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Misery and Economic Growth Nexus in Nigeria; Implications for Electrical Energy Management

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Abstract: At first glance, misery seems unquantifiable but has been established to be an aggregation of unemployment and inflation. Nigeria is in a pitiable condition as she is ranked the 6th most miserable country in the world. This study aims to ascertain the effect of economic growth on Misery in Nigeria, that is, to determine whether economic growth rate has strengthened or weakened the misery of Nigerians. This study adopts Autoregressive Distributed Lag (ARDL) model because it considers policy lags of economic phenomena and allows combined order of integrations. The study finds an inverse nexus between economic growth and misery. Hence, recommendations were made in form of measures to ensure the need for economic growth to increase at faster and higher pace to combat high misery levels in Nigeria.

Keywords: Misery, Economic Growth, Nigeria

1. Introduction

Gross domestic product (GDP) growth rate measures how fast an economy grows by comparing one quarter of the country's GDP to the previous quarter, thereby measuring economic output of a nation. GDP growth rate is driven by four components, of which personal consumption is the major driver as it includes the critical sector of retail sales. The second component is business investment, including construction and inventory levels. Government spending is the third growth propellant, comprising largest categories of Social Security benefits, defence spending and medicare benefits. Governments often increase spending to jump start the economy during a recession. The fourth is net trade [1].

The misery index, constructed by [2] provides an easily adjustable snap-shot of the economy. The index helps to determine the economic performance of the average citizen by adding the seasonally adjusted unemployment rate to the annual inflation rate. For simplicity purpose, misery index is proxied by an aggregation of seasonally adjusted unemployment rate and annual inflation rates. Bank lending rate is left out because it is not within the context of this study as it relates more to the financial sector and might result in high correlation with economic growth.

The study on the relationship between misery and economic growth has not attracted several scholars empirically both in developed and developing countries as previous studies have researched the isolated components of unemployment [3, 4] and inflation [5, 6] among others; while a few have used the index as a judge of good governance [7]. It is expected that economic growth should increase living standards of people while reducing their misery levels. This study fills this existent gap in literature and considers recognizing the fact that despite its numerous positive growth fluctuations over time and given the contrasting escalated misery levels in the economy, economic growth rates



might just still have a role to play in determining Nigeria's misery index. The rest of the paper is structured as follows: Section 2 reviews the extant literature, Section 3 outlines the data and empirical technique, Section 4 details the findings and Section 5 concludes with policy recommendations.

2. Brief Insights from Literature

[2] propounded that as joblessness reduces by 1 percent, total national output expands by 3 percent. However, this was condemned in light of the fact that it holds for the United States. [8] led an experimental research on some Asian nations that have a place with the association for financial collaboration and advancement (OECD) with the outcomes demonstrating negative relations between economic growth and inflation. This is in accordance with [9] who attempted to set up the connection between inflation and growth for an illustration of over 100 countries within the timeframe of 1960 to 1990. Barro discovered that a normal increment of 10 percent inflation annually results in decreased growth of real GDP by 0.2 to 0.3 percent, thereby arriving at the resolution that few reasons exist to propose that higher expansion in the long haul lessens national growth. This demonstrated that extreme inverse relationship exists between inflation and economic growth in every economy as discovered by [8] who researched some Asian nations that are associated with OECD countries and found same outcomes. This is additionally upheld by crafted by [10] who insisted that inflation in many nations were unobtrusive before the 1970s and was higher much later. He disaggregated his discoveries into two timelines of before and after 1970 and found positive relationship between inflation and economic growth prior to 1970 while the inverse was the case after 1970.

Nigeria's misery index reported by [11] is approximately 18.02 percent, but peaked at approximately 28.73 percent in 2016 (the highest ever) with inflation and unemployment rising significantly. As at 2018, the country ranked 7th as most miserable country worldwide while this worsened in 2019 as the nation took one step further to be ranked 6th in the world in terms of the adjusted misery index by Dr Steve Hanke (bank lending rate was added to capture excessive borrowing levels while changes in real GDP per capita was subtracted) [12]. According to [11], Venezuela stands as the most miserable country in the world at 1,993 percent due to excessively high levels of hyper-inflation though unemployment is lower than that of Yemen, which is the second most miserable country worldwide at 47 percent. [11] reports that Democratic Republic of Congo (DRC) is the third most miserable country globally with 45.3 percent, followed by Mozambique (34.2 percent), South Africa (33.4 percent), Kosovo (28.4 percent), Argentina (28 percent), Nigeria (26.5 percent), Egypt (26.5 percent) and Angola (26.4 percent). Among these economies, Nigeria has the largest population with over 184 million people [13] which makes it more of a formidable concern. Ranking 6th most miserable country should give our economists concern as we investigate the root of the problem in order to fix it. The question remains why do we have relatively improved economic growth but high level of misery?

