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**SECTORAL PERFORMANCE AND ECONOMIC DEVELOPMENT IN NIGERIA:  
IMPLICATIONS FOR POVERTY REDUCTION**

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**Abstract**

The study examined the impact of sectoral performance on Nigeria's economic development, with specific focus on poverty reduction. Sectoral performance was disaggregated into agriculture, industry, and service sectors, measured by their growth rates. Government expenditure was introduced following its link to economic development. Data were obtained from Central Bank of Nigeria Statistical Bulletin, National Bureau of Statistics and World Development Indicator. The analysis techniques include descriptive statistics, unit root test, bounds cointegration and Autoregressive Distributed Lag estimation and robustness tests. The unit root tests results showed that while agriculture and industrial sector growth rates were integrated of order zero, the other variables were integrated of order one. Evidence of cointegration was established in the model. The ARDL results showed that agriculture sector performance had a significant negative impact on poverty. The t-statistic (-2.432) of the estimated parameter is associated with probability value (0.0411) less than 0.05. However, the industrial sector growth did not significantly impact poverty reduction, given the probability level (0.89, 0.23) associated with the t-statistics (0.11, 0.15) in both long and short term respectively. Meanwhile, evidence of a significant (0.0028) negative (-3.873) effect of service sector growth on poverty exists. Similarly, government expenditure has significant (0.0004) negative (-5.205) effect on poverty. Thus, the study recommends that the government should place priorities on promoting mechanized farming, provision of post-harvest facilities, lands, provide incentives for private investment in the sectors while providing health services, education, employable skills, economic and social community services with high potential for poverty reduction in Nigeria.

**Keywords:** Poverty reduction, Economic development, Sectoral Performance, Nigeria.

**1. Introduction**

There are divers schools of thought as to the concept of poverty. To the classical economists, poverty is a choice. A choice which rests on the productivity of the individual. Accordingly, poverty begets poverty. On the other hand, the neo-classicalists likened poverty to inequality dynamics. They argued that poverty is determined by an individual's level of skills, talents, capital, among others. Both the classicals and neo-classicals argued against government

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**Proceedings of the 2<sup>nd</sup> (Hybrid) International Conference, Faculty of Social Sciences, Niger Delta University, Held on March 13, 2024**

intervention in poverty eradication because they believed that the market forces can self-regulate into solving the problem of poverty in the economy. On the contrary, the Keynesians, in support of government intervention, argued that failure of the market forces in determining the perfect workings of the economy is not the only factor responsible for poverty but also underdevelopment. According to Keynes, government intervention is a prerequisite for tackling the problem of underdevelopment. Hence, the government must intervene through increase in its expenditure on education, health, and infrastructure for increased production capacity. This will have a multiplier effect on employment, growth, and poverty.

Poverty is a situation where a person's resources, mainly material resources are not sufficient to meet minimum needs, including social participation (Maclines, Aldridge, Bushe, Kenway and Tinson, 2013). The implication of this is that a person is considered poor when his resources fall short of meeting his minimum needs and social group participation. Poverty is generally absolute and relative. Absolute poverty is characterized by severe deprivation of basic human needs including food, safe drinking water, sanitation facilities, health, shelter, education and information (United Nations, 2020). It depends not only on income but also on access to services, meanwhile, relative poverty is a standard measured in terms of the society in which an individual live and therefore differs overtime and between countries.

In Nigeria, available data from world development indicator (2019) has revealed that poverty level has maintained a steady increase over time. From 1986 to 1989, the level of poverty increased within the level of 46.3 percent, 47.3 percent, 48.3 percent, and 49.3 percent respectively. However, from 1990 to 1995 it further increased to 50.3 percent, 51.3 percent, 57.1 percent, 54.7 percent, 55.9 percent, and 57.1 percent consecutively. This increasing trend continued into 1996 to 2002 with poverty levels ranging from 63.5 percent, 60.6 percent, 61.9 percent, 63.1 percent, 64.1 percent, 65.7 percent, and 66.9 percent, before it finally declined to 53.5 percent in 2003 and remained so until 2007 when it decreased to 52.99 percent. It however, increased further to 53.6 and 53.5 percent in 2008 and 2009 respectively before maintaining a steady increase from 2010 onward, ranging from 54.43 percent to 54.9 percent in 2011 until 2017 when it increased further to 61.2 percent and 61.69 percent in 2018. It however, declined by 2019 to 50.1 percent. Even with the decline, the level of poverty remains above average in the face of growth in various sectors of the economy. This is the motivation

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for this study. It focuses on appraising the performance of the agricultural, industrial, and service sectors in poverty reduction in Nigeria.

