

## **Impact of Carbon Dioxide Emissions and Financial Development on Economic Growth in Nigeria: An ARDL Approach**

**Jibrin Zakari<sup>1</sup>, Ibrahim Haruna Abdulkarim<sup>2</sup>& Aliyu Umar<sup>3</sup>**

<sup>1&2</sup> Department of Economics and Development Studies Federal University  
Dutsin-Ma, Katsina

<sup>3</sup> Department of Economics Umaru Musa Yar`adua University, Katsina

Corresponding Author: [zakarijibrin446@gmail.com](mailto:zakarijibrin446@gmail.com), Tel: +2348161505441

### **Abstract**

*Many studies have been conducted on the impact of carbon dioxide emission and economic growth in Nigeria using different techniques, however several studies did not consider the role of financial sector development in their analysis. Therefore, this study examines the impact of CO<sub>2</sub> emission and financial development on the growth of economy in Nigeria using ARDL bounds testing technique from 1981 to 2021. The result of the bounds test to cointegration indicates that there is a long run cointegration among the variables, since the F-statistic of 23.10816 is greater than the upper bound at 1% level. The results of the estimation show that rising emission has a significant and positive impact on economic growth in Nigeria. In addition, openness and financial development has a significant and positive effect on the growth of Nigerian economy, while domestic investment has a negative but significant impact on economic growth. Based on these findings, this study makes the following recommendations; First, government should apply appropriate policy to curb emission, since increase production leads to more environmental hazards which translate to economic growth in Nigeria. Second, government should spell out the consequences for polluters and others mining companies who failed to abide by the government directives.*

**Keywords:** Economic growth, Carbon dioxide emissions, Financial development, ARDL.

### **1.1 Introduction**

Climate change affects the level of productivity and growth in the country. For instance, increases in emission or the use of fossil fuel affects million people with no access to clean air or adequate electricity and threaten Nigeria's rain-fed

agricultural sector (Energy Administration, 2021). CO<sub>2</sub> emissions in Nigeria increased by 0.70% over the previous years, representing an increase of 578,039 tons in 2015, before rising to 82,634,214 tons in 2016. In addition, carbon emissions continue to increase significantly up to 1.65% in 2020. Therefore, the present government has put more efforts in reducing green-house gas emissions to 20% by the year 2030, when compared to “business-as-usual” levels (Ameyaw & Yao, 2018).

On the other hand, Gross Domestic Product (GDP) is important in an economy, because it is used to determine the level of growth and development both in the developed and developing economies (Desmond et al., 2015). However, the level of economic growth depends on several factors include: the availability of resources, employment and level of productivity (see Solow, 1956; Swan, 1956). Despite an impressive performance of economic growth in some developing nations like South-Africa and Ghana, Nigeria’s GDP growth rate declined to 2.7%, owing to the collapse of oil price from 2014 to 2016. Thus, the country experiences a recession that led to economic contraction of about 1.6% in 2017 (World Development Indicator, 2021). Furthermore, WDI (2021) reported that the Nigerian GDP continues to fluctuate over the years, averaging about 1.9% in 2018 and remained stable at 2% in 2019. As a medium term plan to boost the economic growth between 2017 and 2021, the Economic Recovery and Growth Plan (ERGP) was introduced in 2017, in order to strengthen the social inclusion, reducing poverty and generate employment opportunities in the country (Iyoboyi & Sabitu, 2020).

Whereas, rising economic growth is very important, since it helps to solve several challenges Nigeria is facing as nation, but increase in carbon dioxide emission can be an impediment to the growth of the economy in Nigeria. In fact, it causes environmental hazards thereby reducing production and economic activities (Muftau et al., 2014). For example, Nigeria is considered among the leading producers and user of fossil fuel in Sub-Saharan Africa (SSA). Interestingly, over 90% of Nigeria’s earnings on foreign trade came from the petroleum sector and which eventually recorded about 80% of the government revenues (Mesagan, 2015).

Another factor responsible for influencing economic growth in Nigeria is financial sector. Though, financial sector proxies as domestic credit to private sector is relatively high (12.1% of GDP) compared to some of the developing countries, including Central African Republic 11%, Guinea 10% and Sierra Leone 6% (WDI,

2022). However, WDI (2022) reported that credit to private sector was N30.15 trillion in December, 2020, the value slightly increased to N31.44 trillion as at the end of March, 2021. During the first quarter of 2021, Bank credits to private sector declined to less than 2 trillion. This shows an increase of GDP in real term by 0.51% in March, 2021, the bank credit to private sector has continues to increase up to 22% in 2022.

