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An Analysis of Declining Oil Revenue Implications on Oil-Exporting Countries: An ARDL Bound Test Approach for Nigeria and Venezuela.

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Abstract— This study is a comparative analysis of declining oil revenue implications on oil-exporting countries, the case of highly oil-dependent nations; Nigeria (West Africa) and Venezuela (South America). The Autoregressive Distributed Lag (ARDL) Bound Test Approach was employed for the estimation of the parameters of the model. Yearly time series data for 40 years (1981-2020) were employed for the empirical analyses. However, the unit root tests were first carried out using the Augmented Dickey-Fuller (ADF) and Philips Peron's (PP) Tests. The Unit Root results indicate that all the variables of the model are stationary at level I(0) and at first difference I(1). This outcome was the basis for the choice of the ARDL estimation technique for the analyses. Contrary to expectation, the findings for both Nigeria and Venezuela reveal that government expenditure increases for a per cent decline in oil price. The findings further reveal that the increasing expenditures in both economies are financed mainly through borrowing and seigniorage. The results also show that there is a substantial decline in government revenues of both countries for a per cent decline in oil price. It however, shows that these nations are overwhelmingly relying on oil exports for the nations' sustainability. Given the above findings, it is highly recommended that both Nigeria and Venezuela diversify their revenue base, develop other sectors of the economies since the nations are endowed with other natural resources aside from oil, and restore security which would help in attracting foreign investors and ensure effective management of government funds. However, an economic model has been proposed to help in closing the revenue gaps in these highly oil-dependent nations.

Index Terms— Autoregressive Distributed Lag (ARDL) model, borrowing, comparative analysis, declining oil revenue, oil price, seigniorage.

I. INTRODUCTION

Most oil exporting countries, especially those having oil as their "*heart-beat"* are facing multiple economic crises in recent times; mainly from the COVID-19 pandemic which has crippled global economic activities and the collapse of the global oil price which shrinks the oil revenue of most of the oil exporters. The present crisis in the global oil market is also driven by the carbon reduction target and high improvement in technology to gradually shift from hydrocarbon-based economies to ones based on a more sustainable form of energy, thereby making renewable energies to be the most preferred energy option due to the low cost of its production [14], [37], [13].

However, this is the very first time in history that the West Texas Intermediate (WTI) crude oil price moved towards negative in April 2020 while the Brent Crude price declined significantly as most of the oil exporting countries are tremendously susceptible to constant volatility in the oil market. The volatility in the global oil price did not begin today but started in the 1970s while the issue of future trading supports the increasing speculation in the oil market. Both high demand and high supply of oil contributed to the high fluctuations which are frequently seen in the global oil market. More so, the current decline in the oil demand was further crowned by the unanticipated COVID-19 pandemic that led to the decline in production and mobility of oil across the globe due to the quarantines and the lockdowns in almost all the countries of the world, thereby leading to the drastic decline in the oil price which became lower than never before in history. Hence, a ripple effect of a crash in the financial markets and a drastic decline in the oil revenue of most of the oil exporting countries. However, the drastic contraction of global oil demand in recent times is the first after the global financial crisis of 2007-2009. On the supply side, the inability of the Organization of the Petroleum Exporting Countries (OPEC) to cut production as proposed during their meeting on the 5th of March, 2020, aggravated the plunge in oil price to about $31.1 per barrel (WTI) on the 9th of March 2020 and further declined to $11.57 per barrel (WTI) by the 21st of April 2020 due to the impact of the COVID-19 pandemic [51], [65].

Oil price fluctuations are crucial to the global economy since oil serves as the primary energy source and raw materials for several industries [38]. The impacts of oil on the world economy are paramount in today's world as it is an essential parameter for growth and development in the entire globe. For several decades now, oil has been an indispensable and highly stabilising energy commodity, which is stimulating the global economy. There is no doubt that oil price fluctuations have a significant impact on the total world economy since it serves as a vital input commodity for most oil importers and a very crucial source of revenue generation for most oil-exporting countries. There is indeed a positive correlation between oil price and oil revenue because fluctuations in oil price result in revenue fluctuations as well. The level of impact of the fluctuations differs across nations as it depends on different factors in these economies. These perspectives could be regarding the macroeconomy as a whole, socio-political factors, international market effects and the level of oil reserves. Also, other factors could be a strategy

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employed by the firm in an economy, the climatic condition of a nation and even depending on the developmental stage of the economy [16], [2], [38], [70], [3].

However, most of the oil exporters are also affected but this study centers on the impact of the declining oil revenue on the economic performance of two highly oil-dependent nations – Nigeria and Venezuela for a comparative analysis. Nigeria is blessed abundantly with natural resources as it depends so much on the oil sector which accounts for over 91% of its revenue and 82% of its foreign exchange earnings [55].

Aside from the high proceeds the Nigerian economy has reaped from oil, for over three decades now; the nation is still facing many issues such as a high level of unemployment, high level of insecurity, low level of production, poor infrastructural development and high level of poverty as over 70% of the populace are living below the poverty line. The Nigerian economy is also facing severe macroeconomic instability due to its over-dependence on oil export, exchange rate depreciation and fiscal imbalances. Nigeria is the only member of OPEC that is still importing fuel in the country because most of the refineries are not functional [14], [15], [36], [32], [1].