Nigeria's growth rate from 1991 to 2017 averaged 2.7 percent annually [13] which implies a slow but upward trend in living standard of citizens, nonetheless global statistics have placed Nigeria as one of the most miserable countries on earth with the most recent rankings indicating 6th position globally in the world misery index [11]. The Nigerian economy developed by a measly 1.5 percent in the second quarter of 2018. It was the second quarterly decrease in yield development from 2.11 percent in Q4 2017 to 1.95 percent in the first quarter of 2018; and down to 1.5 percent in the second. Additionally, about 40 percent of Nigerians have access to electricity supply given the high operating costs of over ₦8 billion / US\$53 million, of which over 80 percent goes into payment of staff's salaries and welfare; moreover, average growth per annum is less than 1 percent due to limited investment. Also, according to [14], electricity generation, transmission and distribution account for less than one percent of Nigeria's GDP. Hence, electricity is a major issue plaguing Nigerians and this can be traced back several years ago. This justifies electricity as an influencer of misery levels within the nation.

Surprisingly, misery level of Nigerians has been rising even despite previous years of economic growth. This directly contradicts theoretical expectations that improved economic growth should

result in better living standards, thus, indicating a deviation from the norm which is a problem in itself. This begs the questions: why has the recent economic growth in Nigeria resulted in higher level of misery as compared to before the growth? Has economic growth rate strengthened or weakened the misery of Nigerians? This study attempts to answer these questions by empirically investigating the impact of economic growth on misery levels of Nigeria. This provides a unique perspective as most previous studies have observed single elements of misery (that is, either inflation or unemployment) to be determinants of economic growth [15, 16, 17, 18].

Examinations of connectivity between misery and growth has attracted few researchers to establish this connection both in advanced and developing nations. In any case, a great deal of work has been done in separating unemployment and inflation as indicated as follows. [19] in his investigation on joblessness and rate of cash wage in the British economy noticed that expansion in joblessness in the economy makes inflation drop which he alluded to as an exchange off between the factors. Thus, the reasoning that as an economy's prosperity heightens, expansion rises, yet joblessness expands and inflation worsens as national buying intensity ends up more fragile [20].

The high cost and benefits associated with the energy sector, makes a major impact on the misery index given that there is a high chance of happiness (reduction in misery) when employment is generated by the sector and a sharp contrasting fall in happiness and increase in misery due the increased unemployment rate given the volatile nature of the energy industry. Furthermore, [30] studied the nexus between natural resource extraction and economic performance in Nigeria with the aim to see the effect of such extraction on the economic variables in Nigeria's Niger Delta region. A positive impact was observed by the study for the Niger Delta region, which implies that a fall in the misery level is impliedly attained. Also, [29] looked at the carbon emission's impact on crop production in Nigeria. Such contributions from the energy sector contribute to the reduction in the misery levels in a Nigeria.

The connection between inflation and economic growth was examined by [6], using Brazil as a case study within the period 1980 to 1995. The study confirmed that a negative relationship exists in the short run, nonetheless inflation does not influence growth in the long run. [15] analysed the likelihood that the relationship between inflation and economic growth would have auxiliary impacts for the scope of 1970 to 2003 Jordanian economy. Although great positive link existed between growth and inflation rate of beneath 2 percent, he developed auxiliary breakpoint at 2 percent inflation, thereby causing more than 2 percent inflationary impact on economic growth. This offers a genuine approach for Nigeria which has not recorded inflation rate below 5 percent since 1986 with the most minimal in 2007 as 5.4 percent and the highest point at 72.72 percent in 1995. Studies have set up the limit of yearly inflation increment to associate with an average of 1 percent for developed nations while that of developing countries like Nigeria is placed at an average of 11 percent.

2.1 Methodology

2.1.1. Model Specification

The study adapted the model of [21] and [22]. [22] used growth rate of per capita GDP and infrastructure (captured by electricity generation and distribution) as indicators to evaluate food security via ARDL technique. However, this work adapts this by adding population growth and death rate as explanatory variables to analyse their effects on misery levels of Nigeria. The implicit form of the model specified below:

$$MY = f(GDPR_t, ELE_t, POP_t, DR_t) \quad (1)$$

Re-stating equation 1 in its explicit form:

$$MY_t = \beta_0 + \beta_1 GDPR_t + \beta_2 ELE_t + \beta_3 POP_t + \beta_4 DR_t + \varepsilon_t \quad (2)$$

Where MY = misery index; GDPR= gross domestic product rate

ELE= Access to Energy (% of population); POP= population growth; DR= death rate

Apriori Expectation

GDPR: an increase in growth rate will reduce misery levels, hence, a negative relationship exists.