A large number of studies have focused on the contribution of the agricultural, industrial and service sectors to economic growth with emphasis on its output (Olajide, Akinlabi, & Tijani, 2012; Odetola & Etumnu, 2013; Obioma, Anyanwu & Kalu, 2015; Uchechukwu & Ibiok, 2015; Ibe & Obodoechi, 2019). However only a few studies have examined the problem beyond economic growth (measured by Gross Domestic Product), focusing on per capita income as a measure of economic development (Linden & Mahmood, 2007; Tandrayen-Ragoobur, 2010; and Abula & Mordecai, 2016). The foregoing submissions notwithstanding, there is still no consensus on the impact of the agricultural, industrial, and service sector on a key index of economic development such as poverty reduction. For instance, while Kolawole and Omobitan (2014) in their study reported a negative effect of the agricultural, industrial and service sectors on poverty, other studies indicated a positive effect (Oyakhilomen & Zibah, 2014; Egwu, 2016). From the foregoing, empirical studies on Nigeria's sectoral performance have mainly focused on its contribution to economic growth measured by real gross domestic product, while its contribution to overall socio-economic development measured by level of reduction in poverty has remained grey. Thus, the study examined the impact of sectoral performance using the percentage growth rates of the agricultural, industrial, and service sectors output on poverty reduction in Nigeria. In addition, government expenditure was introduced into the empirical model following its link to economic development.

### **2. Literature Review**

Several theories relating to the agricultural, industrial and service sectors as well as their relationship with economic development variables has been well developed in economic literature.

The traditional agricultural theory by Schultz (1956) builds its basic assumptions on low productivity in traditional agriculture which he asserts would improve with increase in investment in the sector along with increased technological knowhow. With regards to economic growth, the theory assumes that the rural peasants or farmers when mobilized,

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**Proceedings of the 2<sup>nd</sup> (Hybrid) International Conference, Faculty of Social Sciences, Niger Delta University, Held on March 13, 2024**

higher income would result in higher return which could be reinvested into the agricultural and non-agricultural sectors of the economy of developing countries. This he argued will lead to economic growth which would eventually transcend to or enhance economic development of the economies. More so, with regards to his assumption on human capital development, he posits that in order to transform the agricultural sector for improved social welfare and development, investment should be directed to the human capital base of the country's manpower. This is because, he argued, the new and improved knowledge, skill and experience would aid in facilitating the change process of the traditional agricultural pattern of these rural communities and as such, enhancing the capacity of the rural farmers would result in improved and increased production and output. This, he posits would lead to economic growth and subsequently, development.

In the same vein, the Kaldor's theory was developed in 1966. It emphasized on the growth process of developing economies and highlights the relationship between industrial growth and the performance of these economies. The law states that there is a close nexus between the growth of the industrial sector output and economic growth. Kaldor's first law can be summed up in the expression "manufacturing industry is the engine of growth", which he first estimated in a cross-sectional study of developed countries. The relationship between total output and manufacturing output, he argued was positive, which means that the overall growth rate of the economy is associated with the excess of the growth rate of manufacturing output over the growth rate of non-manufacturing output. This proposition implies that high growth rates are usually found in cases where the share of industry in gross domestic product is increasing. The explanation for the correlation between the growth of manufacturing output and the overall performance of the economy is to be found on the impact of the former on the growth of productivity in the economy. Hence, the increase in productivity level would cause an increase in economic growth and development. most suitably, was the Fisher-Clark's service/three sector theory. The theory was first developed by Fisher (1939). Fisher, in trying to understand the process of economic transformation and new aspects of consumer demand that goes beyond basic agricultural and manufactured goods, came about the idea of the tertiary sector also known as service sector that deals with intangible goods and its role in economic progress and development.

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**Proceedings of the 2<sup>nd</sup> (Hybrid) International Conference, Faculty of Social Sciences, Niger Delta University, Held on March 13, 2024**

However, it was the broader definition developed by Clark (1940) in his treatise “The Conditions of Economic Progress” that became an established component of the economic lexicon. In it, Clark described a tripartite economic structure consisting of primary, secondary and tertiary economic activities. Primary activities are agricultural or extractive in nature and are limited by natural growth factors. Secondary activities are primarily composed of manufacturing and production activities, in this case the industrial sector. While the tertiary activities are service based and are dependent on, and limited by, human skill and expertise. Primary and secondary activities can be further distinguished from tertiary activities by the nature of their output, which is tangible in nature, whereas tertiary activities produce intangible outcomes.

The service sector, which was what they referred to as tertiary, for Clark is also a repository for activities that do not fit under the narrower and much more traditional understandings of the first two (agricultural and industrial) sectors. Clark’s intervention became particularly influential as a means of tracking economic progress and structural change. The central thesis is that technological progress parallels a decline in primary and secondary activities and an increase in tertiary activities. As outlined by Clark, the parameters of the economic model states that over time the tertiary sector would become the dominant economic sector within a nation. Structural change or transformation is therefore, the reallocation of economic activity and capital across the primary (agricultural), secondary (industrial) and tertiary (service) sectors. Clark’s work became part of a long tradition attempting to understand national economic growth and development through the lens of sectoral structures.

