. The result of the Granger causality test also suggested corruption did not granger cause economic growth but the other way in Nigeria. A uni-directional relationship also existed between growth rate in oil contribution to real GDP and corruption perception index. The government is, enjoined to reengineer its policies and procedures in order to simplify its bureaucracy and remove operational red tapes. The top management of business concerns should engage in more transparent treatment of the disguised and hidden costs of doing business.

Key Words: ARDL, Causality, Cointegration, Corruption, Economic growth.

INTRODUCTION

The definition given by the World Bank (1997) for corruption is the abuse of public office for private gain. This was consistent with the opinion of Ullah and Ahmed (2011) that corruption is the use of private wealth to modify the behaviour of public officer in the exercise of his public authority. It is also the misapplication of public power for personal enrichment by public officers (Bakare, 2011). Marek (2013) described corruption as the abuse of public trust in the exercise of power.

Beyond trade, the exchange of slaves for foreign goods traders was identified by Rotimi, Obasaju, Lawal and Iseolorunkanmi (2013) as the manifestation of corruptive practices in the pre-Nigerian colonial era. The country has been recorded as one of the most corrupt nations by Transparency International (T.I) since 1996. A country or territory's score indicates the perceived level of public sector corruption on a scale of 0 (highly corrupt) to (very clean) 100. The Corruption Perception Index (CPI) ranking of Nigeria in the corruption league was on the average, 122.50 out of 180 between 1996 and 2019. Year 2005 was the worst with an all-time high of 152. The best corruption perception ranking of 52 was recorded in 1997 (Transparency International, 2019).

The linkage between the growth of the economy and corruption in the literature has been mixed. Alfada (2019), Aransi (2009), Agbiboa, (2013), Bakare (2011) and Jie *et al.* (2014) reported the relationship between the two concepts as adversarial. In their findings, corruption constituted 'sand in the wheel' and barriers to growth. d'Agustino, Dunne, and Peroni (2016)

found indirect and negative linkage through military expenditure and government consumption. Similar deleterious impact on Nigerian growth was reported by Nageri, Umar & Abdul (2013), Rotimi et al. (2013)

Research papers published by Shao et al (2007) and *Podobnik* et al (2008) investigated the economic implication of corruption perception index (CPI) by transparency International found high correlation between higher long-term economic growth and higher CPI levels. A unit rise in a country's CPI score led to 1.7 per cent increase in GDP growth. It also manifested a power-play relationship which links higher level of foreign direct investment (FDI) with higher CPI score. The power-law is the functional connection between two quantities, wherein a variation in one variable leads to a proportional relative variation in the other, in this case, CPI and GDP. However, the CPI has been critiqued based on its methodology. The position taken by *Hough (27 January 2016) is that c*orruption was too complex to be captured by a single score. The other limitation is that it is only a perception study with inherent biases.

Ullah & Ahmad (2011) and Kutan, Douglas & Judge (2009) on the other, contend that corruption, serving as 'efficiency grease', oils the wheel of economic development. They are supported by Kato and Sato (2015). Even so, a few other reports found statistically insignificant connexion between economic growth and corrupt practices, (Anderson, 2013; Everhart, Martinez-Vazquez & McNab, 2003).

The oil and gas sector in Nigeria is the dominant contributor to the economy accounting for about 10 per cent of GDP and more than 90 per cent its total exports revenue (Organization of the Petroleum Exporting Countries, 2019). The country however suffers from the Dutch disease which is the co-presence of vast natural resources wealth and extreme poverty. This theory propounded by Auty (1993) afflicts Nigeria and is also referred to as the resource curse. This is consistent with the findings of Bakare (2011) in Nigeria and Awdeh and Hamadi (2019) in Mena countries.

The oil sector in Nigeria is been particularly prone to corruptive practices and in the findings of Gillies (2009) is fertile for corrupt practices given the latitudes and opaqueness in the processes for awarding contracts, licenses, bunkering, downstream and upstream operations. This according to Brock (2012) is manifested in the discretionary power conferred upon the Minister of Petroleum which promotes the likelihood of corruption through rent-seeking activities. In addition, inefficiencies, bureaucratic bottlenecks, crude oil bunkering provide opportunities for bribery and result in the 'greasing the wheels' theory. This sector therefore deserves special attention because according to Smith (2008), significant levels of corruption are said to exist within the Nigerian oil and gas sector.

This study becomes relevant given the differing findings in the intensity and direction of the linkages between the growth of the economy and corruption. This is in light of the importance of the oil sector in Nigeria, and the perception of the country as one of the most corrupt nations in the world. The rest of the research is as follows: The theoretical foundation and empirical review are contained in second section. In the third section, the methodology is presented, while section four covers the analysis and presentation of results. Section five concludes and recommends.