Venezuela is one of the most affected nations among its peers as the economy is overwhelmingly dependent on oil revenue for its sustainability. The declining oil revenue has indeed led to an increase in foreign debt, an increase in poverty level, and increasing political tension due to the economic instability. The Venezuelan economy is falling apart because the residents now lack access to basic food while the country has laid off many of its oil workers and scrapped multibillion-dollar projects due to lack of funds and resources to finance those projects [14], [68], [69], [51], [42], [62].

The impact of these established factors on oil-exporting economies differs across nations given that some countries can "*weather the storm*" than others due to their excess savings with the Sovereign Wealth Fund while other nations are having the challenges of increasing public debt, high levels of insecurity and inability to attract foreign investments to propel economic growth.

The intricate issue with special concern is the loss of oil revenue on the part of the oil-producing economies as a result of the persistent decline in oil prices. Hence, the main purpose of this study is to examine the consequences of declining oil revenue on the economic performance of highly oil-dependent nations: Nigeria (West Africa) and Venezuela (South America) for a comparative analysis.

The study also aims to examine the impact of declining oil revenue on the macroeconomic variables of both economies due to the continuous decline in oil prices. This research will be beneficial to the governments of Nigeria and Venezuela as well as other highly oil-dependent economies to find solutions to the problems of decreasing oil prices which led to decreasing oil revenue by discovering other endowed natural resources which can yield more revenue and by diversifying the economies too. More so, the power of OPEC has always been to shore up prices but the collusive power of the oligopoly has failed because OPEC could no longer control the production quotas of its members in recent times. However, with the fear of the failure of the power of OPEC and with the impression that the fall in oil prices might continue, an economic model is developed in this study to help close the revenue gaps in these two oil-dependent nations: Nigeria and Venezuela.

II. LITERATURE REVIEW

Crude oil is one of the most transacted commodities across the globe. Fluctuations in oil prices have been a constant phenomenon since February 1946 when oil price was as low as $1.17 per barrel up to July 2008 when oil price reached its highest level of $145.31 per barrel. Currently, the oil price as of the 07th of November, 2023 was traded at $79.05 per barrel for the WTI crude and $83.31 per barrel for the Brent crude [50]. The average closing price of the WTI crude for the year 2023 is $78.21 per barrel [40]. The changes in oil price in the whole series is often demonstrated using a roller coaster simulation of oil prices which usually displays different years with the corresponding oil prices. This, however, indicates that oil price has been fluctuating over the years.

However, the magnitude of these changes differs across nations, depending on whether the nation imports or exports oil. Both oil exporters and oil importers find oil prices very critical in dealing with the affairs of the nation as oil serves as a crucial input to oil importers and a good source of revenue generator to oil exporters. Both are economically dependent on oil and as such, fluctuations in oil prices as we often observe, affect both market sides [16], [60].

Globally, the price of oil is of great importance since oil is the highest commodity, traded in volume and value across the globe. Oil is the number one export product in the world as it accounts for about 4.8 per cent of the world's total exports while the total value of oil shipments was about $786.3 billion in 2015 [69]. The price of all the energy-demanding goods and services, as well as the price of other fuels, are to a reasonable extent, linked to the oil price while oil revenues play a very significant role in the structure of the oil-exporting countries [12], [3], [17], [18]. Hence, an unexpected change in the price of oil tends to have a significant impact on oil-exporting economies, oil-importing economies and the world as a whole [16], [35].

There is a wide gap between the current oil price and the oil prices that most oil producers break even. The oil price has to be at a certain level for most of the oil-dependent nations to be able to balance their budgets. Oil price needs to be above $100 per

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barrel for the majority of the oil exporters to be able to balance their national budgets [7], [61]. Although the Norwegian economy as an oil-producing nation is also highly dependent on oil revenue, studies reveal that the nation has the largest Sovereign Wealth Fund in the world and has mapped out $41 billion from the oil savings to boost its economy [56].

The important role of oil in the macroeconomy has indeed attracted lots of attention given that many studies have examined whether there is a correlation between fluctuating oil prices and the macroeconomic variables. [20] carried out the first research on this subject for the United States of America. The study shows that oil was the important variable that was responsible for almost all of the recessions in the United States. On the other hand, [43] found that there is no relationship between the macroeconomic variables and changes in oil prices. Consistently, [31] shows that changes in oil prices have no significant impact on the main macroeconomic variables

[66] found that the implication of the fluctuations in oil price on the GDP growth and inflation of the Chinese economy is higher than those of the developed nations – the United States of America and Japan. Consistently, [23] shows that there exists a relationship between the oil price and the macroeconomic variables while [3] posits that the changes between the oil price and the macroeconomic variables are highly unpredictable given that both oil exporters and oil importers are affected diversely. On the other hand, [66] reveals that the impact of fluctuating oil prices on the GDP of developed oil-importing countries is highly insignificant when compared with those of emerging economies. [27] found that the direct and indirect effects of increasing oil prices on the GDP of Iran and Russia are positive while the direct effect is negative for Canada.