Going forward, these theories did well in stating the importance of the agricultural, industrial and service sectors to the developmental process of LDCs but it is noteworthy to state here that a mere investment in these sectors does not guarantee development unless some certain indicators are met and this is where the development thesis by Seers (1969) comes in, which stresses on the question of poverty, unemployment and inequality in the development process. This is the bone of contention of this thesis.

Empirically, Kolawole and Omobitan (2014) investigated the impact of the agricultural subsector on poverty reduction in Nigeria. The study utilized the error correction mechanism.

**Theme:** *African Solutions to Emerging Challenges: Building Viable Democratic, Economic, Information and Sustainable Systems in the 21<sup>st</sup> Century*



**Proceedings of the 2<sup>nd</sup> (Hybrid) International Conference, Faculty of Social Sciences, Niger Delta University, Held on March 13, 2024**

The result showed that agricultural production negatively impacted on poverty reduction using poverty headcount as proxy. Lawrence and Essang (2015) examined the effect of agricultural expenditure on agricultural output and then agricultural output on poverty in Nigeria. The study utilized time series data with the use of cointegration. The result showed that poverty responded to agricultural output in Nigeria but the response was insignificant. Egwu (2016) investigated the impact of agricultural sector on poverty in Nigeria using variables on agricultural financing and agricultural output and ordinary least square estimation method. The findings revealed that agricultural financing through the Agricultural Credit Guarantee Scheme Fund, Commercial Bank Credit to Agriculture were significant at reducing the poverty level. Darwati (2018) studied the effect of agricultural production using agricultural output on economic growth and poverty in Indonesia using panel data with path analysis method of analysis. the study found out that there was no relationship between agricultural production on the growth rate of Gross Domestic Products well as not been able to reduce the level of poverty in the study country. John and Dankawu (2018) studied the effect of agriculture sector output on poverty reduction in Nigeria. The method of estimation was the principal component analysis and vector error correction model. The findings revealed that agricultural sector shock would impact on poverty reduction significantly.

With regards to the industrial sector, Thu and Riedel (2019) investigated the impact of industrial sector on poverty reduction in Vietman from 2010 to 2016 using the two-stage least square estimation technique. Their findings revealed that an increase in industrial sector output as well as agricultural output led to a reduction in poverty rate while the increase in service sector output led to an increase in poverty rate in Vietnam. Eneji, Tangka, Eneji, Haruna and Uzochukwu (2018) examined the effect of industrial sector output performance on poverty reduction in Nigeria from 1981 to 2018 using ordinary least square and granger causality approach. Their result reveled that industrial sector output positively influenced poverty rate in Nigeria. Alhaji, Said, and Sidique (2015) examined the industrial sector output and its effect on poverty and subsequently inequality in Nigeria using static panel data method of analysis. Their findings revealed that there was no statistically significant influence of industrial sector output on poverty reduction, neither was there any statistical evidence to conclude that increase in poverty leads to higher inequality in Nigeria.

**Theme:** *African Solutions to Emerging Challenges: Building Viable Democratic, Economic, Information and Sustainable Systems in the 21<sup>st</sup> Century*



**Proceedings of the 2<sup>nd</sup> (Hybrid) International Conference, Faculty of Social Sciences, Niger Delta University, Held on March 13, 2024**

While Thu and Riedel (2019) investigated the impact of service sector on poverty reduction in Vietnam using the two-stage least square estimation technique. Their findings revealed that an increase in service sector output led to an increase in poverty rate in Vietnam. Focusing on studies that worked on the service sector output and economic development using per capita GDP as proxy for poverty are that of Kabeta and Sidhu (2016) who investigated the service sector contribution to Ethiopia's growth per capita rate using granger causality and cointegration test approach. Their findings revealed that the countries per capita growth rate improved through contributions in terms of productivity and not through employment creation as observed from the agricultural sector. Thus, GDP per capita improved through the service sector during the period under study. Also, Eichengreen and Gupta (2009) examined the effect of the service sector and poverty measured by living standard with the use of per capita income in Asia using descriptive statistics. Their result revealed there was a positive correlation between the service sector output and per capita income. More so, Kongsamut, Rebelo and Xie (2001) examined the contribution of the service sector to poverty using per capita income of 123 countries using the Kaldo facts. Their result revealed that the service sector contributed highly to the per capita income increase in the study countries.

The review of existing literatures has demonstrated that agriculture, industry and service have a major role to play in the process of development of less developed countries, including Nigeria. This study reviewed several theories relating to the agricultural, industrial and service sector. These theories include the traditional agricultural theory by Schults (1956), Kaldor's (1966) first law/theory of the industrial sector as well as the Fisher-Clark (1940) service/three sector theory. These theories were able to trace the development process of the agricultural, industrial and service sectors and their role in the economic transformation process of developed and developing economies. This notwithstanding, it is noteworthy to state here that a mere investment in these sectors does not guarantee development unless certain indicators are met and this is where the development thesis by Seers (1969) comes in, which stresses on the question of poverty, unemployment and inequality in the development process. This is the bone of contention of this study.