REVIEW OF RELATED LITERATURE

Theoretical Review

There are three main disparate schools of thought on the impact and nature of corruptive

practices on the growth of the economy. The argument for the beneficial impact of corrupt practice is based on the understanding that it generates trading activities that may not have occurred in the first place. It may in addition according to Méon and Weill (2010), enable the agents of the investing private sector to side-step burdensome regulations and thereby stimulate efficiency and productivity. The same argument is provided by Powell, Manish, & Nair (2010) for the use of corruption to circumvent growth-retarding government policies. This is only a second best option because the removal of inefficient and bureaucratic policies can only end in enhanced growth.

The contention that corruption inhibits the growth of an economy is that it distorts the efficient allocative mechanism associated with an open market system. This in the view of Mauro (1997) is injurious to the growth of the economy. Nwankwo (2014) also reported negative consequence of corruption on economic growth. The position held by Nageri et al. Umar and Abdul (2013) is that it worsens poverty level and hampers economic development.

Nas, Price and Weber (1986) provided a policy oriented theory of corruption. They posited that corruption is a multidimensional phenomenon from illegitimate activities and resulting in net beneficial social welfare where the net impact is positive. On the other hand, where the net social impact is negative, the impact is taken damaging. The theory is focused on policy choices given that corruption is seen as a product of the interaction of structural and individual variables which produces both negative and positive outcomes. Individual-level issues including greed and the likelihood of detection and prosecution require a set of corruption-reducing policies. Therefore individual, micro-level policies should be designed and deployed at micro, to address the causative factors. Structural issues such as the constraints of bureaucracy, legal system, citizen participation and the imperatives of social demands suggests a challenging set of government policies for addressing analyzing corrupt practices. In this case, macro-level policies should be employed to stymied corruption at national level.

Johnson (1982) propounded the bottle-neck theory which states that the inherent inertial in bureaucracy may encourage people to side-step official channels using bribery or other prohibited approaches to accomplish a desired outcomes. Therefore, whether wheel sanding or greasing, the need for corruption management policies of government is required and compelling. The next discussion is on the review of previous works.

Empirical Review

There is no consensus in the literature on the direction and intensity of the influence of corruption on economic growth. As pointed out in the previous section, there are three different schools of opinion. These are the "grease the wheels", the "sand the wheels" and those which found no significant nexus between corruption and the growth of the economy.

The analysis on the impact of corruption on economic growth across Indonesian provinces was conducted by Alfada (2019) between 2004 and 2015. The study deployed the Hansen (2000) sample-splitting and threshold model and instrumental variable two-stage least squares (2SLS) estimation methods. The results show that most of the provinces are bedeviled with corruption difficulties. The use of the International Country Risk Guide (ICRG) by Hakimi and Hamdi (2017) and the corruption index in the Middle East and North African nations (MENA)

resulted in similar conclusion. The Granger causality and panel cointegration techniques identified dynamic relationships between corruption and economic growth through reduced foreign direct investment inflows.

Agbodohu and Churchill (2014) provide evidence of the propensity of developing countries to cope less with corruption issues than developed ones, although the existence of corruption is manifest in all countries. It is more prevalent in low income nations because fundamental conditions for growth of corruption is more in poor countries. This seems to answer the concerns expressed by Bakare (2011) wondered at wide-spread nature of corrupt practices in developing nations as reported by Transparency International over the years. He raised the question as to whether corruption is indeed a cultural phenomenon in developing countries. However the position earlier taken by Ogundiya (2009) is that corruption is worldwide occurrence which is not specific to any culture but is a ubiquitous phenomenon.

The nexus between corruption and poverty in developing nations was also examined by Jie *et al*. (2014). The report provided evidence of strong linkage between ten most corrupt nations which appear at the bottom of the Corruption Perception Index (CPI) of the Transparency International and poverty. This also corroborates the study earlier conducted by Anohuo and Braha (2005) which reveals that where economic growth is anemic, corruption thrives more. The investigation covers 18 African nations: Zambia, Uganda, Togo, Sierra Leone, Republic of Congo, Mozambique, Niger, Mali, Malawi, Madagascar, Kenya, Guinea-Bissau, Ghana, Cote d'Ivoire, Democratic Republic of Congo, Burkina Faso, Cameroon, and Angola.