[42] examined the effect of oil price decline on the economy of Venezuela and found the existence of a three-digit inflation rate, a deficit in current account, political instability, a contraction in production and a fall in GDP. Although the study is mainly historical, there's no statistical analysis carried out to authenticate the claims.

Similarly, [28] advanced that the magnitude of the impact of the decline in oil price is highly dependent on the engineering factor, the tenacity of the drop in oil price as well as on the policy outcome. Furthermore, they maintained that the resultant effects of oil price fluctuations on the global economy are positive since the oil-exporting economies' expenditure is likely to be less than the increasing expenditure of those of oil-importing economies. The impact of the decline in the recent oil price decline lowers the living cost of the populace. The real incomes of the oil-consuming economies rise as well. The marginal costs of the industries using oil as an input factor reduce; thereby reducing the actual prices for their goods and services and as well motivate supply.

[63] revealed that there is no significant causality between most of the macroeconomic variables and oil prices for both the Chinese economy and India while [29]and [30] posit that the relationship between the macroeconomic variables and oil prices might be very difficult to identify because of the behavioural nature of the times series data on the oil price. [18] found that both the negative and the positive oil price shock increases inflation. The study also shows that increasing oil prices and GDP are positively correlated. [49] examined the relationship between economic activities and changes in oil prices in South Africa; the results indicate that both increasing and decreasing oil prices are important because they have asymmetric impacts on economic activities. [53] concluded that there is a relationship between the macroeconomic variables and oil price fluctuations and that Nigeria is highly vulnerable to changes in oil prices.

However, most of these related studies focused mainly on the impact of increasing oil prices on developed and oil-importing nations, such as [5], [49], [6], [66], [33], [39], [71], [11], [48], [27], [63], [4], [17], [18], [8], [19], [10], [26], [24], [25], [23], [22], [21], [20], [34], [43]. Others still are mainly historical like those of [16], [28], [42], [64], [67]. The impact of declining oil revenue on highly oil-dependent economies is rare and scanty, especially on how these nations would be able to meet their fiscal needs when oil revenue declines as a result of declining oil prices. This research focused mainly on the impact of declining oil prices on the economies of Nigeria and Venezuela for a comparative analysis.

The different views and conclusions of most of the researchers on oil-related issues gave rise to the derivation of the research hypotheses in this study. $H_{0(s)}$ are the null hypotheses that state that there is no impact of decreasing oil prices on the macroeconomic variables of both countries, i.e. government revenues, government expenditures, economic growth, external reserves, inflation rates and the rate of unemployment of the Nigerian and Venezuelan economies. These null hypotheses were tested as against the alternative hypotheses, $H_{1(s)}$.

III. METHODOLOGY

Choosing the appropriate methodology plays an important role in any research as it helps to prevent spurious results from the analysis [9]. The variable of the models are time series of macroeconomic variables which includes: Government Revenues, Government Expenditures, Oil Price, Gross Domestic Products, External Reserves, Inflation Rates, Exchange Rates and Unemployment Rates. Exchange Rate and Oil Price are the two main exogenous variables in the model while the Oil Price is the main independent variable. The exchange rate is also an independent variable but also serves as a control variable. The data were sourced from the World Bank, Central Bank of Nigeria, Central Bank of Venezuela, International Monetary Fund (IMF), International Energy Agency and Trading Economics.

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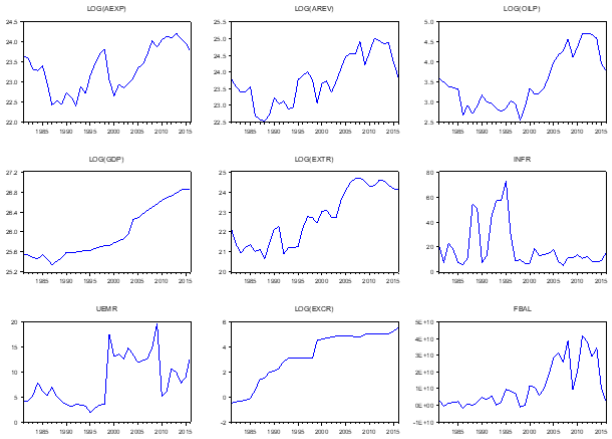
Most time series variables are non-stationary and can create serious issues while estimating the parameters of the models. Unit roots are the main sources of non-stationarity and since the time series data has unit roots, using them for the regression analyses would produce misleading results and spurious regression. However, the unit root tests were first carried out using the Augmented Dickey-Fuller (ADF) and Philips Peron's (PP) Tests. The Unit Root results indicate that all the variables are stationary at level I(0) and at first difference I(1). This outcome was the basis for the choice of the ARDL estimation technique for the analyses.