More so, a greater chunk of the literature relating to sectoral performance concentrated more on indices like economic growth proxied by real gross domestic product and various sectoral

**Theme: *African Solutions to Emerging Challenges: Building Viable Democratic, Economic, Information and Sustainable Systems in the 21<sup>st</sup> Century***



## **Proceedings of the 2<sup>nd</sup> (Hybrid) International Conference, Faculty of Social Sciences, Niger Delta University, Held on March 13, 2024**

variable output as well as variables ranging from public expenditure on the real sector, population, interest rate, gross capital formation, etc. These studies also in utilizing variables like output of the agricultural, industrial and service sectors in carrying out their analysis, failed to look at the performance of these sectors. It is one thing to look at the sectoral output in relation to economic growth and another to measure how this sector performance has impacted on economic development with emphasis on poverty reduction.

### **3. Methodology**

#### **3.1 Research Design**

The study employed ex post facto research design to explore the impact of sectoral performance on sustainable job creation in Nigeria. The motivation for this research design was based on the type of data employed, being time series data devoid of manipulation.

#### **3.2 Data Collection Methods and Sources**

The study utilized the secondary sources of data. The data frequency was on a yearly basis, comprising five time series variables (poverty as the dependent variables and growth rates of agricultural, industrial and service sector as independent variables capturing their performance during the period of study. The inclusion of government expenditure as a fourth independent variable was to serve as check variable. This is in a bid to capture the policy environment in Nigeria, since government decisions has a way of affecting other sectors of the economy and development in general. The data covered the period 1986 to 2020 and sourced from World Bank: World Development Indicator, National Bureau of Statistics, and Central Bank of Nigeria statistical bulletin (2019, 2020). The choice of timeframe and frequency of data was based on the intention of the researcher to capture the post sap trends as well as the need to capture past and current trends in these sectors vis-à-vis trends in economic development in the study country. The growth rate of the respective sectoral data was chosen for the study because it is best suited to capture the performance of the sectors during the intended period of study

#### **3.3 Model Specification**

The model specification for this study followed the work of Uchechukwu and Ibiok (2015). Poverty rate was introduced as the dependent variable, agricultural, industrial and service

**Theme:** *African Solutions to Emerging Challenges: Building Viable Democratic, Economic, Information and Sustainable Systems in the 21<sup>st</sup> Century*



**Proceedings of the 2<sup>nd</sup> (Hybrid) International Conference, Faculty of Social Sciences, Niger Delta University, Held on March 13, 2024**

sector growth rates as well as government expenditure are the independent variables. The model specification is provided as follows:

Functional form of the model:

$$POVR = f(AGR, IND, SERV, GEX) \quad - - - - - (3.1)$$

Stated in linear form gives;

$$POVR = a_0 + a_1 AGR + a_2 IND + a_3 SERV + a_4 GEX + \mu \quad - - - - - (3.2)$$

Formulating the Autoregressive Distributed Lag (ARDL) long-run model gives;

$$\begin{aligned} \Delta(POVR)_t = & a_0 + a_1(POVR)_t + a_2(AGR)_t + a_3(IND)_t + a_4(SERV)_t + a_5(GEX)_t \\ & + \sum_{i=1}^n \Delta a_1(POVR)_{t-1} + \sum_{i=1}^n \Delta a_2(AGR)_{t-1} + \sum_{i=1}^n \Delta a_3(IND)_{t-1} \\ & + \sum_{i=1}^n \Delta a_4(SERV)_{t-1} + \sum_{i=1}^n \Delta a_5(GEX)_{t-1} + \mu_{1t} \quad - - - (3.3) \end{aligned}$$

**While the short-run Error Correction Model derived from the ARDL model yields;**

$$\begin{aligned} \Delta(POVR)_t = & \partial_0 + \partial_1(POVR)_t + \partial_2(AGR)_t + \partial_3(IND)_t + \partial_4.(SERV)_t + \partial_5.(GEX)_t \\ & + \sum_{i=1}^n \Delta \partial_1(POVR)_{t-1} + \sum_{i=1}^n \Delta \partial_2(AGR)_{t-1} + \sum_{i=1}^n \Delta \partial_3(IND)_{t-1} \\ & + \sum_{i=1}^n \Delta \partial_4(SERV)_{t-1} + \sum_{i=1}^n \Delta \partial_5(GEX)_{t-1} + \Pi ECM + \mu_{1t} \quad - - \\ & - (3.4) \end{aligned}$$

Where:

$POVR = \text{Poverty Rate ( \% )}$

$AGR, IND, SERV = \text{Agriculture, Industry, and Service Sector Growth Rates ( \% )}$

$GEX = \text{Government Expenditure ( \% )}$

$a_0, \partial_0 = \text{respective intercept of the model}$

$a_1 - a_4 = \text{Slopes and long - run dynamic coefficient of the model respectively.}$

$\partial_1 - \partial_5 = \text{Short - run dynamic coefficients.}$

$\mu_{1t} - \mu_{4t} = \text{Disturbance or error term}$

$\Delta = \text{First difference operator.}$

$n = \text{Maximum lag length.}$

$\Pi = \text{Error correction coefficient.}$

**Theme: *African Solutions to Emerging Challenges: Building Viable Democratic, Economic, Information and Sustainable Systems in the 21<sup>st</sup> Century***



**Proceedings of the 2<sup>nd</sup> (Hybrid) International Conference, Faculty  
of Social Sciences, Niger Delta University, Held on March 13, 2024**

ECM = Error correction term with one period lag.

f = Functional Notation

ln = Natural Log Notation

### **3.4 Method of Data Analysis**

The study adopted autoregressive distributed lag (ARDL)/Bound model of co-integration by Pesaran et al (2001), given its flexibility properties in allowing for mixed order of integration with exception of I(2). Error Correction Mechanism (ECM) was also utilized to reconcile long run disequilibrium with short run. More so, descriptive statistics was conducted as well as unit Root test by Augmented Dickey-Fuller (1984) and Phillip and Perron (1988) for stationarity to stabilize the time series data accustomed with irregularities.

## **4. Results and Discussion**

### **4.1 Descriptive Statistics**

The descriptive statistics for the variables are presented in table 4.1:

**Table 4.1: Summary of descriptive statistics for the variables**

Table 4.1 shows summary of descriptive statistics.

|              | POVR  | AGR     | IND   | SERV  | GEX  |
|--------------|-------|---------|-------|-------|------|
| Mean         | 55.88 | 5.89    | 1.91  | 5.77  | 3.02 |
| Median       | 55.01 | 4.11    | 1.89  | 4.00  | 2.60 |
| Maximum      | 66.90 | 55.58   | 18.05 | 19.99 | 9.08 |
| Minimum      | 46.30 | -3.19   | -8.85 | -0.91 | 0.64 |
| Std. Dev.    | 5.24  | 8.97    | 5.47  | 4.70  | 1.93 |
| Jarque-Bera  | 1.05  | 1095.15 | 2.67  | 7.52  | 7.78 |
| Probability  | 0.59  | 0.00    | 0.26  | 0.02  | 0.02 |
| Observations | 35    | 35      | 35    | 35    | 35   |

**Source: Author's computation from E-views software, 2020.**

The descriptive statistics showed a mean value of 55.8 percent for poverty rate. The mean values further showed that agriculture, industrial and service sectors performance and

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## **Proceedings of the 2<sup>nd</sup> (Hybrid) International Conference, Faculty of Social Sciences, Niger Delta University, Held on March 13, 2024**

government expenditure are 5.89, 1.91, 5.77 and 3.02 percent respectively. This finding indicates that, on the average, the performance of the agriculture sector surpassed the industrial and service sectors' performance over the study period. The standard deviation showed that the observations for all the variables clustered around their respective mean values with the exception of agriculture (8.97) and industrial (5.47) sectors' performance that were higher than their mean value. Additionally, the probability values of the Jarque-Bera statistics showed that all the variables for the investigation were normally distributed at 5 percent level except agriculture and service sector performance, and government expenditure. This is because their probability values (0.00, 0.02 and 0.02 percent respectively) are lower than the conventional 5 percent level of significance.

### **4.2 Unit Root**

Being conventional part of time series analysis, the study subjected the variables to unit root test. This test is necessary because time series variables have the tendency of trending upward and downward hence characterized by inconsistencies. There are several kinds of unit root test such as the Dickey Fuller (1979), Augmented Dickey-Fuller (1984), Phillip Perron (1988), but the most common is the Augmented Dickey-Fuller (1984) and Phillip Perron (1988). The ADF (1984) builds on the Dickey-Fuller test and uses the null hypothesis of a unit root (otherwise, non-stationarity) in the series against the alternate hypothesis at the researchers chosen level of significance (in this case, 5 percent). The more negative or greater the calculated statistics is than the critical statistics in absolute terms, the stronger the rejection of the hypothesis that there is a unit root present in the time series.

On the other hand, Phillip Perron (1988) like the ADF test builds on the DF test and follows the testing of the null hypothesis ( $\rho = 1$ ) of a non-stationary (I(1)) time series data. Unlike the ADF, it is more robust in the sense that it takes account of the unspecified heteroscedasticity and autocorrelation in the errors and makes corrections to the test statistics. The PP test argues that the process of data generation for the time series ( $y_t$ ) being investigated might possess more autocorrelation than is acknowledged in the DF test equation thereby invalidating it, which would warrant  $y_{t-1}$  to be endogenous. While the ADF test solved this problem by bringing in the lags of the time series as regressors under investigation into the model equation, the PP introduced a non-parametric correction to the t-statistics.