The results of analysis of 71 developing and developed countries by Ullah and Ahmad (2011) to define the optimal level of economic growth-enhancing corruption level was not unanimous. An optimal level of corruption could not be discerned. Interestingly, the growth maximizing levels of corruption was not necessarily equal to zero. In an earlier study, the investigation into the linkage between the two variables by Meon and Sekkat (2005) focussed on the quality of government. With the deployment of the rule of law index of governance and the World Bank index of corruption, the result revealed that the corruption coefficient was increasing in spite the improvement in the quality of the governance. This is a validation of the 'sand the wheels' hypothesis. Indeed, the investigation by Ali and Solarin (2019) on the level of military expenditure showed that in countries with more endemic corruption, the level of military expenses tends to be higher and vice versa.

In examining the influence of taxation and corruption on economic growth, Aghion *et al*. (2016) utilised the endogenous growth model. They also found that where the tax revenues are efficiently and effectively utilised through reduction in corrupt practices the welfare gains to the people are enhanced. The study carried out in Nigeria by Nageri et al., (2013) showed significant influence of corruption on the Gross Domestic Product. Using Ordinary Least Squares (OLS) estimation method, they reported significant but adverse nexus. Similar result, using the same method was obtained by Rotimi et al., (2013).

The efficiency-enhancement theory is that corruption can compensate for the adverse effect of the distortions caused by ill-functioning bureaucracy and grease the wheel of development. This hypothesis was upheld by Huang (2016) which investigated the relationship between the variables in 13 Asia-Pacific countries. The finding

reveals that China and South Korea despite high-corruption levels, experienced economic advancement. This is consistent with the firm-level investigation of Kato and Sato (2015) in India. The high level of corruption in China has been reported by the Turkish Journal (2014) to be strongly correlated with continuing growth of the economy.This is in support with the "grease the wheels" hypothesis.

The result of Guatemalan study by Godinez and Gartia (2015) showed that firms which, operate in similar institutional environment are at advantage in benefiting from corrupt practices in a foreign country. On the other hand, companies from countries with lower levels of corruption seem to be more adversely affected in the host country. The East Asia must be an exception to the 'grease the wheels' theory. In Taiwan, South Korea and Japan, corruption exists together with rapid growth of the economy. In this case, corruption does not hamper economic growth given that foreign investments are attracted to the region resulting in economic growth (Wei, 1998).

Evidence supporting the 'grease the wheels' hypothesis was provided by Méon and Weill (2010) in a panel data of fifty-four developed and developing economies. They deployed 3 measurements of corruption and 5 measurements of other governance parameters and concluded that corruption was generally beneficial to the economies where institutions are ineffective. The reason advanced for this phenomenon in developing countries by Colombatto (2003) was that corruption reduces the hostile conditions hindering growth by serving as "speed money" in the face of institutional inefficiency and sometimes, political instability.

Olken (2009) employed two measurements of corruption in analysing the impact of corruption on road constructions in some in Indonesian villages. Using the qualitative approach, he conducted a perception survey of corruption among the villagers. He also deployed the quantitative approach of calculating the amount of project materials purchased but missing. He came to the conclusion that corruption was harmful to the success of the projects. However, the result reported by Kato and Sato (2015) using corruption-related criminal cases as the measure corruption in the India manufacturing sectors was different. The use of the number of law violations as the parameter for measuring the level of corruption revealed that corruption stimulated productivity. Indeed, there were improvements in both the capital-to-labour ratio and gross value added per worker.

The evolutionary classification of corruption was addressed by Ali (2015) who identified three phases: pre-modern, modern and post-modern periods. He argued that the causes-effect impact of bribery varies across the stages and submitted that the level of institutional development at the different stages affects the impact and efficacy of corruption-reducing actions of government. In another vein, significant moderating impact of corruption on the relationship between urbanisation and carbon dioxide emissions was observed by Wang, Zhang, and Wang (*2018*) in the BRICS countries. This is an indication of poor environmental performance.

The impact of corruption on foreign aid in 42 Sub-Saharan African (SSA) countries between 2000 and 2010 was investigated by Mohamed et al. (2015). Using the Quintile regression (QR) method, they found that the level of corruption was positively and significantly related to the level of foreign aid received. Nwankwo (2014) on the other hand made use of the Granger causality test,

found one-way relationship that GDP does not granger cause corruption. The simulation approach utilised by Bakare (2011) showed that the corruption perception index (CPI) coefficient demonstrated significant adverse nexus in both the short and long run. This contrasts with the report of Subair (2013) which deployed the OLS method and discovered a limited connection between the two variables in Nigeria.

A review of the annual corruption perception index reports by Transparency International (2019) on a cross section of developed and developing nations shows that on the average, the perception of respondents is that corruption is strongly associated with developing countries. The top 6 nations which scored between 85 and 87 out of 100 points are Denmark, New Zealand, Finland, Singapore, Sweden and Switzerland. The bottom nations with scores ranging between 9 and16 out of 100 points are Venezuela, Yemen, Syria, Sudan, South Sudan and Somalia (Figure 1).