The Autoregressive Distributed Lag (ARDL) estimation technique is employed for the analysis because of its advantages. However, [58] and [44] outlined several strengths that the ARDL estimation technique has over the traditional Engel-Granger and Johansen approach. This method helps to prevent the endogeneity problem and is used to produce both the long-run and the short-run estimates of the model simultaneously. Also, [58] and [41] are of the view that the ARDL bounds methods are not affected when dummy variables are involved in any model. The variables of the model could also have different lag lengths when using the ARDL technique, while this is not obtainable when analyzing using the conventional Johansen method of cointegration.

3.1 Line Graphs and Descriptive Statistics of the Data

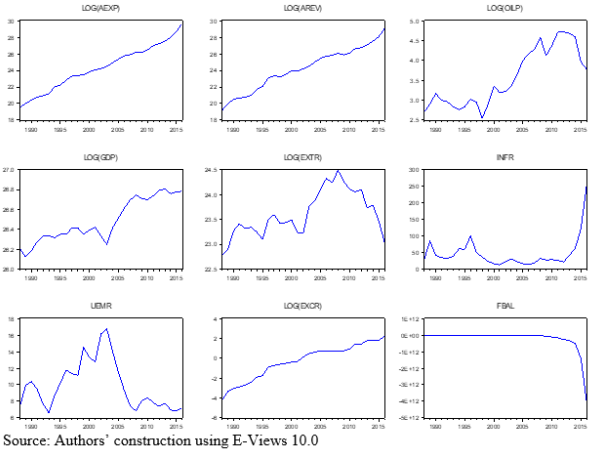
The line graphs and the descriptive statistics of the macroeconomic variables were adequately carried out in order to determine if there are pronounced visual trends. The line graphs for both the Nigerian and Venezuelan economies are presented below:

3.1.1 Multiple Line Graphs for Nigeria



Source: Authors' construction using E-Views 10.0

3.1.2 Multiple Line Graphs for Venezuela



Source: Authors' construction using E-Views 10.0

3.2 Model Specification

According to [41], [45], [58] and [59] the Autoregressive Distributed Lag (ARDL) Model is specified as shown below. The model is employed to determine the response of the economic activities of these two economies to the declining oil revenue. It was also used to determine both the long-run and short-run relationships among series with different orders of integration.

However, in order to be consistent with the diagnosis of all the econometric requirements before the estimation of the underlying ARDL model, all the diagnostic tests were carried out, such as the structural and dynamic stability tests (CUSUM

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and CUSUM SQUARES); the Residual Diagnostics (Heteroscedasticity, Serial Correlation and the Normality tests); Coefficient Diagnostics (Long-Run Form and the Bound Test, Error Correction Form (Short-Run Test).

3.2.1 Estimation of the Underlying ARDL Model

The unrestricted Error Correction ARDL Model is specified below, for all the variables of the model.

$$\Delta lnGREV_t = \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta lnGREV_{t-i} + \sum_{i=0}^{q} \alpha_2 \Delta lnGEXP_{t-i} + \sum_{i=0}^{r} \alpha_3 \Delta lnOILP_{t-i} + \sum_{i=0}^{s} \alpha_4 \Delta lnGDP_{t-i} + \sum_{i=0}^{u} \alpha_5 \Delta lnEXTR_{t-i} + \sum_{i=0}^{v} \alpha_6 \Delta lnINFR_{t-i} + \sum_{i=0}^{w} \alpha_7 \Delta lnUEMR_{t-i} + \sum_{i=0}^{z} \alpha_8 \Delta lnEXCR_{t-i} + \lambda_1 lnGREV_{t-1} + \lambda_2 lnGEXP_{t-1} + \lambda_3 lnOILP_{t-1} + \lambda_4 lnGDP_{t-1} + \lambda_5 lnEXTR_{t-1} + \lambda_6 lnINFR_{t-1} + \lambda_7 lnUEMR_{t-1} + \lambda_8 lnEXCR_{t-1} + \lambda_9 Dummy + \mathcal{U}_{tI} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

$$\Delta lnGEXP_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta lnGEXP_{t-i} + \sum_{i=0}^{q} \beta_2 \Delta lnGREV_{t-i} + \sum_{i=0}^{r} \beta_3 \Delta lnOILP_{t-i} + \sum_{i=0}^{s} \beta_4 \Delta lnGDP_{t-i} + \sum_{i=0}^{u} \beta_5 \Delta lnEXTR_{t-i} + \sum_{i=0}^{v} \beta_6 \Delta lnINFR_{t-i} + \sum_{i=0}^{w} \beta_7 \Delta lnUEMR_{t-i} + \sum_{i=0}^{z} \beta_8 \Delta lnEXCR_{t-i} + \lambda_1 lnGREV_{t-1} + \lambda_2 lnGEXP_{t-1} + \lambda_3 lnOILP_{t-1} + \lambda_4 lnGDP_{t-1} + \lambda_5 lnEXTR_{t-1} + \lambda_6 lnINFR_{t-1} + \lambda_7 lnUEMR_{t-1} + \lambda_8 lnEXCR_{t-1} + \lambda_9 Dummy + \mathcal{U}_{tII} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