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**Proceedings of the 2<sup>nd</sup> (Hybrid) International Conference, Faculty  
of Social Sciences, Niger Delta University, Held on March 13, 2024**

Hence the adoption of these tests in particular. Lag lengths was determined using Akaike Information Criteria (AIC) or Schwarz information criterion (SIC).

The Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) test result are presented in Table 4.2 and 4.3.

**Table 4.2: ADF Unit Root Test Results**

| Variable              | ADF statistic at levels | ADF statistic at first difference | Order of integration |
|-----------------------|-------------------------|-----------------------------------|----------------------|
| POVR                  | -2.575                  | -6.846                            | I(1)                 |
| AGR                   | -5.563                  | NA                                | I(0)                 |
| IND                   | -5.939                  | NA                                | I(0)                 |
| SERV                  | -1.463                  | -10.122                           | I(1)                 |
| GEX                   | -3.197                  | -8.866                            | I(1)                 |
| <i>Critical value</i> | <i>-3.55</i>            | <i>-3.55</i>                      |                      |

**Source:** Author's computation from E-views software, 2020.

**Note:** NA denotes not applicable given that the associated variables were stationary at levels

**Table 4.3: PP Unit Root Test Results**

| Variable              | PP statistic at levels | PP statistic at first difference | Order of integration |
|-----------------------|------------------------|----------------------------------|----------------------|
| POVR                  | -2.575                 | -6.959                           | I(1)                 |
| AGR                   | -5.565                 | NA                               | I(0)                 |
| IND                   | -5.932                 | NA                               | I(0)                 |
| SERV                  | -2.881                 | -11.183                          | I(1)                 |
| GEX                   | -2.962                 | -8.854                           | I(1)                 |
| <i>Critical value</i> | <i>-3.55</i>           | <i>-3.55</i>                     |                      |

**Source:** Author's computation from E-views software, 2020.

**Note:** NA denotes not applicable given that the associated variables are stationary at levels

**Theme:** *African Solutions to Emerging Challenges: Building Viable Democratic, Economic, Information and Sustainable Systems in the 21<sup>st</sup> Century*



**Proceedings of the 2<sup>nd</sup> (Hybrid) International Conference, Faculty  
of Social Sciences, Niger Delta University, Held on March 13, 2024**

The ADF unit root tests results showed that agriculture and industrial sectors' growth rates were stationary at levels given that their ADF statistics (-5.563 and -5.939) were greater than the critical value (-3.55) in absolute terms hence cointegrated at order zero [I(0)]. This finding in PP unit root test is synonymous with the ADF unit root tests results, which provided the basis for rejecting the null hypothesis of unit root for agriculture and industrial sector growth rates. Consequently, the other variables for investigation were not stationary at levels in both the ADF and PP unit root test results; they became stationary at first difference. This implies that they were integrated of order one [I(1)]. The outcomes of the ADF and PP unit root tests showed that the variables were mixed integrated [I(0), I(1)], which prompted the test for cointegration using the bounds ARDL method.

#### **4.3 Cointegration Test**

Co-integration test was conducted in order to test for the presence of long-run relationship. It is very important to consider the possible presence of co-integration when one is choosing a technique to test the relationships between economic time series variables that have unit root. Given the result of mixed integration in the variables, the ARDL bounds cointegration test method was conducted. The result is shown in table 4.4:

**Table 4.4: Bounds cointegration test results for the poverty reduction model**

| Series: POVR AGR IND SERV GEX                    |          |          |
|--------------------------------------------------|----------|----------|
| Null Hypothesis: No long-run relationships exist |          |          |
| Test Statistic                                   | Value    | K        |
| F-statistic                                      | 4.338    | 4        |
| Critical Value Bounds                            |          |          |
| Significance                                     | I0 Bound | I1 Bound |
| 10%                                              | 2.45     | 3.52     |
| 5%                                               | 2.86     | 4.01     |
| 2.5%                                             | 3.25     | 4.49     |
| 1%                                               | 3.74     | 5.06     |

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**Proceedings of the 2<sup>nd</sup> (Hybrid) International Conference, Faculty  
of Social Sciences, Niger Delta University, Held on March 13, 2024**

**Source:** Author's computation from E-views software, 2020.

**Note:** K denotes number of explanatory variables

The bounds cointegration test was performed at 5 percent level of significance using F-statistic. The results showed that the computed F-statistic (4.338) exceeds the upper bound critical value (4.01) at 5 percent significance level. This finding provides enough empirical evidence for rejecting the null hypothesis of no cointegration. This implies that poverty rate has a long-run relationship with the sectoral performance indicators and government expenditure during the study period. This finding is in accordance with the results of Lawrence and Essang (2015) and Egwu (2016) as well as satisfies the pre-condition for fitting the ARDL short and long-run estimates.