Most of the reviewed studies used different methods of analysis (such as Akpan & Akpan, 2012; Alege, Adediran & Ogundipe, 2017; Ameyaw & Yao, 2018; Ejubekpokp, 2015; Muftau et al., 2014; and Mesagan, 2015). To the best of our knowledge and going by the literature review, there is scarcity of the empirical studies that include financial development despite its important in influencing GDP in Nigeria (see Mesagan, 2015; Ameyaw & Yao, 2018). Therefore, this study assessed the CO<sub>2</sub> emissions, financial development and economic growth nexus in Nigeria, using ARDL bounds testing technique.

The rest of the paper is structured as follows: literature review, then method and data is in section three, result and discussion has been presented in section four and finally conclusion and recommendation is in section five.

## **2.1 Literature Review**

### **2.1.1 Conceptual framework**

Economic growth is an increase in the production of economic goods and services, compared from one period to another. Economic growth can be measures as nominal or real value. This study measured the economic growth in real value (Mesagan, 2015). In addition, CO<sub>2</sub> emissions are emissions that stemming from the burning of fossil fuels (coal, natural gas and oil). CO<sub>2</sub> emission is measured as the burning of oil, coal, natural gas and waste materials for energy use (Akpan & Akpan, 2012). However, financial sector are economic services provided by the finance industry which encompasses a broad range of business that manage money including credit unions, banks, credit card companies, insurance companies and stock brokerages. Financial sector is however measured as the bank credit to private sector (Jammeh, 2022).

### **2.1.2 Empirical Literature Review**

There are limited studies on the impact of CO<sub>2</sub> emissions and financial development on GDP. Existing studies concentrate on the relationship between CO<sub>2</sub> emissions and economic growth and or financial development and economic growth nexus. For instance, Akpan and Akpan (2012) used a Multivariate Vector Error Correction (VECM) approach to assess the long run and causal relationship between electricity consumption, carbon emissions and economic growth in Nigeria from 1970 to 2008. The findings show that, economic growth is positively associated with carbon dioxide emissions.

Using a panel approach for West African countries over a period of 1970-2011, Muftau, et al. (2014) investigated the nexus between CO<sub>2</sub> emission and economic growth. The results reveal that there is a positive relationship between CO<sub>2</sub> emission and economic growth in the region. Also, Mesagan (2015) studied the relationship between carbon emission and economic growth in Nigeria from 1970 to 2013 using error correction mechanism. The findings show that economic growth has a positive impact on carbon emission in the country. In the same vein, Ejubekpokp (2014) assessed the impact of carbon emissions on GDP from 1980 to 2010 using Ordinary Least Square (OLS) technique. The results reveal that carbon emission has negative impact on GDP in Nigeria.

Chindo et al. (2015) examined the association between energy consumption, CO<sub>2</sub> emissions and GDP in Nigeria using Autoregressive Distributed Lag (ARDL) approach from 1970 to 2010. The empirical results reveal that, CO<sub>2</sub> emission has found to have a significant positive impact on GDP. Furthermore, Alege et al. (2017) evaluated the behavior of carbon dioxide emissions to different macroeconomic variables, using the structural vector autoregressive approach over the 1981–2015 periods. The researchers found that an increase in CO<sub>2</sub> emissions has a positive and significant effect on GDP in Nigeria. Gambo et al. (2018) examined the relations of energy consumption, emissions and economic growth in Nigeria during the 1970–2014 periods using the ARDL method. The findings confirm that, CO<sub>2</sub> emission reduces GDP in Nigeria.

Musibau, Shittu and Ogunlana (2020) used non-linear ARDL to examine the connection among environmental degradation, energy use and economic growth in Nigeria between 1981 and 2014. The study reveals that CO<sub>2</sub> rise GDP in Nigeria. Moreover, Shah et al, (2022) used the restricted cointegration analysis to compute cointegration relationship among financial development and GDP in Pakistan. The

empirical evidence reveals that financial development prompt economic growth in the long run via direct and indirect channel, during 1970 to 2020 period. Also, Jammeh (2022) studied the nexus between domestic credit to the private sector, financial development and GDP in the Gambia from 1967 to 2020 using a VAR approach. The finding reveals that financial development has a significant impact on economic growth.

