IMPACT OF OIL REVENUE ON THE WELL-BEING IN NIGERIA: EMPIRICAL EVIDENCE FROM NONLINEAR-AUTO REGRESSIVE DISTRIBUTED LAG (NARDL)

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Abstract

The study aims to interrogate the dynamic effect of oil revenue on the well-being of Nigerians using data from 1980 to 2020 in conjunction with linear and non–linear autoregressive distributed lag (NARDL) approach. This study will add empirically to the discourse by exploring other indicators of economic well-being such as per capita consumption, which previous studies have not used extensively. The objective is to check the long and short-run relationships and the asymmetrical effects between the decomposed variables. Simple linear ARDL is applied for the symmetrical effect and non-linear Autoregressive distributed lag NARDL is applied to check the asymmetrical effect. The findings indicated the existence of asymmetrical linkages between oil revenue and well-being in Nigeria. As a result, the study suggested that the government ought to diversify the economy to form alternative sources of revenue as well as to embark on aggressive infrastructural development which would improve the well-being of Nigerians and the policy that will encourage equitable distribution of income.

Keywords: Oil Revenue, Well-being, asymmetric linkages, non-linear autoregressive distributed lag (NARDL), Symmetrical

Introduction

The welfare of the residents of a country is one of the paramount targets each accountable government might need to achieve. However, welfare

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economics is a subjective examination that relies closely on selected assumptions concerning how welfare may be defined, measured, and compared for people and society as a whole. Like different international locations with a large wide variety of people, Nigeria's populace is measuring at approximately two hundred and twenty-one million population and it's endowed with forms of natural assets crude oil is one of them (United Nations report, 2023), (Mesagan et al., 2019). Given this, crude oil as a crucial commodity to the world marketplace generates large income for the Nigerian economy which presumes amongst different matters need to have a massive effect on the welfare of the residents. Important questions which need answers are raised. This includes: Are oil sales and well-being interrelated? If they may be related, what form of linkage do they have? Could it be the symmetrical or asymmetrical relationship that exists among them? These questions precipitated the analysis of the linkages between oil sales and well-being in Nigeria.

However, the Oscillation in the rate of crude oil amidst the oil sales which broadly speaking should have furnished sufficiently to the population dwindles, thus, affecting the overall financial well-being. To check the connection between oil sales and well-being, two theoretical procedures of Dutch disease and Rent-seeking theories were employed to look into the uneven impact of oil revenues on the well-being of Nigeria. The excessive factors may be defined within the theoretical literature. The theories concerned do not suggest that there are no extra different theories that may explain the study however, to stay regular inside the confide targets. Other studies on the linkages between oil revenue on well-being, had not examined symmetric or asymmetric relationships in this regard in Nigeria. The first technique is the Dutch disease technique which became added upon the discovery of natural gas within the Netherlands. It ends in a decline in the production sector. Dutch disease stimulates spending impact and aid pull impact. Natural aid sales may be used to guide the world over traded items in place of home items. This is referred to as the spending impact. This should cause financial inequality, maladministration, and corruption that could affect well-being. The second impact of the Dutch disease is

visible because of the procedure through which an increase in natural resource area results in shrinkage within the non-resource convertible. The implication is that profits acquired propels imports to grow collectively with home absorption for each tradable and non-tradable which can cause a growth in alternate and inflation charges respectively. This will truly have an intense impact on the welfare of the residents.

The first technique is primarily based on the expectancies that the fundamental commodity for sales technology is the income of crude oil and upon it is the fundamental forex income for Nigeria. Growth in the rate of crude oil is anticipated to grow the sales and allow additional growth in the well-being and vis-a-vis. The second approach is primarily based on the advanced living standard furnished due to monetary and social welfare via infrastructural and institutional improvement with the growth in oil sales. The creation of non-linear author regressive distributed lag might test not only for long and short-run relations however in addition for the negative and positive relationship in our model. Nigeria is the sixth-biggest oil producer and crude oil export contributes majorly to the Nigerian revenue. Therefore, measuring the connection between crude oil sales and well-being in Nigeria is of the essence amongst academia and policymakers.