$$\Delta lnGDP_t = \gamma_0 \sum_{i=1}^{p} \gamma_1 \Delta lnGDP_{t-i} + \sum_{i=0}^{q} \gamma_2 \Delta lnGREV_{t-i} + \sum_{i=0}^{r} \gamma_3 \Delta lnOILP_{t-i} \sum_{i=0}^{s} \gamma_4 \Delta lnGEXP_{t-i} + \sum_{i=0}^{u} \gamma_5 \Delta lnEXTR_{t-i} + \sum_{i=0}^{v} \gamma_6 \Delta lnINFR_{t-i} + \sum_{i=0}^{w} \gamma_7 \Delta lnUEMR_{t-i} + \sum_{i=0}^{z} \gamma_8 \Delta lnEXCR_{t-i} + \lambda_1 lnGREV_{t-1} + \lambda_2 lnGEXP_{t-1} + \lambda_3 lnOILP_{t-1} + \lambda_4 lnGDP_{t-1} + \lambda_5 lnEXTR_{t-1} + \lambda_6 lnINFR_{t-1} + \lambda_7 lnUEMR_{t-1} + \lambda_8 lnEXCR_{t-1} + \lambda_9 Dummy + \mathcal{U}_{tIII} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3$$

$$\Delta lnEXTR_t = \theta_0 \sum_{i=1}^{p} \theta_1 \Delta lnEXTR_{t-i} + \sum_{i=0}^{q} \theta_2 \Delta lnGREV_{t-i} + \sum_{i=0}^{r} \theta_3 \Delta lnOILP_{t-i} \sum_{i=0}^{s} \theta_4 \Delta lnGEXP_{t-i} + \sum_{i=0}^{u} \theta_5 \Delta lnGDP_{t-i} + \sum_{i=0}^{v} \theta_6 \Delta lnINFR_{t-i} + \sum_{i=0}^{w} \theta_7 \Delta lnUEMR_{t-i} + \sum_{i=0}^{z} \theta_8 \Delta lnEXCR_{t-i} + \lambda_1 lnGREV_{t-1} + \lambda_2 lnGEXP_{t-1} + \lambda_3 lnOILP_{t-1} + \lambda_4 lnGDP_{t-1} + \lambda_5 lnEXTR_{t-1} + \lambda_6 lnINFR_{t-1} + \lambda_7 lnUEMR_{t-1} + \lambda_8 lnEXCR_{t-1} + \lambda_9 Dummy + \mathcal{U}_{tIv} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 4$$

$$\Delta lnINFR_t = \pi_0 \sum_{i=1}^{p} \pi_1 \Delta lnINFR_{t-i} + \sum_{i=0}^{q} \pi_2 \Delta lnGREV_{t-i} + \sum_{i=0}^{r} \pi_3 \Delta lnOILP_{t-i} \sum_{i=0}^{s} \pi_4 \Delta lnGEXP_{t-i} + \sum_{i=0}^{u} \pi_5 \Delta lnGDP_{t-i} + \sum_{i=0}^{v} \pi_6 \Delta lnEXTR_{t-i} + \sum_{i=0}^{w} \pi_7 \Delta lnUEMR_{t-i} + \sum_{i=0}^{z} \pi_8 \Delta lnEXCR_{t-i} + \lambda_1 lnGREV_{t-1} + \lambda_2 lnGEXP_{t-1} + \lambda_3 lnOILP_{t-1} + \lambda_4 lnGDP_{t-1} + \lambda_5 lnEXTR_{t-1} + \lambda_6 lnINFR_{t-1} + \lambda_7 lnUEMR_{t-1} + \lambda_8 lnEXCR_{t-1} + \lambda_9 Dummy + \mathcal{U}_{tv} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 5$$

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$$\Delta lnUEMR_t = \rho_0 \sum_{i=1}^{p} \rho_1 \Delta lnUEMR_{t-i} + \sum_{i=0}^{q} \rho_2 \Delta lnGREV_{t-i} + \sum_{i=0}^{r} \rho_3 \Delta lnOILP_{t-i} \sum_{i=0}^{s} \rho_4 \Delta lnGEXP_{t-i}$$

$$+ \sum_{i=0}^{u} \rho_5 \Delta lnGDP_{t-i} + \sum_{i=0}^{v} \rho_6 \Delta lnEXTR_{t-i} + \sum_{i=0}^{w} \rho_7 \Delta lnINFR_{t-i} + \sum_{i=0}^{z} \rho_8 \Delta lnEXCR_{t-i}$$

$$+ \lambda_1 lnGREV_{t-1} + \lambda_2 lnGEXP_{t-1} + \lambda_3 lnOILP_{t-1} + \lambda_4 lnGDP_{t-1} + \lambda_5 lnEXTR_{t-1}$$

$$+ \lambda_6 lnINFR_{t-1} + \lambda_7 lnUEMR_{t-1} + \lambda_8 lnEXCR_{t-1} + \lambda_9 Dummy$$

$$+ \mathcal{U}_{tyl} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 6$$

Where *ECM is the error correction term lagged for one period;*

φ is the coefficient for measuring the speed of adjustment

Δ is the first differencing operator

$\alpha, \beta, \gamma, \theta, \pi, \rho$ are the coefficients of the shortrun models