From the literature reviewed, existing studies used various determinants of GDP in their analysis. To the best of our ability, none of the studies examine the impact of carbon dioxide emission and considered the mediating role of financial development in Nigeria. In addition, various empirical evidences have shown that the financial development has a positive effect on economic growth (see Shah et al., 2022; Jammeh, 2022). Therefore, the study examines the CO2 emissions, financial development and economic growth nexus in Nigeria, using ARDL bounds testing technique, and consider the mediating role of financial development which was proxied by credit to private sector.

## **2. 2 Theoretical underpinning and the Model**

The theoretical framework for this study is based on the Solow`s neoclassical theory of economic growth, which considered the important of technological progress as the residual factor explaining long-term growth. The Gross Domestic Product (GDP) is dependent variable and emission is the independent variable (CO2). Studies have been conducted using neo classical theory (Bekar, 2018). Thus, the relationships specified as follows.

$$GDP = f(CO2) \dots\dots\dots (1)$$

For the purpose of this study, we follow Bekar (2018) which hypothesize that an increase in CO2 emissions leads to an increase in GDP. Authors argued that CO2 emission has a lasting impact on growth (see Kasperowicz, 2015, Jammeh, 2022). Other important determinants of economic growth cited in the literature include Foreign Direct Investment (FDI), Trade openness (OPN), Domestic Credit to private sector (CREDIT) and Gross fixed capital formation (INV). All the control variables are theoretically link with the dependent variable (see Ejubekpokp, 2014; Mesagan, 2015). Therefore, the general model is specified as:

$$GDP_t = \delta_0 + \delta_1 CO2_t + \delta_2 OPN_t + \delta_3 CREDIT_t + \delta_4 INV_t + \mu_t \dots\dots (2)$$

Where;  $\delta_0 - \delta_5$  are parameters to be estimated and  $\mu_t$  is the error terms.

### 3.1 Method and Data

This study uses annual data from 1981 to 2021 to examine the effect of CO2 on economic growth in Nigeria. All the data were collected from the World Development Indicators. The method employed was Autoregressive Distributed lag (ARDL) formerly familiarized by Pesaran and Shin (1999) and further extended by Pesaran, Shin and Smith (2001). Several benefits exist with this approach that may be contrasted with the Johansen and Juselius Cointegration methods. For instance, the ARDL method can be employed regardless of the order of integration of the series, I(0),I(1) or combination of both (Zakari & Umar 2020). In addition, the technique can be used even if the samples size is small (Abu & Staniewski, 2019; Umar & Zakari, 2020). Furthermore, the ARDL approach solves the problem associated with omitted variables and autocorrelations (Abu, 2017; Abubakar & Kassim, 2016).

A long run model is estimated as given by Equation (3) as follows:

$$L(\text{GDP})_t = \partial_0 + \sum_{i=1}^j \beta_1 L(\text{GDP})_{t-i} + \sum_{i=0}^b \beta_2 L(\text{CO2})_{t-i} + \sum_{i=0}^k \beta_3 L(\text{INV})_{t-i} + \sum_{i=0}^v \beta_4 (\text{OPN})_{t-i} + \sum_{i=0}^k \beta_5 L(\text{CREDIT})_{t-i} + e_t \dots \dots \dots (3)$$

The ARDL specification of the ECM is represented as;

$$\Delta L(\text{GDP})_t = \partial_0 + \sum_{i=1}^z \beta_1 \Delta L(\text{GDP})_{t-i} + \sum_{i=0}^h \beta_2 \Delta L(\text{CO2})_{t-i} + \sum_{i=0}^j \beta_3 \Delta L(\text{INV})_{t-i} + \sum_{i=0}^c \beta_4 \Delta (\text{OPN})_{t-i} + \sum_{i=0}^g \beta_5 \Delta L(\text{CREDIT})_{t-i} + \varphi_1 ECT_{t-1} + e_t \dots \dots \dots (4)$$

### 4.1 Results and Discussion

#### 4.2 Unit Root Test

To investigate the relationship between CO2 emission, financial development and economic growth, a unit root test was conducted to ascertain the stationarity property of the variables. Two tests were employed to perform the unit root test. They are the Augmented Dicker-Fuller (ADF) and Philips–Perron (PP). The unit

root test results reported in Table 1 illustrate that LINV is stationary at level (i.e., they have no unit root).