Theoretical Literature

Dutch disease theory

Even though studies have explored the linkages between oil revenue and well-being, using different theoretical methodologies, the theoretical background of this study is based on the Dutch disease theory which was introduced in the 1960s. The term was coined by the economist in 1977 to describe when natural gas was discovered in the Netherlands (hence the name) and this discovery leads to a decline in the manufacturing sector. The term is in line with the paradox situation where good news for one sector of the economy, such as natural resources, precipitates a negative impact on the country's overall economy. Dutch disease stimulates the spending effect and resource pull effect. Natural resource revenues can be used to support

internationally traded goods rather than domestic goods, this is known as the spending effect. The second effect, of the Dutch disease, can be seen as the process by which a boom in a natural resource sector results in shrinkage in the non-resource convertible contrary to cooperative advantage theory. As a result, the economy will be directed towards the services sector thereby affecting the production processes in the manufacturing sector of the country. The implication is that revenue generated through the sale of oil propels imports to increase together with domestic absorption for both tradable and non-tradable.

Similarly, labour and other factors of production would be transformed into the non-tradable sector, notwithstanding, increasing the cost of production in the traditional tradable sectors, resulting in a rise in unemployment in the manufacturing sector (Dartey-Baah et al., 2012; Gerelmaa and Kotani, 2016). In, by and large, the negative impact of natural gas discoveries in Nigeria results, in a negative impact on investment in other sectors and over dependent on imported products. The economy depends mainly on natural capital, as a result, natural capital crowds out other types of capital. These affect the general life standard leading to the reduction in savings and investments in human capital and other sectors of the economy. Natural resources move productive entrepreneurs into rent-seeking activity, lowering national income and welfare (Torvik, 2002). The spending effect on the other hand can be seen as the increase in revenue accounted for by the natural resource discovered, mainly when its price dramatically increases.

Rent-seeking theory

The concept of rent-seeking is the idea that transfers as converted into social costs when individuals expend real resources and effects to capture them. Before the invention of the concept by (Tollison, 2012 in Tullock, 1972), transfers were treated as costless redistributions from losers to winners in activities such as regulation and monopolization. This theory provides support to the resource course or Dutch disease theory. According to (Paolo, 1997), rent-seeking means spending time and money not only on the production of real goods and services but also on trying to get the government to change the rules to make

business more profitable. Adam Smith defined rent-seeking as wealth obtained through shrewd or potentially manipulative use of resources. Smith's studies suggested that entities earn income from wages, profit, and rent. Creating profit usually requires the risk of capital to gain a return. Earning wages comes from employment. However, of the three income sources, rent is the easiest to obtain and can require little risk.

Economic rent is the income earned from the utilization of resource ownership. Entities that own resources can lend them to earn interest rent, lease them to earn rental income, or may utilize their resources in other income-producing ways. In general, the term economic rent has evolved to mean receiving a payment that exceeds the costs involved in the associated resource. Entities, therefore, will take rent-seeking steps to obtain economic rent that requires no reciprocal contribution of production. Oftentimes, this can mean using a particular status to gain economic rent from the government through social service grants.

Empirical Literature

The study of the relationship between oil revenue and well-being has been conducted by different researchers. Further to examine other research works based on region, variables, periods, and models, (Adedokun, 2018), investigated the effects of oil shocks (price and revenue) on the dynamic relationship between government revenues and government expenditures in Nigeria and how it transmits effects on major macroeconomic variables using data from 1981 to 2014 on structural VAR (SVAR) model. The results of SVAR show that oil price shocks could not predict the variation in government expenditure in the short run, while the predictive power of oil revenue shocks is very strong both in the short run and in the long run. Though work on Nigeria. Our work established the most recent data and period. However, our work is a combination of a linear and non-linear model using NARDL which has more advantages and is superior to testing the estimated variables as not been used in Nigeria.

In the work of (Abdel-Latif et al., 2018), on the effect of oil price shocks on government expenditures on the health and education sectors

in Saudi Arabia. Using a quarterly dataset 1990Q1–2017Q2 and employing a non-linear autoregressive distributed lag (NARDL) model. The researchers show evidence of a non-linear relationship between oil prices and government expenditures in Saudi Arabia, where a negative oil price shock would have a statistically significant different impact in the long run compared to a positive shock. Our work is directly looking at oil revenue and well-being in Nigeria. We also would want to confirm if there is an asymmetric effect between oil revenue and the well-being in Nigeria, hence variables in the previous work measured expenditure on health and education. We in our work measure per capita income, exchange rate, and inflation rate as the macroeconomic variables on which oil revenue would have a ripple effect as Nigeria's economy is contingent on oil.