#### **4.4 Long and Short Run Model**

The result of the ARDL method for estimating the dynamic long and short run parameters of the explanatory variables for the model is presented in table 4.5.

**Table 4.5: ARDL Long and Short Run for the Poverty Reduction Model**

| Dependent Variable: POVR |             |            |             |        |
|--------------------------|-------------|------------|-------------|--------|
| Short run results        |             |            |             |        |
| Variable                 | Coefficient | Std. Error | t-Statistic | Prob.  |
| D(AGR)                   | 0.121554    | 0.080926   | 1.502051    | 0.1715 |
| D(AGR(-1))               | -0.266839   | 0.109724   | -2.431917   | 0.0411 |
| D(IND)                   | 0.329853    | 0.153326   | 2.151321    | 0.0636 |
| D(IND(-1))               | 0.145941    | 0.111545   | 1.308364    | 0.2271 |
| D(SERV)                  | 0.273547    | 0.289837   | 0.943796    | 0.3729 |
| D(SERV(-1))              | 0.430207    | 0.188140   | 2.286637    | 0.0515 |
| D(GEX)                   | 0.340354    | 0.475858   | 0.715243    | 0.4948 |
| CointEq(-1)              | -0.474443   | 0.190796   | -2.486648   | 0.0377 |
| Long run results         |             |            |             |        |

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**Proceedings of the 2<sup>nd</sup> (Hybrid) International Conference, Faculty  
of Social Sciences, Niger Delta University, Held on March 13, 2024**

| Variable      | Coefficient | Std. Error | t-Statistic       | Prob.  |
|---------------|-------------|------------|-------------------|--------|
| AGR           | -1.833859   | 0.525611   | -3.489004         | 0.0083 |
| IND           | 0.108945    | 0.745317   | 0.146173          | 0.8874 |
| SERV          | -0.096442   | 0.024902   | -3.872861         | 0.0028 |
| GEX           | -1.082280   | 0.207949   | -5.204543         | 0.0004 |
| C             | 73.797922   | 10.923590  | 6.755830          | 0.0001 |
| Adj R-squared | 0.8647      |            | Prob(F-statistic) | 0.0303 |

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**Source: Author's computation from E-views software, 2020.**

The results showed that agriculture sector growth in the current year was positive and insignificant, however, a significant negative effect was witnessed after a one period lag on poverty rate in the long run. The t-statistic (-3.489) with probability value (0.0083) indicates that agriculture sector growth is significant in explaining changes in poverty rate in the long run. At the same time, the short run results showed that the first lag of agricultural sector growth negatively affected poverty rate. The t-statistic (-2.432) of the estimated parameter is associated with probability value (0.0411) which is less than 0.05, meaning that the negative effect of the first lag of agricultural sector growth is significant at 5 percent level at the short term. What this means is that an increase in agricultural sector performance leads to a reduction in poverty level. This finding highlights the important contribution of the agriculture sector performance to poverty reduction in Nigeria. The industrial sector growth was found to have an insignificant positive effect on poverty rate in the current year and one period lag in both long and short long run. This explains that the performance of the industrial sector does not significantly offer opportunity for poverty reduction.

The results of the service sector growth rate showed that the current year effect on poverty was positive and insignificant. The result further showed that the service sector growth negatively affected poverty rate in the long run after a one period lag. The probability value (0.0028) of the t-statistic (-3.873) is less than 0.05, which implies that the long-term negative effect of service sector growth on poverty rate is statistically significant at 5 percent level. On the contrary, evidence of a positive effect of the first lag of service sector growth on poverty

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## **Proceedings of the 2<sup>nd</sup> (Hybrid) International Conference, Faculty of Social Sciences, Niger Delta University, Held on March 13, 2024**

was established in the short run. The t-statistic (2.2866) with probability value (0.0515) implies that service sector growth is significant in explaining changes in poverty rate in the short run. This finding suggests the effectiveness of the service sector performance in reducing poverty manifests in the long run. The results further showed that government expenditure has a negative effect on poverty rate in the long run. The t-statistic (-5.205) of the estimated parameter is associated with probability value (0.0004) which are less than 0.05, indicating that government expenditure has a significant long term negative effect on poverty rate. This finding suggests that government expenditure in critical infrastructure provides long term opportunity for poverty reduction in Nigeria.

The error correction coefficient (-0.4744) is negative and significant at 5 percent significance level, which implies that the model can adjust to long run equilibrium position at a speed of 47.44 percent. In addition, The R-squared (0.9075) and adjusted R-square of 0.8647 showed that 86.47 percent variations in poverty rate are jointly explained by changes in agricultural, industrial and service sector performance as well as government expenditure hence indicates that the explanatory variables are jointly significant in explaining changes in poverty rate during the study period. This finding authenticated the statistical reliability of the estimated model.