ELE: higher access to energy and electricity for greater proportion of the populace lessens misery levels in an economy, thus, an inverse relationship prevails.

POP: greater population growth tends to raise misery levels because of the shortage of resources to be distributed among the numerous needs of the populace.

DR: higher death rate is theoretically expected to reduce misery levels due to lesser number of people that will struggle for the limited available resources.

2.2.2. Data and Data sources

The misery index and economic growth is examined with data spanning from 1987 – 2017. Misery index is calculated by an addition to annual inflation rate of the seasonally adjusted unemployment rate. It assumes that high unemployment and inflation costs the country socially and economically. For the data analysis, the study uses quantitative and inductive research design. This approach combines theory with empirical observation and extracts maximum information from the data available. It therefore allows the researcher to observe the effects of explaining variables on the dependent variable. The study sets out a misery index model that captures the impact of economic growth, money supply, mortality and population growth on misery in Nigeria. This enables the researcher therefore to observe the effects of explanatory variables on the dependent variable. This model permits the estimation of the implication of inflation and interest rate on economic growth using Nigeria data. More information on the variables are presented in Table 1.

Table 1: Data Description

Variables Identifier	Data source	Measurement
MISERY (MY)	World Bank (2018)	Percentage
Gross Domestic Product Rate (GDPR)	World Bank (2018)	Percentage
Access to electricity (% of population) (ELE)	World Bank (2018)	Percentage
Population growth rate (POP)	World Bank (2018)	Percentage
Death rate (DR)	World Bank (2018)	Percentage

Source: Authors' computation

2.2.3. Estimation Technique.

Autoregressive Distributed Lag (ARDL) models are parsimonious infinite lag distributed models that are very important in analysing economic scenarios. Infinite here illustrates the presence of infinite number of parameters to be estimates, which can be rather complex but ARDL rectifies issues relating to specifications of certain lag lengths. The word 'autoregressive' simply means that the outcome variable (Y_t) is not just explained by the regressors (X_t) but also by its own lag. When changes occur to economic phenomena, the effects are not spontaneous as the impact is distributed over future time periods. So, to determine dynamic influences of variables on one another, it is important to address the distributed lag problem of the model, which is efficiently done by ARDL. Also, ARDL takes care of collinearity issues by allowing lags of the dependent variable to co-exist with that of the regressors. ARDL is based on presumptions, including normal distribution of the data; variable stationarity at combined levels of $I(0)$ and $I(1)$; no autocorrelation among error terms; heteroscedasticity must not exist in the data, that is, mean and variance should be constant in the model [22].

This ARDL technique helps to establish short and long run relationship among variables. One major advantage of this approach is that it identifies cointegrating vector(s) when there are multiple cointegrating equations. Due to single equation of the underlying equation, endogeneity is less of a

problem in ARDL as it is free from residual correlation. Lastly, error correction model (ECM) can be gotten from ARDL model via simple linear transformation, which incorporates short run adjustments into long run equilibrium without losing long run information. ECM model employs adequate number of lags to account for data generating procedures in general to specific modelling frameworks.

Bounds testing approach [23] is used to establish the existence of a long-run relationship between misery and GDP in Nigeria. Justification of the use of the ARDL technique is in its ability to handle relationship irrespective of whether the regressors are I(0) or I(1).

$$\Delta MY_t = \alpha_0 + \sum_{j=1}^p \phi_j \Delta MY_{t-j} + \sum_{j=1}^p \omega_j \Delta GDP_{t-j} + \sum_{j=1}^p \eta_j \Delta ELE_{t-j} + \sum_{j=1}^p \delta_j \Delta POP_{t-j} + \sum_{j=1}^p \psi_j \Delta DR_{t-j} + \beta_1 MY_{t-1} + \beta_2 GDP_{t-1} + \beta_3 ELE_{t-1} + \beta_4 POP_{t-1} + \beta_5 DR_{t-1} + \square_t$$

The zero hypothesis (H0) tested by F-statistics at this stage is that there is no long-term relationship to the alternative hypothesis (H1). This is specified by: H0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$