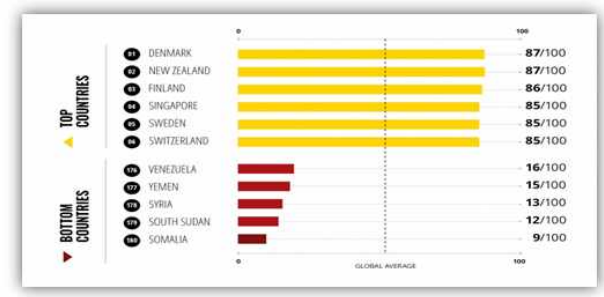

Figure 1: Transparency Perception Index in Sample Developing and Developed Countries 2019

Source: Transparency International (2019)

Anderson (2015) however found mixed results of the impact of corruption on the development of the economy. Igbaekemen, Abbah, and Geidam (2014) could not establish the level of influence of corruptive practices on the growth of the economy. Therefore, with the conflicting direction and the intensity of impact between economic growth and corruption in the literature, the need for this research especially for Nigeria becomes manifest. The method of research is presented in the next section.

METHODOLOGY

Data Source and Descriptions

The study obtained the secondary data for a period of thirty seven years (1983 to 2019). The measurement of corruption is proxied by the Corruption Perception index (CPI) obtained from the Transparency International (various years). The other secondary data obtained are from the Central Bank of Nigeria's (CBN) Annual Statistical Bulletins of various years are the Real Gross Domestic Product (proxy for economic growth), Gross Fixed Capital formation, and the contribution of the oil industry to GDP.

Model Specification

In formulating the model for estimation, the research took into consideration, the approaches adopted in literature but adapted to take salient variables into consideration.

The contribution of the oil and gas sector to GDP has been included because the sector contributes on the averaged about 10% of GDP and is responsible for about 65% of government revenue and about 88% of foreign exchange earnings of the country (KPMG Professional Service, 2019). In addition, the sector is rife with corruption (Gillies, 2009). Furthermore, the country is symptomatic of the Dutch disease. The Gross Fixed Capital Formation which reflects the addition to the capital stock including foreign direct investments (FDI), foreign aid has been added to the model. This is because of the reported influence of FDI (Ugochukwu & Uruakpa, 2013) and foreign aid (Mohamed et al., 2015) on the level of corruption

practices. The functional formulation of the model for this study in its econometric form is therefore expressed as follows:

$$\Delta RGDP = \beta_1 + \beta_2 CPI + \beta_3 \Delta CAP + \beta_4 \Delta OIL + u \quad (1)$$

Where:

RGDP = Real Gross Domestic Product Growth rate

CPI = *C*orruption Perception Index

CAP = Gross Fixed Capital Formation Growth rate

OIL = Growth rate of Contribution of the Oil sector to GDP

The a priori expectation, based on the efficiency enhancing theory is that the level of corruption is positively linked to economic growth.

Estimation Techniques and Procedure

The estimation utilised a three-stage approach. In the first stage, the descriptive analysis of the variables is done in order to comprehend the nature of the variables. Stationarity tests (Augmented Dickey-fuller (ADF), and Phillip Peron) are required in order to select the estimation technique to be deployed in the estimation stage.

Since as it is in this particular case, some of series are stationary at level while others are at first difference, the applicable estimation technique is the Autoregressive Distributive lag (ARDL) (Pesaran *et al*., 2001). This is due to the fact that the technique method yields normal consistent long run coefficients notwithstanding the stationarity status of the variable ((I(0) and/ or I(1)). In addition, the method is useful for handling potential endogeneity of the variables which is likely to occur in this model. It removes bias from the long-run model estimates and provides valid t-statistics even in the presence of possible endogeneity problem. The Autoregressive Distributive lag model is specified as in equation (2):

$$Y = \lambda_0 + \sum_{i=1}^{m} \alpha_1 + Y_{t-1} + \sum_{i=0}^{n} \emptyset_1 ECM + \mu_t \quad (3)$$

Where: α, $\lambda_\circ$, and $\emptyset_1$ are the coefficients estimated from equation

The third stage involves the calculation of the short-run dynamic parameters. This is the estimation of an error correction model (ECM) to know the speed of adjustment back to the equilibrium after the introduction of a shock associated with the long-run estimates:

$$Y = \varphi_0 + \sum_{i=1}^{m} \emptyset_1 \Lambda EC_{t-1} + pECM_{t-1} + \varepsilon_t$$

Where: $\varphi_\circ$, $\emptyset_1$ and Þ are the coefficients estimated from equation

The error correction term ECM_{t-1} shows how the speed of re-adjustment of the variables to equilibrium level after a shock. This is represented by coefficient (Þ) which is expected to be a statistically significant coefficient with a negative sign. The residuals (ε_t) is also expected to be normally distributed with constant variance and zero mean. Although with the ARDL technique, there is no need for unit root pre-testing of the series (Pesaran et al, 2001). This was conducted in this research in order to eliminate the possibility of the variables being integrated in second order. This would have rendered the model unsuitable for bounds testing.