**Table1: Result of Unit Root Test**

Variables	ADF		PP		Stationarity status
	Level	First difference	Level	First difference	
LGDP	-0.8544	-3.6802**	-0.1949	-3.6802**	I(1)
LC02	-2.6480	7.5095***	-7.5095	12.2364***	I(1)
OPN	-2.0216	7.2567***	-2.3135	-7.3561***	I(1)
LCREDIT	-1.5227	-	-1.6371	-	I(1)
		4.8109***		16.3500***	
LINV	-2.8879*	.....	-2.8978*	.....	I(0)

Notes: Lag lengths are selected based on Akaike Information Criterion (AIC). \*\*\*, \*\* and \* denote significance at 1%, respectively.

That is, the variables are I(0). On the other hand, CO2, LGDP, OPN and LCREDIT, are stationary after taking their first difference. In essence, the series are I(1). Therefore, the variables are a mixture of I(0) and (1).

### 4.3 Results of Bound Test Approach

The outcomes of bounds testing approach presented in Table 2 demonstrate that, computed F-statistic of 12.0313 is greater than 1% upper critical bound value.

This means that cointegration relationship exists between carbon dioxide emission, financial development, openness, investment and GDP.

**Table 2: Bound Test Result**

Dependent variables	Function				F Statistics			
LGDP	f(LGDP/LC02, OPN,LCREDIT, LINV)				12.0313***			
Critical Bounds	Value							
	10%		5%		2.5%		1%	
	I(0)	I(1)	I(0)	I(1)	I(1)	I(0)	I(1)	I(0)

2.45	3.52	2.86	4.01	3.25	4.49	3.74	5.06
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Source: Researcher’s calculation (2022). \*\*\* symbolizes significance at 1% level  
 Since it was established that a cointegration relationship exists among the variables, the subsequent stage is to estimate the long-run and short-run relationships.

#### 4.4 Results of Selected Short Run and Long Run Model

The result of short run model is reported in Table 3. The optimal lag-length suggested by the Akaike Information Criteria is (2, 4, 0, 4, 1). The results reveal that there is a short run positive and significant relationship between emission and economic growth at 1% level. A 1% increase in carbon dioxide emission leads to a 1.8% rises in economic growth in the short run. The finding is in line with the earlier studies that established that improvement in emission rises economic growth (Alege et al., 2017; Kasperowicz, 2015).

**Table 3: Short-run Model Results**

Panel A: Short-run Coefficients - Dependent variable is LGDP				
Regressor	Coefficient	Standard Error	T-Ratio	Prob.
$\Delta$ GDP <sub>t-1</sub>	1.1700	0.1951	5.9946	0.0000
$\Delta$ LC02	1.8021	0.0909	19.822	0.0000
$\Delta$ LC02 <sub>t-1</sub>	-1.7041	0.3407	-5.0010	0.0000
$\Delta$ LCREDIT	2.3873	0.7194	3.3184	0.0043
$\Delta$ LC02 <sub>t-3</sub>	-0.3751	0.1180	-3.1780	0.0058
$\Delta$ DIV <sub>t-1</sub>	0.6418	1.1011	0.5829	0.5681
$\Delta$ DIV <sub>t-2</sub>	-2.7386	0.8916	-3.0715	0.0073
$\Delta$ DIV <sub>t-3</sub>	-2.0219	0.8995	-2.2475	0.0391
$\Delta$ OPN	0.5352	0.5646	0.9479	0.3573
ECT <sub>t-1</sub>	0.5352	0.8192	0.6533	0.0528

Source: Researcher’s calculation (2022).  $\Delta$  is the first difference operator

Moreover, domestic credit to private sector has a positive sign and statistically significant effect on economic growth in the short run at the 1% level. This implies that an improvement in domestic credit to private sector by 1% causes economic growth to rise by 2.39% in the short run. The finding is line with that of Shah et al., (2022); Jammeh (2022). Furthermore, investment was found to have a negative and significant effect on economic growth in the short-run at the 1% level. A 1% increase in domestic investment causes economic growth to decrease by a -2.74%.

Also, trade openness has a statistically insignificant, but positive effect on economic growth.

The result also indicates that adjustment from the short-run to the long run is taking place as suggested by the negative and statistically significant one-lagged error correction terms. This suggests that 33% of the deviation from equilibrium is corrected within one year.