While *λ is the coefficient of the longrun models*

Dummy is the dummy variable used to capture oil price decline

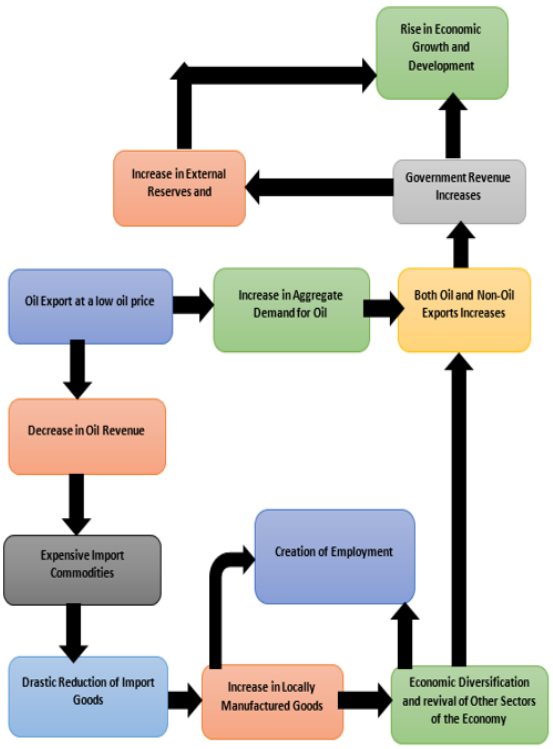
"1" was used to capture the period when oil price declines and "0" was used when otherwise.

However, the Error Correction Models (ECM) are estimated in order to analyse the short-run determinants of the effect of declining g oil prices on the macroeconomic variables in Nigeria and Venezuela. This would also help in determining the speed of adjustment over time.

IV. PROPOSED ECONOMIC MODEL FOR NIGEIR AND VENEZUELA

The economic model proposed in this study is aimed as closing the revenue gaps in these oil-dependent countries: Nigeria and Venezuela. The economic model is a simplified way of explaining the real world which is often so complex to understand. Different economists have different views and different judgements concerning the interpretation of reality, as such, economic models are subjective. Most economists maintain that the validity of any economic model can be tested when it is able to forecast and explain the activities in the real world. More so, economic models cannot just be tested by enquiring into the reality of their outlined assumptions; rather economic models can be tested when it is faced with the data from the economy in question [54].

Figure 1.0 Proposed Economic Model for Nigeria and Venezuela



Source: Author's Design

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However, looking at the above proposed economic model for the two economies, from the declining oil revenue which emanated from the decreasing oil price, the nations are not able to finance their fiscal needs which is one of the serious issues the oil-dependent nations are facing. Import of consumer goods becomes very expensive because of the weak exchange rate. However, the cheap oil price would lead to an increase in aggregate demand for oil. On the other hand, the expensive imports would lead to a drastic reduction of imported goods which would drastically encourage the production of local goods. The production of local goods would bring about economic diversification which would in turn help these economies to shift from a mono-economy (production of a single product) to a more diversified economy by developing and investing in other sectors of the economy apart from oil. The underlying assumptions upon which this model is based are:

a. The nations are relying solely on one source of revenue, e.g., oil.
b. The price of oil in this case is assumed to be decreasing, thereby leading to a decrease in the oil revenue.
c. It is also assumed that these economies are endowed with several other natural resources apart from oil.
d. We also assume that these naturally endowed countries can harness these other resources to diversify their revenue base.

V. SUMMARY FINDINGS FOR BOTH NIGERIA AND VENEZUELA

For both the Nigerian and Venezuelan economies, the findings reveal that government revenues dropped significantly for a per cent decrease in oil prices amidst the covid-19 pandemic which crippled global economic activities; hence lower oil demand. It shows that both economies are highly dependent on oil export which serves as the main source of revenues. Contrary to our expectations, the government expenditures for both economies increase for a per cent decline in oil price. The increase in government expenditure is financed mainly through borrowing for Nigeria while for Venezuela, aside from borrowing, the nation also finances the fiscal needs through seigniorage.

Since the Nigerian economy depends on oil revenue for over 98 per cent of its exports, it is expected that as oil price decreases, oil revenue will decline too which is supposed to adversely affect the government expenditure. The contrary result of increasing government expenditure as oil price declines could be due to both internal and external borrowing or through the recovered loot as revealed by [47] and [57].

However, our study revealed that deficit financing through borrowing encourages more government borrowing which would exert a negative impact on both economies by crowding out private investments and increasing the burden of external debt. Our findings are in tandem with the study of [46] that revealed different sources of budget financing in Nigeria that led to higher government spending which in turn exerts a negative effect on economic growth.