In the third stage which is the post estimation exercise, the study examined the estimated model to check for its validity and robustness. The following tests were carried Normality (Ramsey Regression Equation Specification Error **Test** RESET), Stability (NARDL CUSUM), Breusch-Godfrey Serial Correlation Lm, Linearity (Ramsey Reset Test) and the heteroskedasticity tests. The Granger causality test was also utilised to understand the direction of causality between series. E-views version 9 software was utilised in the computations.

RESULTS AND DISCUSSION OF FINDINGS

Pre Estimation Tests

The characteristics of the variables are provided in Table 1.

Table 1: Descriptive Statistics of Estimated Data

Statistics	. . -	CPI	ΔCAP	ΔOIL
Mean	3.62	1.80	0.35	21.40
Median	4.23	1.60	1.39	8.19
Maximum	15.33	2.70	40.39	123.63
Minimum	-10.92	0.60	-30.17	-43.16
Std. Dev.	4.89	0.61	13.30	41.32
Skewness	-0.53	0.20	0.07	0.83
Kurtosis	4.29	1.70	4.34	2.93
Jarque-Bera	4.30	2.86	2.81	4.24
Probability	0.12	0.24	0.24	0.12
Sum	133.78	66.70	12.89	792.11
Sum Sq. Dev.	861.99	13.35	6,370.80	61,474.75
Observations	37	37	37	37

Source: Authors' computation (2020) using E-views 9.0

The large differences between the maximum and minimum and values result showed significant trends deviation in the variables.

Except for RGDP, all the other variables are negatively skewed. Also, apart from the CPI and the contribution of the oils sector to GDP, the other variables are platykurtic with lesser kurtosis than the normal distribution. The others are leptokurtic. The values of the Jarque-Bera statistic which is a goodness of fit and a test of normality that combines skewness and kurtosis characteristics are greater than standard threshold of 2. The Jacque-Bera probability values are greater than 0.05. This indicates that all the variables follow normal distribution at 5 per cent significance level.

The results of the unit root tests using Augmented Dickey Fuller (ADF) and Phillip Perron tests are presented in Table 2:

Table 2: Unit Root Test Results: Augmented Dickey Fuller (ADF) and Phillip Perron Tests

Series	Critical Value 5%	ADF (Prob.)	Equation Specification	Order of Integration	Phillip Perron (Prob.)	Equation Specification	Order of integration
ΔRGDP	2.95	-3.84 (0.01)	Intercept	I(0)	3.84 (0.01)	Intercept	I(0)
CPI	2.95	7.89 (0.00)	Intercept	I(1)	12.55 (0.00)	Intercept	I(1)
ΔCAP	2.95	6.68 (0.00)	Intercept	I(0)	6.42 (0.00)	Intercept	I(0)
ΔOIL	2.95	6.16 (0.00)	Intercept	I(0)	6.16 (0.00)	Intercept	I(0)

Source: Authors' computation (2020) using E-views 9.0

Estimation Results

Prior to the estimation of the regression, and given the sensitivity of Auto Regressive Distributed Lag to lag structure, it is necessary to determine the optimal lag length before deploying the estimation techniques. This is presented next.

Optimal Lag Length Selection

The result of the optimal lag length is presented in Table 3

Table 3 Results of the Lag Length Criteria

Lag	LogL	AIC	LR	FPE	HQ	SC
0	-427.66	25.39	NA	1,252,387.12	25.45	25.57
1	-395.50	24.44	54.87	488,005.24	24.75*	25.34*
2	-377.40	24.32*	26.61*	450,302.31*	24.87	25.93
3	-364.50	24.50	15.93	604,539.57	25.30	26.83

Source: Authors computation (2020) using E-views 9.0

* indicates lag order selected by the criterion

AIC: Akaike information criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

HQ: -Hannan- Quinn information criterion

SC: Schwarz information criterion

All the lag length criteria selected a lag length of 2 periods except the Schwarz information criterion and Hannan- Quinn

information criterion which selected one period lag length. One period lag-length explains how the performance of the immediate past year influences on the current year while a two period lag-length explains how the outcomes of the past 2 years influences the current year.