Similarly, using the Johansson Counteraction approach on a time series of data from 1981-2014, (Manasseh et al., 2019), measured oil price fluctuation, oil revenue, and well-being in Nigeria. The findings suggest that oil price fluctuations have no significant impact on well-being, while oil revenue is observed to have a significant and positive impact on well-being. Notwithstanding the insignificant impact of oil price fluctuation, further investigation using the test result showed the existence of a long-run relationship in the series. Although this work was in Nigeria and recently, the researchers have used a method that cannot adequately enough to explain the shock or volatility as captioned in the research title, this is why we are using a superior method that can capture the shock.

In the work of (Olayungbo and Adediran, 2017) on the effect of oil revenue and institutional quality on economic growth in Nigeria: an ARDL model, the work shows the existence of long-run equilibrium among oil revenue, institutional quality, and economic growth. The short-run analysis indicates that institutional quality measured by the corruption index promotes economic growth, while institutional quality retards economic growth in the long run. Also, oil revenue promotes economic growth in the short run and reduces it in the long run, thereby confirming the existence of the resource curse hypothesis in Nigeria. Notwithstanding the ARDL model application which

measures the existence of a long and short-run relationship, the work centred on economic growth which has a direct relationship with well-being, our work is a combination of a linear and non-linear model which is superior to test the estimated variables.

Similarly, applying the ARDL model in a time-series data from 1983 to 2017 in the work of (Kamasa et al., 2020) the working title: 'Do crude oil price changes affect economic welfare'? Empirical evidence from Ghana. The variables employed were Crude oil price, GDP per capita, Interest rate, trade openness, foreign direct investment, and gross fixed capital formation. The researchers' findings revealed that crude oil price changes have a negative and significant impact on economic welfare in the short and long run, albeit marginal.

In terms of covariates, the findings revealed that trade openness and gross fixed capital formation have a positive and significant impact whilst interest rates harm economic welfare in both the short and long run. Foreign direct investment had a positive effect, though insignificant. Accordingly, the researcher also adopted the ARDL model as an approach for estimation, but not in Nigeria. Our research is focused on Nigeria. Nigeria is one of the largest oil producers in the world and has been affected by the Dutch disease. However, our model used longer period data that can show better results and variations when compared with shorter period data as the author implemented.

In a similar study by (Laourari and Gasmi, 2016), on the relationship between oil revenue and industrial growth in Nigeria, the evidence show that oil revenue has a positive significant impact on industrial growth and the economy in the long run despite the mismanagement of oil revenue as identified in literature evidenced by its insignificant relationship with industrial growth in the short run.

In the quest to establish the relationships between The impact of oil prices on macroeconomic fundamentals, monetary policy, and stock market for eight Middle East and North African countries, (Mohammed et al., 2016) used the VAR model to examine responses of all variables to oil price shocks. Results show a relatively high elastic response of economic growth in oil-exporting countries except for Kuwait and, conversely, in oil-importing economics, GDP response to oil prices

appears reasonably stable, close to zero. Similarly, the same results can be captured for each oil-importing and exporting country as far as the negative sign exhibited by the market response to price rise during the first period caused by financial crisis contagion. The next macroeconomic variable, CPI, shows a positive response to oil Our work covered lengthier periods and recent data. Thus, our model is good enough to address the recent happenings in Nigeria's oil revenue well-, unlike their work which is centred on selected African countries. According to (Mesagan et al., 2019), on Oil Resource Abundance in Nigeria and Iran: Contrapuntal Effect on Social and Economic Welfare using time series data on a VAR model for a period, 1970 to 2016. The researchers find that oil resource abundance has a contrapuntal effect on the social and economic welfare of Nigerians while we did not find evidence of a contrapuntal effect on Iranians' welfare.

Thus, this study will add empirically to the discourse' by exploring other indicators of economic well-being such as per capita consumption, which previous studies have not used extensively. The main objective is to check the long-term and short-run relationships and the asymmetrical effects between the decomposed variables; simple linear ARDL is applied for the symmetrical effect and non-linear ARDL is applied for checking the asymmetrical effect. We used time-series data from Nigeria to empirically examine them. There has been no study conducted using this period of data in Nigeria from the 1980–2020 time period.