Against H1: $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq 0$

The next step is to estimate the long-term coefficient, given the presence of a long-term relationship. The long-term model to be estimated is:

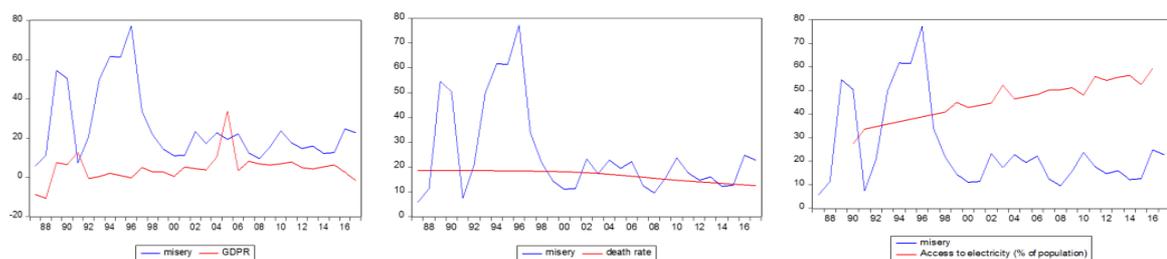
$$\Delta MY_t = \alpha_0 + \sum_{j=1}^p \phi_j \Delta MY_{t-j} + \sum_{j=1}^p \omega_j \Delta GDP_{t-j} + \sum_{j=1}^p \eta_j \Delta ELE_{t-j} + \sum_{j=1}^p \delta_j \Delta POP_{t-j} + \sum_{j=1}^p \psi_j \Delta DR_{t-j} + \theta ECM_{t-1} + \square_t$$

Finally, all the coefficients of the short-run equations are coefficients relating to the short-run dynamics that reflect the model's convergence to (θ), which represents the speed of the adjustment parameter showing how errors generated in one period are corrected in the following period [24].

3.0. Results and discussion

3.1. Trend analysis

Misery index is an economic indicator to determine the economic performance of the average citizen. It is calculated by an addition to the annual inflation rate of the seasonally adjusted unemployment rate. It assumes that high unemployment and inflation cost the country socially and economically.



Source: Authors' compilation from E-view (2019).

Figure 1: Misery and Economic Growth Pattern in Nigeria

Figure 1 shows the plot of misery index, growth rate, death rate and access to electricity in Nigeria. The 2015 misery index in Nigeria was approximately 18.02 percent, but then peaked at approximately 28.73 percent in 2016, the highest ever, with inflation and unemployment rising significantly. As at 2018 today we are ranked 7th most miserable country in the world because of our high misery index. The misery index, constructed by American economist Arthur Okun for US President Lyndon Johnson, provides an easily adjustable snap-shot of the economy [25]. The trend between misery and economic growth fluctuates in some but mostly moves in the opposite directions. Years of

exceptionally high misery occurred in periods of military regimes mainly General Ibrahim Babangida and General Sanni Abachi mostly due to excessive government spending which led to high inflation levels. Surprisingly, death rate consistently declined even during fluctuations and high levels of misery. Despite periodical fluctuations, access to electricity increased over the years as misery rate was higher in the 1990s than in recent years.

3.2. Econometric Analysis

The analysis commenced with a pre-estimation test for unit root using the Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) tests. This is to ensure that none of the variables are I(2) as this would render the outcome of Bounds test to be invalid because they are established relying on the prerequisite that variables are I(0) and/or I(1). The PP trial of unit root is introduced in Table 2. This gives comparable discovery that ADF test results as in both joblessness and mechanical yield are stationary after first difference, while loan cost and inflation are stationary at levels. Both trial of unit root (ADF and PP), demonstrate signs of I (0) and I (1), in this way defending the utilization of ARDL.

Table 2: Unit Root Test

Variables	Test statistics	Critical	Order of Integration
MY	-3.68	-2.99	I (0)
GDPR	-4.38	-2.96	I (0)
ELE	-4.80	-3.00	I (1)
POP	-4.15	-2.97	I (0)
DR	-4.46	-3.58	I (0)

Source: Authors' compilation from E-views.

Table 3: ARDL Bounds Test

F-Bounds test Value	Significance level	I (0)	I (1)
F-stat: 5.499	10%	2.2	3.09
K = 4	5%	2.56	3.49
	2.5%	2.88	3.87
	1%	3.29	4.37

Source: Authors' compilation from E-views

This tests the invalid theory that there is no long run relationship among the factors. Table 3 exhibits the after-effects of the figured F-measurements dependent on the Narayan's CV table. This is done as [26] revealed that for test sizes running from 30 to 80, the Pesaran F-insights isn't suitable. The figured F-insights (5.499) is higher than the upper bound basic incentive at 10, 5 and 1 percent levels of significance. Based on this outcome, we dismiss the null hypothesis and presume that there is a long run relationship among misery, growth rate, energy access, death rate and the population.