The optimum lag length of 2 periods selected Final prediction error (FPE) and Akaike Information Criterion (AIC) is accepted. This is because when the observation is less than 120, these two criteria are have advantage over other lag selectors. They are more capable to maximise the true lag length recovery while at the same time minimizing the probable under-estimation (Liew, 2004).

Bound test

The result of the long run Bounds Cointegration test relationship among the variables at 5% level of significance is in Table 4.

Table 4: Bounds Cointegration Test Result

Test Statistic	Value	k
F-statistic	4.17	3
Critical Value Bounds		
Significance	I(0) Bound	I(1) Bound
10%	2.37	3.2
5%	2.79	3.67
2.5%	3.15	4.08
1%	3.65	4.66

Source: Authors computation (2020) using E-views 9.0

The result revealed that since the estimated F-statistics value of 4.17 is greater than the upper bounds critical values for the 5% significant levels, there exists long run relationship among the variables. The null hypothesis which states that there is no co-integration between the variables is not accepted. The determination of the estimated Auto-Regressive Distribution Lag short run and long run models are presented next.

Short Run ARDL Result

The Short run Auto Regressive Distributed Lag (ARDL) is obtainable from Table 5.

Table 5: Short run Auto Regressive Distributed Lag (ARDL)

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ΔRGDP(-1))	-0.29	0.12	-2.39	0.03
D(CPI)	**-1.38**	1.81	-0.76	0.45
D(ΔCAP)	0.04	0.03	1.15	0.25
D(ΔOIL)	-0.04	0.01	-3.48	0.00
CointEq(-1)	-0.53	0.10	-4.81	0.00

Source: Authors computation (2020) using E-views 9.0

Adjusted R-squared = 0.21; F-Statistics = 2.52; Prob(F-Statistics) = 0.04

The coefficient of $\Delta RGDP_{-1}$ is -0.29 which indicates that there is a negative relationship between the growth rates in real GDP of previous year in comparison with the current year. This indicates that in the short run, a percentage change in growth rate of real GDP in the previous year would lead to 0.29% change in the growth rate of real GDP in the current year.

The relationship is statistically significant because the probability value is less than 5% Negative linkage between corruption perception index and Gross Fixed Capital Formation Growth rate on the one hand and economic growth was recorded in the short-run. The relationships were not statistically significant since the probability values were greater than 0.05. The contribution of oil sector to economic growth was negative and significant in the short run. A percentage increase in growth rate of contribution of oil sector to RGDP would result to a 0.04% reduction in RGDP.

The value of Coint Eq(-1) is negative and significant. This with coefficient of (-0.53) shows

the speed of convergence to the equilibrium in the short-run after a shock.

Long-Run ARDL Result

The long- run Auto Regressive Distributed Lag (ARDL) is obtainable from Table 6.

Table 6: Long run Auto Regressive Distributed Lag (ARDL) Result

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPI	4.21	0.13	2.41	0.02
ΔCAP	0.10	0.10	0.96	0.35
ΔOIL	0.12	0.01	3.51	0.01
C	14.97	8.02	1.87	0.07

Source: Authors computation (2020) using E-views 9.0

The estimated long run model after normalization is stated as:

ΔGDP = -14.97 + 4.21CPI + 0.1CAP + 0.12OIL + ε (5)

T Statistic (1.20) (0.35) (0.11)

The relationship between the growth rate of contribution of oil sector to RGDP in the long run and RGDP is positive and statistically significant. A percentage increase in growth rate of contribution of oil sector to RGDP would result to a 0.12% increase in growth rate of real GDP. The Gross Fixed Capital Formation Growth rate is not statistically significant.

Post Estimation Tests

The results of the normality, heteroscedasticity, stability, serial correlation and linearity tests are presented and discussed in turns.

A. Vector Error Correction Residual Normality test

This test was carried out using the histogram normality test to check if there was a normal distribution among variables in Figure 2. Since the probability value (0.84) is higher than the critical value of 0.05, the variables are significant and therefore largely normal.

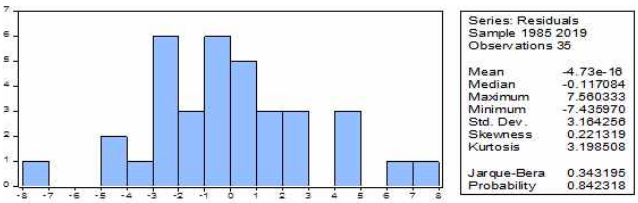

Figure 2: Normality Test

Source: Authors' computation (2020) using E-views 9.0

Heteroscedasticity Test

The heteroscedasticity test (Breusch & Pagan, 1979) result of the heteroscedasticity showed that presented in Table 8 indicates that with the probability of 0.23 which is greater than the 5 percent statistical significance, the null hypothesis of the absence of heteroscedasticity is accepted.