Data and Methodology

This section presents analysis and findings from a long and short-run relationship from a multi-method empirical study. Data were collected from the World Bank (WB) database, Human Development Index (HDI), and the Central Bank of Nigeria (CBN) data bank. The data were collected and the period of study was 1980 to 2020. We focused on this period because it is long enough to incorporate the past and present oscillation that could have taken effect as a result of oil price volatility for Nigeria. Analyses the data, we introduced multiple regression econometric methods to attain our objectives. Our empirical results

indicated the existence of a long-run relationship. However, with the decomposition of some variables, we could ascertain the symmetric and asymmetrical effect of the oil revenue on the well-being of Nigerians.

To have a better understanding of the data used in the model, we formulated a single equation as suggested by (Bayer & Hanck, 2013). As far as the short-run adjustments are concerned, they can be integrated with the long-run equilibrium through the error correction mechanism (ECM). This occurs through a linear transformation without sacrificing information about the long-run horizon (Wajahat, 2017), In this case, all the variables in their nominal values were transformed into the logrimathic to reduce heteroscedasticity and to enable us to interpret our results in percentage. The model is then specified thus:

$$\Delta LogPCI = \beta 0 + \beta 1 LogOILR_{t-1}^{+} + \beta 2 LogOILR_{t-1}^{-} + \beta 3 LogGOVSt_{-1}^{+} + \beta 4 LogGOVSt_{-1}^{-} + \beta 5 LogEXRt_{-1}^{+} + \beta 6 EXRt_{-1}^{-} + \beta 7 INFRt_{-1}^{+} + \beta 8 INFRt_{-1}^{-} + \beta 9 LogGDPt + \sum_{n_j}^{n} + Q1\Delta OILRt_{-1}^{+} + \sum_{n_j}^{n} Q2LogOILRt_{-1}^{-} + \sum_{n_j}^{n} Q3\Delta LogGOVSt_{-1}^{+} + \sum_{n_j}^{n} Q4LogGOVSt_{-1}^{-} + \sum_{n_j}^{n} Q5Log\Delta GDPt + \sum_{n_j}^{n} Q6\Delta EXRt_{-1}^{+} + \sum_{n_j}^{n} Q7\Delta t_{-1}^{-} + \sum_{n_j}^{n} Q8\Delta INFRt_{-1}^{+} + \sum_{n_j}^{n} Q9\Delta INFRt_{-1}^{-} + ECM + \mu$$

Where PCI = Per-capita Income proxy well being

OILR = Oil revenue

GOVS = Government spending

GDP = Gross domestic product

EXR = Exchange rate at current prices

INFR = Inflation rate

t= Time trend

μ =Error term

Results and discussion

Before assessing the long- and short-run dynamics of the model, we used unit root tests to check the level of stationarity in each series. In this study precisely, the most commonly used unit root tests of Augmented Dickey-Fuller" (ADF) and "Phillips–Perron" (PP) were incorporated. However, the rule on the applications of the ARDL model

is that none of the variables should be stationary at [1(2)] and that the dependent variable should be stationary at [1(1)]. We have checked the stationary level of the variables at the "level" [I (0)] and the "first difference" [I(1)] of all the sequences, and the rules were full-filled as shown in Table 1. Both ADF and PP unit root testing approaches of stationarity suggest that all variables are of mixed order Precisely, even when transformed. The LogPCI, LogOILR, LogGOVS, LogGDP, and EXR are stationary at [I (1)] and INFR is stationary at level.