### **4.4.1 Discussion of Findings**

The results showed that agriculture sector growth has a significant negative effect on poverty in the long and short run. This finding conforms to the theoretical expectation which identifies the agriculture sector as an important aspect of the sectoral performance indicators with great potentials for poverty reduction. The significant contribution of agriculture sector growth to poverty reduction corroborates with the findings of Kolawole and Omobitan (2014) and Egwu (2016) but deviated from the findings of Oyakhilomen and Zibah (2014). The implication of this finding is that improved performance of the agriculture sector through rapid and sustainable growth provides supports to the poverty reduction efforts of the government.

In addition, the industrial sector growth does not have any significant effect on poverty during the study period. This finding is contrary to the a priori expectations and previous findings by Thu and Riedel (2019). The implication of this finding is that growth in the industrial sector

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**Proceedings of the 2<sup>nd</sup> (Hybrid) International Conference, Faculty  
of Social Sciences, Niger Delta University, Held on March 13, 2024**

tends to intensify the incidence of poverty in Nigeria. Evidence of a significant negative effect of service sector growth on poverty was established in the long run, but the short run results revealed that the effect of service sector growth on poverty is positive and significant. The significant negative effect of service sector growth on poverty is consistent with the theoretical expectation and the findings of Antai, Udo, and Effiong (2016) which highlighted the positive contribution of the service sector to economic growth and by extension poverty reduction. The implication of this finding is that improved performance of the service sector through sustained growth in the sector is imperative for mitigating poverty incidence in Nigeria. It was also found that government expenditure has a significant negative effect on poverty rate in the long run. This finding is indication that increase in government investments in economic, social and community services yield positive benefits of poverty reduction in Nigeria.

#### **4.5 Diagnostic Test**

The post-estimation tests focused mainly on the residual's diagnostics and model stability tests. The result is presented in Table 4.5.

**Table 4.6: Post-estimation tests results**

| <b>Poverty Reduction Model</b>                |                      |        |
|-----------------------------------------------|----------------------|--------|
| Test type                                     | Test statistic       | Prob.  |
| Breusch-Godfrey serial correlation LM test    | Chi-square (4.4557)  | 0.1078 |
| Breusch-Pagan-Godfrey Heteroskedasticity test | Chi-square (20.942)  | 0.4625 |
| Ramsey RESET Test                             | F-statistic (0.5698) | 0.5935 |

**Source: Author's computation from E-views software, 2020.**

The results of the residual diagnostics tests (Breusch-Godfrey serial correlation LM test and Breusch-Pagan-Godfrey Heteroskedasticity test) showed that there was no evidence of serial correlation and heteroscedasticity in the model at 5 percent significance level. This is because the probability values of the Chi-square statistics for the Breusch-Godfrey serial correlation LM test and Breusch-Pagan-Godfrey Heteroskedasticity test results was greater than 0.05.

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## **Proceedings of the 2<sup>nd</sup> (Hybrid) International Conference, Faculty of Social Sciences, Niger Delta University, Held on March 13, 2024**

Hence, the null hypotheses of no serial correlation and homoscedasticity were accepted. This finding indicates that the residuals are serially independent and do not pose any problem in the estimated model. In addition to the residual diagnostics tests, the model stability test (Ramsey RESET) showed that the estimated parameters were stable at 5 percent level with probability value of the F-statistic greater than 0.05. This provided the basis for accepting the null hypothesis that the model is stable hence, reliable for long term forecast and policy recommendation.

### **5. Conclusion**

The study concluded that agriculture and service sector growth are the channels through which sectoral performance promotes the reduction of poverty in Nigeria. In addition, government expenditure proved to be an important enabler of economic development in Nigeria in terms of long-term reduction in poverty.

### **6. Recommendation**

Government should encourage the development of the agricultural sector by promoting mechanized farming, provide post-harvest facilities, lands and mobilize private investments to the sector. This will boost its performance and sustain its contribution to economic development by creating opportunities for sustainable reduction in poverty; Policymakers should move towards achieving broad-based structural reforms, improve infrastructure development and reduce multiple taxes for businesses including SMEs for the improved performance of the industrial sector and its contribution to the economic development. This will play a substantial role in improving the effectiveness of the industrial sector contributions to poverty reduction; development of the service sector through increased investments in education, health, real estate, transportation and telecommunication services. This will maintain the performance of the service sector with greater opportunities for sustained reduction in income inequality; and government should prioritize expenditure on economic, social and community services with high potentials for economic development.

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- Theme: African Solutions to Emerging Challenges: Building Viable Democratic, Economic, Information and Sustainable Systems in the 21<sup>st</sup> Century**



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