Table 8: Heteroscedasticity Test Result

F-statistic	1.400614	Prob. F(6,28)	0.25
Obs*R-squared	8.079648	Prob. Chi-Square(6)	0.23
Scaled explained SS	5.684214	Prob. Chi-Square(6)	0.46

Source: Authors' computation (2020) using E-views 9.0

Stability Test

The Non-Linear Autoregressive Distributive Lag C**umulative Sum Control Chart (**NARDL CUSUM) graph was deployed to check the stability of the model. The decision rule to check for stability is that if the blue line is in between the red lines, the model is stable. Indeed, the estimated model lies within the 5% significance line for CUSUM tests and thus does not violate the linear regression assumptions.

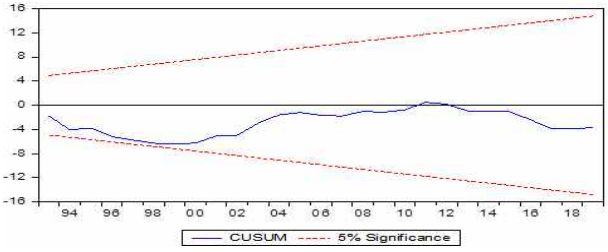

Figure 3: **Cumulative Sum Control Chart**

Source: Authors' computation (2020) using E-views 9.0

Breusch-Godfrey Serial Correlation Lm Test

This serial correlation test was used to check for the serial relationship between the variables (Table 7).

Table 7: Result of Breusch-Godfrey Serial Correlation LM Test Result

F-statistic	1.84	Prob. F(2,26)	0.18
Obs*R-squared	4.34	Prob. Chi-Square(2)	0.11

Source: Authors' computation (2020) using E-views 9.0

The probability value of the Obs* R-squared is (0.11). This is greater than 5% significance level. The null hypothesis would not be rejected implies that there is no presence of serial correlation which is desirable.

Linearity test

The test for linearity was carried out using the Ramsey Reset Test, the null hypothesis states that there is no linearity while the alternative hypothesis states that there is linearity. The decision criteria state that if the probability value of the F-statistics is greater than 5% significance level we do not reject the null hypothesis.

Table 8: Results of Ramsey Reset Test

	Value	df	Probability
t-statistic	0.37	27	0.71
F-statistic	0.14	(1, 27)	0.74

Source: Authors computation (2020) using E-views9.0

The result above states that the probability value of the F-statistics is greater than 5% significance level so the null hypothesis which states that there is no linearity in the model is not rejected.

Model Validity

There are diverse results obtained from the *post-estimation diagnostic tests*. In evaluating the residuals, the Vector Error Correction residual heteroscedasticity tests showed the absence heteroscedasticity while the Vector Error Correction residual result confirmed the normality of the residuals. The Non-Linear Autoregressive Distributive Lag **Cumulative Sum Control Chart (**NARDL CUSUM) graph depicted the stability of the model. The result of the Breusch-Godfrey Serial Correlation LM test revealed the absence of serial correlation. The result of linearity test using the Ramsey Reset test showed the absence of linearity in the model.

There are some violations of the some of the assumptions underlining the Ordinary Least Squares estimators. However, given the nature of data sourcing and management in Nigeria, a developing country this model can be reasonably relied upon as basis for making reliable statistical extrapolations. The estimated model can therefore be relied on for policy formulation.

Granger Causality Test Result

The result of the Granger Causality test is presented in Table 9.

Table 9: Granger Causality Test Result

Null Hypothesis	p-value
CPI does not Granger cause GDP	0.0271*
RGDP does not Granger cause CPI	0.6194
CPI does not Granger Cause OIL	0.0315*
OIL does not Granger Cause CPI	0.0535

Source: Authors computation (2020) using E-views9.0

Note: **Significant at 5 percent level
Included observations: 35
Degree of freedom: 2

The result of the pair-wise Granger causality test in 35 observations suggested uni-directional causation in the direction of corruption. In effect,

corruption does not granger cause economic growth but the other way in Nigeria. A uni-directional relationship also exists between growth rate in oil contribution to real GDP and corruption perception index (CPI). This means that CPI does not granger cause changes in the oil contribution of the oil sector to real GDP but the oil sector is indeed a propellant of corruption.