Table 1 | Unit Root Tests

Variable	ADF Result			PP Result		
	[I(0)]	[I(1)]	Remark	[1(0)]	[I(1)]	Remark
LogPCI	N	***	[I(1)]	N	***	
	-0.8811	-4.5792		-0.4746	-4.5059	[I(1)]
LogOILR	**	***	[I(0)]	N	***	[I(1)]
	-3.0691	-4.5098		-1.8990	-5.2580	
LogGOVS	***	***	[I(0)]	N	***	[I(1)]
	-4.7032	-6.9749		-5.1188	-7.5974	
LogGDP	N	***	[I(1)]	N	***	[I(1)]
	-0.3124	-5.3393		-0.5467	-5.3664	
EXR	N	***	[I(1)]	N	***	[I(1)]
	2.5317	-3.8829		2.8688	-3.9102	
INFR	N	***	[I(1)]	*	***	[I(0)]
	-0.3124	-6.3695		-2.9026	-12.1030	

*Author's computation; *, **, *** represent 10,5 and 1% significant levels of the variable's stationarity*

Table two shows the characterization of data with variables used in the work. Mean, median, maximum, and minimum were used to explain

the individual behaviour of the variables. Where mean stands for the average of each data, we realized that the average values which variables produced annually for the series are: 1702.212, 56.76500, 31928.1.8, 1063.260, 18.95640, and 101.2840 respectively for per-capita income, oil revenue, government spending, gross domestic product, exchange rate, and inflation rate.

On the other hand, the maximum and the minimum describe the volatility through the behaviour of the standard deviation. Whereas, when the maximum number is too wide, the standard deviation will be high. The high discrepancy in the standard deviation shows an indication of volatility. In our result, the gap between the maximum and the minimum shows a level of volatility in a couple of the estimated variables. Notwithstanding this,(Hashem; Pesaran; Shin; & Smith, 2001); (Jalil, 2008) Harris and Sollis 2003), have proven that the choice of our model – (ARDL) is one of the most suitable models to accommodate non-distributed data.

TABLE 2| Descriptive statistics

Measures	PCI	OILR	GOVS	GDP	INFR	EXR
Mean	1702.212	56.76500	319281.8	1063.260	18.95640	101.2840
Median	1510.203	45.84500	2.158940	486.1000	12.54700	106.4650
Maximum	2493.453	117.3500	12113830	3099.900	72.83600	3795000
Minimum	1236.428	19.05000	-23.92624	153.6000	5.382000	0.600000
N	40	40	40	40	40	40

Author's computation

Table three is a result of the correlation analysis test for the estimated data, excluding the dependent variable. The dependent variable was excluded because the regressors are to check for serial correlation ship among themselves. In this work, we applied Spearman correlation (rho) procedures to examine the existence of serial correlation in our model

as the present would amount to the interpretation of spurious data. As one of the requirements for time series data, it is expected that the observed variations should be free from serial correlation. In these results, as displayed, we have affirmed that our model is not suffering from serial correlation and has met the requirement for further analysis as all the observed variation values are below 80%.

TABLE 3| Correlation analysis test

Variables	GDP	GOVS	OILR	EXR
INFR				
GDP	1.000000			
GOVS	0.005401	1.000000		
OILR	0.730488	0.169338	1.000000	
EXR	0.683626	-0.155334	0.121009	1.000000
INFR	-0.302613	0.100523	-0.288502	-0.066908
1.000000				

Author's computation

Lag selection criteria

For the analysis of cointegration, lag length selections are very essential. Automatic lag selection criteria were chosen by the application and the Akaike information criterion (AIC), was chosen against the Schwarz information criterion (SIC), and Hannan–Quinn information criterion, (HIC). This was adjusted on the [DV] at one and [IV] at two. The lag order selection after adjustment was best fitted in our model as 1, 0, 2, 2, 2,1,1,0,1

To check for the long-run relationship in our model, asymmetric ARDL bound testing approach results were conducted. We inspected the bounds cointegration testing approach using the Joint-F-significance test to identify whether variables of the study are cointegrated (in the long run). In this study, we have converted most variables in the nominal form into a log form. Therefore, the probabilities of resulting coefficients would be interpreted as elasticity in the long run. Table four below indicates the results of the symmetric bound testing approach up to lag K is 8% level of significance.

According to Table 5, the critical values of the asymmetric bound testing approach are at 1%, indicating a high level of significance. The lower bound value [I(0)] is 2.62 and the upper bound value [I(I)] is 3.77 respectively, while the calculated F-statistic value is 5.777128 which is higher when compared to the upper bound value. These results have shown that PCI has a long-term statistically significant relationship with OILR, GOVS, GDP, EXR, and INFR.