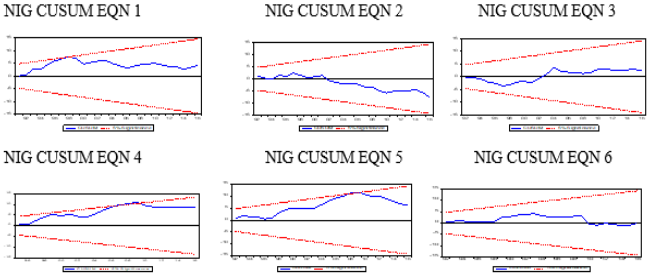
However, given the above findings, it is highly recommended that both Nigeria and Venezuela diversify their revenue base, develop other sectors of the economies since the nations are endowed with other natural resources aside from oil, and restore security which would help in attracting foreign investors and ensure effective management of the government funds.

It would be important for the governments of both economies to reshape the countries' spending patterns by specifying certain percentage of the revenues to be spent to avoid excess spending. Such spending habit rules should be adequately monitored and strictly implemented.

Since Nigeria and Venezuela are abundantly blessed with other natural resources aside from oil, it is highly recommended that both countries should develop and harness other resources for local industries.

APPENDICES

A. Structural and Dynamic Stability Tests for Nigeria (CUSUM Tests)



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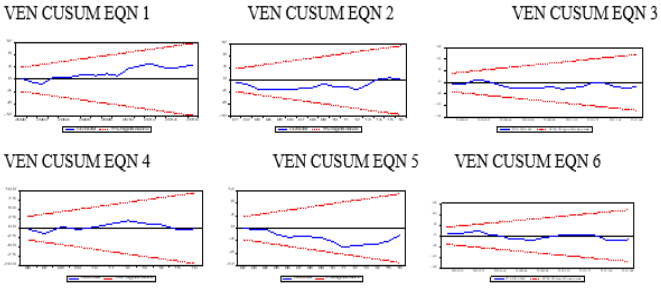
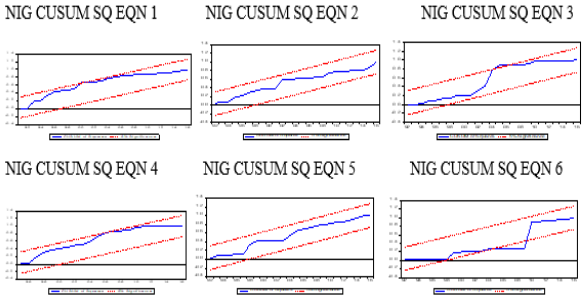
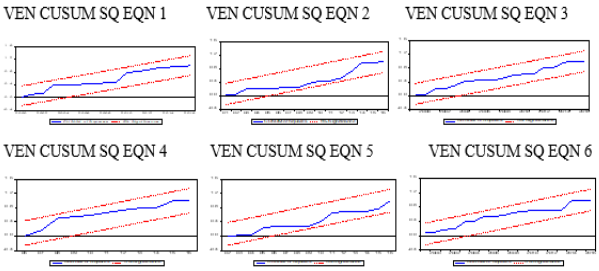
B. Structural and Dynamic Stability Tests for Venezuela (CUSUM Tests)



C. Structural and Dynamic Stability Tests for Nigeria (CUSUM of Squares Tests)



D. Structural and Dynamic Stability Tests for Venezuela (CUSUM of Squares Tests)



E. Long run regression estimates of the impact of declining oil price on key macroeconomic indicators in Nigeria

	AEXP	AREV	GDP	EXTR	INFR	UEMR
LOG(AREV)	0.917***(0.259)		0.181(0.148)	-0.082(0.301)	7.449(11.79)	0.705(5.833)
LOG(AEXP)		0.566**(0.204)	-0.236(0.163)	0.624*(0.335)	-11.846(12.179)	-0.907(5.585)
LOG(OILP)						
LOG(GDP)	-0.369(0.506)	0.106(0.358)		2.366***(0.739)	42.937**(17.886)	-7.125(8.376)
LOG(EXTR)	0.328(0.267)	0.185(0.197)	0.161(0.105)		-31.586***(8.182)	4.924(4.245)
INFR	0.01(0.008)	0.002(0.005)	0.003(0.003)	-0.015***(0.004)		-0.01(0.11)
UEMR	-0.028(0.02)	-0.007(0.018)	0.005(0.009)	0.024(0.016)	0.198(0.79)	
LOG(EXCR)	-0.122(0.087)	0.006(0.079)	-0.219**(0.08)	0.598**(0.235)	7.61**(3.081)	0.595(1.666)
Oil dummy	Yes	Yes	Yes	Yes	Yes	Yes

F. Diagnostic test results for Nigeria

Diagnostics	AEXP	AREV	GDP	EXTR	INFR	UEMR
Normality test, JB- test	1.232(0.540)	1.132(0.568)	26.094(0.000)	1.844(0.398)	0.221(0.895)	11.309(0.004)
Heteroskedasticity	2.525(0.122)	0.148(0.703)	0.118(0.734)	0.024(0.879)	3.577(0.068)	0.213(0.648)
Serial Correlation	1.548(0.233)	1.916(0.170)	0.933(0.408)	1.130(0.343)	1.183(0.324)	0.986(0.388)

***, ** and *denote the significant level at 1%, 5% and 10% respectively

Source: Author's computation from ARDL analyses using E-views 10.0

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G. Short-run regression estimates of the impact of declining oil price on key macroeconomic indicators in Nigeria