DISCUSSIONS

The findings revealed the absence of nexus between corruption and economic growth in Nigeria. On the long-run however, positive relationship existed in Nigeria at 5% level of significance as illustrated in equation (5):

$$\Delta GDP = -14.97 + 4.21CPI + 0.1CAP + 0.12OIL + \varepsilon \quad (5)$$

The long-run result suggests that an increase in the corruption perception index as published by Transparency International would cause 4.8 percentage rise in the Nigerian GDP. This is in line with the greasing the wheel hypothesis in which corruption compensates for the adverse effect of the distortions caused by ill-functioning bureaucracy. Some investments and activities which could hitherto have not been come to life are executed thereby engendering economic growth.

As argued by Méon and Weill (2010) and Powell, Manish, & Nair (2010) it gives the investing private sector the opportunities to side-step burdensome regulations and growth-retarding government policies. The same holds for the findings of the thirteen Asia-Pacific countries by Huang (2016) that China and South Korea despite high-corruption levels, experienced economic advancement. It is also consistent with the firm level investigation of Kato and Sato (2015) in India and Godinez and Gartia (2015) in Guatemala.

The average Chinese annual economic growth rate of 1.8 per cent between 2010 and 2019 in the face of average CPI of 38 per cent (Tradingeconomics, 2019) during the period bears testimony to this phenomenon. This is the so-called Asian paradox which is the positive correlation linkage between corruption and the growth of the economy in most Asian economies as reported by Rock and Bonnett (2004) and, Li and Wu (2007). The reason advanced for this phenomenon in developing countries by Colombatto (2003) was that corruption reduces the hostile conditions hindering growth by serving as "speed money" in the face of institutional inefficiency and sometimes, political instability. In order to bring a veneer of legality to this practice, bribery couched in different names including consultancy fees, lobbying expenses, founder's fees, agency fees and similar business nomenclatures

Indeed, in order to ensure corporate survival, businesses adopt unorthodox methods at using bribery as facilitation payment and considered as such genuine part of the cost of doing business. Such circumlocutions payments are also deployed where the corporate policy prohibits corrupt practices. The facilitation agents, consultants and lobbyists come in useful here as middle channels of procurement. Indeed, bribery is considered as a facilitation fee which is a legitimate cost of doing business in Japan, Taiwan and South Korea.

The Nigerian corruption parody is not surprising. It is in line with the findings of the forty-two Sub-Saharan African (SSA) countries studied by Mohamed et al. (2015). Despite several anti-corruption efforts by the Economic and financial Crime Commission (EFCC), Independent Corrupt Practices Commission, the

plague of corruption still prevails in the country.

The result of the Granger causality test also suggested uni-directional causation from economic growth in the direction of corruption. In effect, corruption does not granger cause economic growth but the other way which is in line with the result of the research by Abu, Karim and Aziz (2015) on the Economic Community of West African States (ECOWAS).

The uni-directional relationship between the oil sector and corruption perception index in the direction of the latter means the oil sector is indeed a promoter of corruption in the country which is consistent with the findings of Nwankwo (2014). The existence of significant levels of corruption in the Nigerian oil and gas sector arises from the discretionary powers conferred upon the top officials of the petroleum regulatory bodies which promote the likelihood of corruption through rent-seeking activities. The endemic inefficiencies, bureaucratic bottlenecks, crude oil bunkering provide opportunities for bribery and result in the 'greasing the wheels' hypothesis (Smith, 2008).

The beneficial impact of corruption cannot be a sustainable strategy in the future in the face of globalization and closer integration of the world economy. The Capital Arbitrage Theory propounded by Samuelson (1948) may come to play and shift foreign direct investments to other climes since international ventures seek higher profit in more transparent climes

CONCLUSION

The objective of this research was to investigate the relationship between economic growth and corruption practices. Although the findings in the literature are mixed, more of the results found corruption to be deleterious to the growth of the economy. This study supports the minority result that corruption is indeed beneficial. This is borne out of the fact that in a developing economy with weakly functional institutions, facilitation payments (speed money) provides the investors with the opportunities to circumvent arduous regulations and growth-retarding government policies. Indeed, the marginal impact of corruption on inequality is negative when it provides informal labour market opportunities to the general public, but positive when firms gain access to privilege treatments. There is a unidirectional causality running from corruption to economic growth thereby enhancing economic growth. This upholds the efficiency enhancing theory of corruption. Similar one-way causality from corruption to the oil sector exists.

The government is bidden to remove operational red tapes. Facilitation and consultancy fees are legitimate when paid in line with international practices. The top management of business concerns should engage in more transparent treatment of the disguised and hidden costs of doing business. The jury is still out on the utilization of corruption as a veritable vehicle for greasing the wheel of sustainable economic growth.

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