Table| 4 Asymmetric ARDL Bound test

Test Stat.	Value			K
F-Stat.	7.779249			8
Critical Bound Value [I (0)]	Critical Value [I(1)]		Bounds	Significance
10%	1.85			2.85
5%	2.11			3.15
2.5%	2.33			3.42
1%	2.62			3.77

Author's computation

The table provides the statistics of the bound to cointegration test including the F-stat. at lag k. The significance levels are rejections of the null hypothesis at 1,2.5, 5, &10% respectively.

Long-run Asymmetric Impact of Oil Revenue on the Well-being in Nigeria. Table 5 indicates the results of asymmetric ARDL long-run coefficients. Per capita, income is used as a dependent variable and represents well-being. While oil revenue, government expenditure, exchange rate, and inflation rate are used as independent variables in this research paper. The examined results of asymmetric ARDL indicate that both oil revenue positive and negative have a causal effect on the well-being of Nigerians. When the oil revenue positively increases, it will positively affect per capita income by 0.425067 and it is highly significant at 1%. In this case, both oil revenue and well-being go the same way. The joint effect also means that the rise and fall in the oil revenue have an asymmetric effect on the well-being of Nigerians.

However, a decrease in the oil revenue will affect well-being by 0.018797 though not statistically significant. Similarly, examining the impact of government spending, both government spending negative and positive have no causal effect on the well-being of Nigerians. It affirms that both increases and decreases in government spending do not have any significant positive impact on the well-being of Nigerians in the long run. We understood that a decrease in government spending will decrease well-being by -0.018862 and it is statistically significant. Simultaneously, for government spending (POS), an increase in the logos (government spending) will increase well-being by -0.007966 and not statistically. Jointly on the Wald test result, both governments spending POS and NEG have no evidence of long-run asymmetry.

This may be a result of corruption and insincerity in executing capital projects for public goods. Note that, government spending in Nigeria is pivotal to the oil revenue. This is also corroborated by the Dutch diseases theory which states that: Natural resource revenues can be used to support internationally traded goods rather than domestic goods. This is known as the spending effect. Oil revenue is not reliable and cannot be used for long-term projection (Alley, Asekomeh, 2014).
At the same time, the result of inflation rate positive and negative do have a causal effect on per-capita income. For INFR_NEG, a decrease in the inflation rate will decrease well-being by 0.004716. This is a marginal number to show how negligible the impact can be. It is also statistically significant. The result of the joint test shows that the inflation rate has evidence of a long-run symmetric relationship to the well-being of Nigeria. This further explains that as inflation decreases, well-being increases as the joint result indicates that both serve the same way. As for the INFR_POS, an increase in the inflation rate will increase well-being by 0.001322. It is not statistically significant.

The result of a negative increase in the exchange rate, (EXR_NEG) explains that a decrease in the exchange rate will decrease well-being in Nigeria. It is statistically significant. Finally, EXR_POS indicated that an increase in the exchange rate will increase well-being in Nigeria. The dynamic relationship between the two variables is indicated asymmetrically. It is possible because the effect of oil supply

and shock on exchange rates is heterogeneous. This is in line with the findings of (Chen, Li Liu, 2016)The effect of the joint result further explains that both exchange and well-being in Nigeria go opposite ways.

This means that, as the exchange rate increases, well-being decreases in Nigeria. This is because most consumables in Nigeria are imported which mounts pressure on foreign exchange. This also has a direct linkage to the inflation rate. As the exchange rate increases, the inflation rate in Nigeria will also increase which affects the purchasing power of Nigeria and their well-being. This is also supported by Dutch disease theory. Overall, researchers stated that an increase in the prices of oil impacts differently to the countries that import and export. (Bahmani-Oskooee, Chang, Elmi, Ranjbar, 2016)This, therefore, means that the rise in the prices of oil impacts the personal consumption expenditures higher as compared to the decrease in prices of oil.

Table 5| NARDL long-run estimation with Wald tests of Asymmetries Results.