Furthermore, the long-run results reported in Table 4 show that some variables have a positive and statistically significant effect, while others have a negative effect on economic growth. The result illustrates that emission has a positive and significant effect on economic growth at 1% level in the long run. A 1% increase in carbon emission causes economic growth to increase by 1.64%. This reflects the situation in Nigeria where by an increase in emission causes environmental hazards, thereby reducing production and economic activities in Nigeria (Muftau et al., 2014). In addition, carbon emissions continue to increase up to 1.65% in 2020 which may lead to unfavorable business environment thereby reducing economic growth in the country (EA, 2022). Again, credit to private sector has a positive and significant effect on the economic growth at 1%, in the long run. It means that an increase in credit to private sector by 1% leads to an improvement in the economic growth by 1.42% in the long-run. This is not surprising in Nigeria where the financial sector boosts economic through bank credit mobilization policy by central bank of Nigeria. Individual and business firm enjoy several credits and loan schemes in order to enhance their business activities in the country (CBN, 2022).

**Table 5: Results of Selected Long-run Model**

Panel B: Long-run Coefficients - Dependent variable is LGDP				
Regressor	Coefficient	Standard Error	T-Ratio	Prob.
LC02	1.6445	0.2206	7.4533	0.0000
LCREDIT	1.4259	0.3945	3.6142	0.0023
LINV	-3.5222	0.7078	-4.9762	0.0001
LOPN	1.0457	0.3356	3.1151	0.0067
C	11.942	3.6802	3.2449	0.0051

Source: Researcher's calculation (2022).

Also, trade openness has a positive and significant effect on economic growth at the 1% level in the long run. An improvement in OPN by 1% causes economic growth to increase by 1.04% in the long-run. The negative linkage between investment and economic growth suggests that decreases in investment leads to reduction in economic growth at 1% level. A 1% improvement in investment leads to a -3.52 % decrease in economic growth

#### **4.5 Result of Diagnostic Tests**

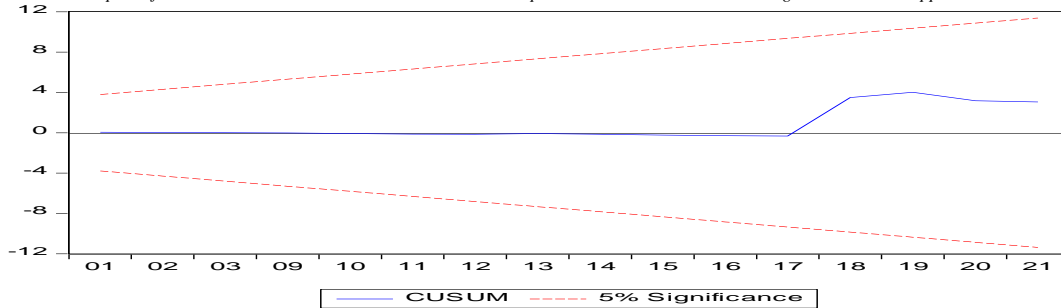
The results of the diagnostic tests are presented in Table 4.6. The Jarque-Bera statistic with value 0.8815 and Probability value of 0.6435 indicates that there is no problem of non-normality, therefore, the model is normally distributed. Also, the test statistics for heteroskedasticity is 0.7100 with a probability value greater than 10%. Hence, there is no heteroskedasticity in the error terms. This is desirable for the study because it signifies that there is no heteroskedasticity problem in the model and that the variance of the residual terms is homoscedastic.

**Table 6: Result of Diagnostic Tests**

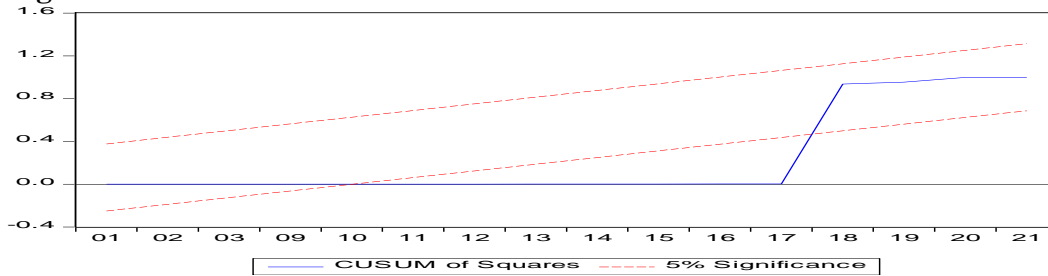
Test Statistic	Results
Serial Correlation: CHSQ (2,14)	1.9489 [0.1792]
Functional Form: Reset F-stat (1,15)	8.5849 [0.3281]
Normality: Jarque-Bera	0.8815[0.6435]
Heteroscedasticity: CHSQ (15,16)	0.7100 [0.7436]

Authors' computation (2022).