	AEXP	AREV	GDP	EXTR	INFR	UEMR
C	1.753*** (0.177)	2.747*** (0.416)	7.564*** (1.791)	-45.287*** (5.953)	-225.937*** (27.926)	80.791 (123.669)
DL(AEXP)					10.138 (5.949)	
DL(AEXP(-1))						
DL(OILP)						
DL(OILP(-1))						
OILD	0.113** (0.051)	-0.292*** (0.065)	0.00 (0.019)	-0.226** (0.084)	1.925 (3.185)	1.051 (0.788)
DL(EXCR)		-0.571*** (0.108)		0.049 (0.157)		7.194***(1.507)
DL(EXCR(-1))				0.266*** (0.091)		
DL(EXTR(-1))						
DL(AREV)						
Ect	-0.444*** (0.045)	-0.691*** (0.117)	-0.329*** (0.078)	-0.894*** (0.116)	-0.735***(0.092)	-0.502***(0.112)
R2	0.756	0.780	0.486	0.776	0.701	0.527
AdjR2	0.741	0.759	0.436	0.736	0.673	0.498
F-stat	49.630 (0.000)	36.630 (0.000)	9.751 (0.000)	19.406 (0.000)	24.273 (0.000)	

Source: Author's computation from ARDL analyses using E-views 10.0
***, ** and *denote the significant level at 1%, 5% and 10% respectively

H. Long-run regression estimates of the impact of declining oil price on key macroeconomic indicators in

	AEXP	AREV	GDP	EXTR	INFR	UEMR
LOG(AEXP)		-1.076(3.76)	-0.081(0.069)	-1.479*(0.819)	-142.059(109.198)	-3.664**(1.319)
LOG(OILP)						
LOG(GDP)	-3.331*(1.742)	4.702(7.857)		-0.955(3.891)	607.758(612.193)	-18.733***(2.933)
LOG(EXTR)	-0.339**(0.147)	-0.636(1.499)	0.055(0.046)		127.033(116.629)	-2.234**(0.814)
INFR	-0.339**(0.147)	-0.636(1.499)	0.055(0.046)		127.033(116.629)	-2.234**(0.814)
UEMR	0.044(0.109)	-0.03***(0.006)	-0.166(0.139)	23.234(21.502)	-0.165**(0.06)	
LOG(EXCR)	0.166(0.224)	1.473(2.416)	0.006(0.049)	0.234(0.48)	7.247(85.574)	2.62**(0.997)
LOG(AREV)	1.22***(0.172)		0.142*(0.081)	1.513(1.028)	75.548(91.824)	3.548**(1.624)
Oil dummy	Yes	Yes	Yes	Yes	Yes	Yes

I. Diagnostic test results for Venezuela

Diagnostics	AEXP	AREV	GDP	EXTR	INFR	UEMR
Normality test, JB- test	1.073 (0.585)	0.933 (0.627)	0.406 (0.816)	0.095 (0.954)	1.231 (0.540)	1.367 (0.505)
Heteroskedasticity	0.914 (0.348)	0.145 (0.707)	0.571 (0.457)	0.013 (0.912)	1.385 (0.251)	1.185 (0.287)
Serial Correlation	0.596 (0.564)	0.814 (0.463)	2.058 (0.160)	0.776 (0.489)	1.539 (0.251)	0.557 (0.584)

Source: Author's computation from ARDL analyses using E-views 10.0
***, ** and *denote the significant level at 1%, 5% and 10% respectively

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J. Short-run regression estimates of the impact of declining oil price on key macroeconomic indicators in Venezuela

	AEXP	AREV	GDP	EXTR	INFR	UEMR
C	55.977***(3.733)	-16.38***(2.181)	24.046***(1.374)	50.469(98.491)	4935.032***(423.801)	562.197***(46.52)
DLOG(AEXP)		0.501***(0.107)		-0.434(0.247)		
DLOG(OILP)						
OILD	0.066**(0.03)	-0.167***(0.037)	-0.004(0.008)	-0.375***(0.074)	-2.146(5.043)	-0.779***(0.254)
DLOG(GDP)	-0.872*(0.422)			-3.644***(0.88)		
DLOG(EXTR)		0.089(0.086)	-0.074***(0.023)		19.263(12.747)	
DLOG(EXCR)				0.243(0.185)	19.172*(10.542)	
DLOG(AREV)				0.464*(0.235)		1.09**(0.414)
@TREND	No	No	No	No	No	No
CointEq(-1)*	-0.602***(0.04)	-0.26***(0.034)	-0.806***(0.06)	-0.598***(0.134)	0.278***(0.024)	-0.996***(0.082)
R-squared	0.911	0.947	0.871	0.823	0.923	0.866
Adjusted R-squared	0.895	0.935	0.861	0.745	0.904	0.849
F-statistic	58.600 (0.000)	78.790 (0.000)			50.219 (0.000)	51.482 (0.000)

***, ** and *denote the significant level at 1%, 5% and 10% respectively
Source: Author's computation from ARDL analyses using E-views 10.0

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