Nonlinear Auto-Regressive Distributed Lag [NARDL] Estimates				
Wald Test Results				
Variables	Coefficients	T-statistics	Probability	F-stat
F-Prob.				
LogOILR_NEG	0.018797	0.377652	0.7101	1.939981
0.0326				
LogOILR_POS	0.425067***	6.633629	0.0000	
LogGOVS_NEG	-0.018862 *	-1.787340	0.0907	1.918357
0.1757				
LogGOVS_POS	-0.007966	-1.520078	0. 1459	
INFR_NEG	0.004716 *	1.804590	0.0879	4.98823
0.0189				
INFR_POS	0.001322	0.701672	0. 4919	
EXR_NEG	0.016796 **	2.114920	0.0486	1.725873
0.2062				
EXR_POS_	-0.001153 **	-2.531338	0. 0209	
Constant	6.965060***	54.41843	0.0000	

, **, and * denote the level of significance at 10 2.5, 5, and 1% respectively. Note: This table reports the results of the asymmetry test. The null hypothesis of the symmetric effect of changes in oil revenue on well-being is to be tested based on model specification*

Table 8 provided us with the short-run estimations of NARDL. The result is the relationship between oil revenue and well-being in Nigeria in the short-run period is shown below:

Table 6 | Short-run estimations of NARDL

Variables	Coefficient	t-statistics	Prob.
D(LogOILR_POS)	0.119477 ***	3.352066	0.0035
D(LogGOVS_NEG)	-0.000476	-0.246581	0.8080
D(INFR_NEG)	-0.001222 **	-2.521357	0.0213
D(INFR_POS)	0.002698 ***	5.718563	0.0000
D(EXR_NEG)	0.011233 ***	2.913386	0.0093
Coint EQ (-1)	-0.554794 ***	-9.308970	0.0000

Author's computation

*Standard errors are in parenthesis. *, **, and *** represent the level of significance at (10, 5, and 1% respectively).*

The result shows that d(LogOILR_POS) increase will increase the well-being of Nigeria by 0.119477 in the short-run and cast statistically significant even at 1%. This indicates that as oil revenue increases so does the well fair of the citizens but in the short-run. On the d(Loggovs_NEG), a decrease in government spending will amount to a decrease in the well-being of Nigerians by -0.000476 though it shows no statistical significance. The result of the negative shocks of inflation rate on the well-being for both the short and long run is statistically significant at 2% and 8% respectively. The implication is that an increase in oil revenue propels an increase in government spending. This is a result of a sudden increase in the importation of public and private ventures. Nigeria's major source of foreign exchange earnings is the sales of crude oil.

The explanation is in line with Dutch disease theory and supported by the work of (RagnarTorvik, 2002); (Kotani, 2016). These affect the general life standard leading to the reduction in savings and investments in human capital and other sectors of the economy. The results of the inflation rate positive are statistically significant in the short-run and did not cast a statistical significance on the long-run period and will increase the well-being of Nigerians by 0.002698 in the short run. This also implies that well-fare declines as oil revenue increases. This is because oil revenue triggers inflation rate as a result of a persistent struggle to get a foreign exchange rate which is the basis for importation in Nigeria.

This is supported by (Onifade & Obademi, 2020)The second effect, of the Dutch disease, can be seen as the process by which a boom in a natural resource sector results in shrinkage in the non-resource convertible. As a result, the economy will be directed towards the services sector thereby affecting the production processes in the manufacturing sector. In the case of both short and long-run associations between exchange rates on well-being, a decrease in the exchange rate (negative shock of the exchange rate) will improve the well-being and the standard of living in Nigeria. This is a result of the decline in the price of goods and services as major household commodities are imported into the country.

(ECTt−1) the error correction term obtained from the cointegration model. The error correction term coefficient range is between -1 to 0. The error correction term should be negative and significant to a speed of adjustment such that when the dependent variable exceeds the long-run relationship with the independent variable, it adjusts downwards at a rate within the range. Table eight has the result of the short-run and the error correction model.

Table 7 Model Statistics

R-Squared	0.994433
Adj. R-Squared	0.988557
F-Statistics	169.2312
F-Stat.[prob.]	0.000000

Table 8 Diagnostic tests

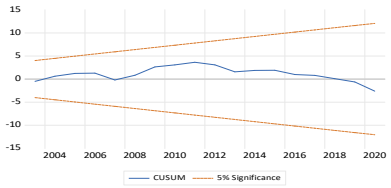
Problem	Test	Probability	Conclusion
Serial Correlation	Breusch-Godfrey LM-test	0.3795	No serial correlation
Breusch-Pagan-Godfrey	Heteroskedasticity test	0.9781	No heteroscedasticity
Specification Error	Ramsey RESET Test	0.3314	Correctly specified