Table 4: ARDL Long Run Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPR	-1.53	0.71	-2.165	0.05
Population Growth	-310.23	165.71	-1.87	0.08
Access to Energy	-6.87	2.68	-2.56	0.02
Death Rate	-36.71	14.48	-2.53	0.02
Constant	1748.94	727.76	2.40	0.03

Source: Authors' compilation from E-views.

The long run dynamics of the model is presented in Table 4. Constant term: In the absence of all explanatory variables (GDPR, POP, ELE and DR), misery will be positive with about 17.49 units. Economic Growth (GDPR) has a negative relationship with misery, that is, an increase in GDPR by one nit will decrease misery by about 1.5 units and vice-versa. This conforms to apriori expectation. GDPR is also significant as the absolute value of t-stat is greater than 2 and p-value is less than 0.05. There are several determining factors to a country's economic progress but what is certain is that growth reduces unemployment and inflation rate, which are the cornerstones of Okun's misery index. It is logical to say that citizens of a progressive nation will be less miserable because of upgraded living standards, which is synonymous with higher income levels among other things. Countries like China have experienced continuous growth alongside significant reduction in unemployment and relatively steady inflation rate, thus resulting in lower misery. This is contrary to the case of Venezuela that had successive recession periods, leading to hyperinflation as they have been predicted to reach 10,000,000 percent in 2019.

Inflation, a crucial aspect of the misery index refers to the sustained increase in the general price level of goods and services over a period of time. Nigeria's inflation rate fell to 17.78 percent year-on-year in February 2017 after rising constantly for 12 straight months to 18.72 percent year-on-year in January 2017, the highest since September 2005. Significant price hikes in the commodity market almost doubled prices of daily goods like bread, eggs and milk. The imported demand, due to depreciating naira, caused this economic low point. Overdependence on crude oil left Nigeria exposed to severe price changes similar to the oil price shock of 2008 (global recession saw prices fall from the 2008 peak of \$147 in July to \$32 in December). The country has yet to fully recover from the fall in the price of 'black gold' and the scarcity of the dollar. Prices continue to sky-rocket and constant demand for dollars to pay school fees and personal travel allowances has further aggravated the issue [27]. These inflationary issues could have a negative impact on economic growth in such a way that despite increases in labour wages, the impact of such an increase is not felt, thus, not improving the economy.

Unemployment rate (another aspect of misery) in Nigeria is not as volatile as inflation rate. While it remains problematic and relatively high, it has not risen as fiercely as the inflation rate. A probable cause is that foreign and domestic investment are not sufficient and with the current economic situation, there is not much incentive to invest in Nigeria. Educational institutions produce thousands of graduates a year to the labour market, increasing the labour-supply give the limited labor-demand available. This leads to relatively low wages which reduces the motivation of the labour force and in turn could negatively impact economic growth in Nigeria.

To reduce the level of misery in Nigeria, the energy sector plays a major role because (i) most economic activities utilise energy in terms of fuel and direct electricity consumption for their performance [28]. An ill-managed energy sector tends to make work-life relatively unbearable, hence increasing the misery level [29] (ii) Carbon dioxide emissions tend to contribute to the climate change effects, such as rising temperature, rising sea levels which has the potential to increase the misery of the Nigeria in the long run [30].

4. Conclusion and Recommendation

The study investigated economic growth as a determinant of misery in Nigeria utilising the ARDL Bounds technique of estimation. After confirming the presence of a statistically significant long run nexus between the economic growth rate and misery, it was discovered that as economic growth increases, the misery level responds with a reduction which conforms to the apriori expectation. This indicates that more activities that lead to economic growth should be accelerated to reduce the misery level in Nigeria. In contrast to the study's findings, despite Nigeria's economic growth, the level of misery is still relatively high because the growth rate is insufficient to bring about formidable change in the misery level of Nigerians. This study proposes that economic growth needs to increase at a faster and higher pace to combat the relatively high level of misery in Nigeria. However, as a target for the Nigerian economy, Inflation and unemployment rates should both be kept within the single digit range required for growth and frictional unemployment. As a suggestion for further studies, the

direct performance of energy sector vis a vis misery should be explored as a worthy contribution to literature.

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