Author's computation

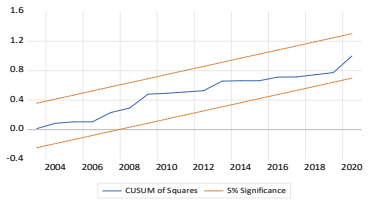
In the diagnostic and model stability tests results, each model presented in Table 7 provides the empirical results for the diagnostic tests. First, we employed Breusch- Godfrey Lagrange multiplier (LM) tests. The test is an alternative to Q-statistics for testing serial correlation. The test is an example of asymptotic for a large sample and it is applicable to test higher-order on whether there are lagged dependent variables or not. The null hypothesis of the test is that there is no serial correlation up to lag order 'P', where P is a pre-specified integer (Godfrey,1988). From the LM test result, we strongly reject the null of no serial correlation. The second diagnostic test in our model is the heteroscedasticity test. This test allowed us to check for a range of specifications of heteroscedasticity in the residuals of the equation.

Given this, if there is evidence of heteroscedasticity, a robust standard error option should be used to correct the standard errors. The result of this test is also presented in Table 7. The result in the model shows that the model is well specified and does not suffer from heteroscedasticity. The last diagnostic test in this study is the Ramsey rest test. This is to check if the model is well specified. If rejected, this indicates signs of misspecification in the data-generating process. The result of our model in the test shows our model is that we cannot reject the null that our model did not have any sign of misspecification.

Cusum test



Cusum of squarer test



Conclusions and Recommendations

The research examined the asymmetric effect of oil revenue on the well-being of Nigerians by using annual time series data from 1980 to 2020 to conduct this analysis. The asymmetric ARDL approach was applied to scrutinize the short and long-run effects between the study variables. Previous studies used the linear cointegration model to ascertain the short and long-run associations between their variables. However, this study, applied non-linear long-run and short-run approaches to find the connectivity between the study variables as it is essential to examine the influence of the rise and fall in the oil revenues on the Nigerians.

In applying the model, it is important to check the stationarity of each variable to be sure that non is stationary at the second difference [I (2)]. The most frequently used ADF and PP were applied to check the stationarity property of each variable. The results of these tests confirm that the variable is of mixed orders of [I(0)] and [I(1)]. Asymmetric ARDL is better when compared with other cointegration because, in the asymmetric ARDL model, there is room to test on different lags to make a better result. Akaike information criteria (AIC) was automatically selected and it is the best lag selection because the calculated value of AIC is the minimum as compared to other lag selection criteria. While the CUSUM and CUSUM of squares tests suggested that the model parameter estimates were structurally stable and well fitted as both plots remained within the 5 per cent critical limits, the model diagnostics tests revealed no problems with normality, serial correlation, heteroscedasticity, or misspecification errors.

The NARDL co-integration results confirmed the existence of a long-run non-linear relationship between oil revenue and well-being

variables in Nigeria throughout the studied period. With statistical support, the Wald test of coefficient restriction demonstrated an asymmetrical long-run influence on oil revenue and inflation rate on well-being in Nigeria. The examined results of the asymmetric long-run indicate that when the oil revenues increase or decrease does not necessarily transform the well-being of Nigerians. This is because, the positive increase in the oil revenue will impact well-being positively, while the negative decrease in the oil revenue will impact negatively on the well-being of Nigerians while government expenditure and exchange rate were estimated to have a symmetric long-run impact on the well-being of Nigerians. Based on the findings, an important policy lesson could be learned from the results of the study which implies that government should embrace economic diversification and the development of critical infrastructures that would assist to improve the well-being of Nigerians. The current study suggests that the well-being of Nigerians would be improved with an increase in oil revenue when there is accountability, proper capital investment, and judicious use of generated oil revenues even in other sectors of the economy in the long run. In the short run, the government should increase the quantity of crude oil exported by cubing oil theft. However, economic policy encourages diversification is necessary in Nigeria. This will enable the export of finished goods, which will in turn provide foreign exchange as well as cushion the effect of inflationary pressure on the economy. Notwithstanding the aforementioned, it would provide employment opportunities to the team population which will increase the well-being of Nigerians.

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