Furthermore, the Ramsey Reset F-statistic is 8.5849 with a probability of 0.3281. This finding illustrates that there is no problem of misspecification in the estimated model. Also, the serial correlation test result demonstrates that there is no existence of serial correlation among the errors. In the same direction, both the plots of the cumulative sum of recursive residuals and the cumulative sum of squares of recursive residuals reported in figure 1 and figure 2 are within the boundaries. This confirms the stability of the model.



**Figure 1:** Cumulative Sum of Recursive Residuals



**Figure 2:** Cumulative Sum of Squares of Recursive Residuals

### 5.1 Conclusion and Recommendation

This study utilizes the ARDL bounds testing technique to examine the impact of carbon dioxide emissions and financial development on economic growth in Nigeria, from 1980 to 2020. The results indicate a cointegrating relationship exists between carbon dioxide emissions financial development and economic growth including OPN, and LINV. The empirical results reveal that carbon dioxide emission has a long term positive and significant effect on economic growth in Nigeria. Therefore, policymakers should take steps to provide appropriate environmental policies in order to promote economic growth in Nigeria, through reducing pollution as well as encouraging afforestation. The study further established that credit to private sector is highly sensitive to the economic growth in Nigeria. Also, the empirical findings obtained shows that financial development is an important determinant of economic growth in Nigeria. Therefore, government and stakeholders in the country should focus their efforts in promoting development in the financial sector and building more confidence in the sector for both domestic and foreign investors to invest in the sector. As a result, this will create incentives

for people to save and promote investment in the economy. Without improving the credibility sector, investments and economic growth will suffer.

## **References**

- Abu, N. (2017). Does Okun's law exist in Nigeria? Evidence from the ARDL bounds testing approach. *Contemporary Economics*, 11(2), 131-144.
- Abu N., & Staniewski, M. W. (2019). Determinants of corruption in Nigeria: Evidence from various estimation techniques. *Economic Research-Ekonomska Istraživanja*, 32(1), 3052-3076.
- Abubakar, A., & Kassim, S. (2016). Sectoral impact of bank credit in Malaysia: ARDL modeling approach. *Pertanika Journal of Social Science and Humanities*, 24, 205-211.
- Akpan, G. E., & Apkan, U. F. (2012). Electricity consumption, carbon emissions and economic growth in Nigeria. *International Journal of Energy Economics and Policy*, 2(4), 293-308.
- Alege, P. O., Oye, Q., Adu O. O., Amu, B., & Owolabi, T. (2017). Carbon Emissions and the Business Cycle in Nigeria. *International Journal of Energy Economics and Policy*, 7(5), 1-8.
- Ameyaw, B., & Yao, L. (2018). Sectoral energy demand forecasting under an assumption-free data-driven technique, *Sustainability* 10 (7), 2348–2367.
- Bekar, S. A. (2018) The relationship between co2 emission and economic growth in Turkey: 1977-2011. *Uluslararası İktisadi ve İdari İncelemeler Dergisi*, 193-206.
- Central Bank of Nigeria. (2022). Central Bank of Nigeria Annual Statistical Bulletin. Abuja: Central Bank of Nigeria.
- Chindo, S., Abdulrashid, A., Waziri, S. I., Huong, W. M., & Ahmed, A. A. (2014). Energy consumption, CO2 emissions and GDP in Nigeria. *Geojournal*, 80(3), 315-322.
- Desmond, O., Akunna, I., Collins U, N., & Ifeyinwa, O. J. (2015). Analysis of the gross domestic product of Nigeria: 1960-2012. *West African Journal of Industrial & Academic Research*, 14(1), 81-90.
- Ejুবekpokpo, S. A. (2014). Impact of carbon emissions on economic growth in Nigeria. *Asian Journal of Basic and Applied Sciences*. 1(1).

- Gambo, S., Ishak, S., Ismail, N., & Idris M. M. (2018). Energy Consumption, Environmental Emissions and Economic Growth: An Empirical Analysis in Nigeria. *Journal of Humanities and Social Science*, 23(2), 11-22.
- Jammeh, I. Y. (2022). The Relationship between Domestic Credit, Financial Development and Economic Growth in the Gambia. *International Journal of Social Sciences Perspectives*, 10(2), 43-60.
- Mesagan, E. P. (2015). Economic growth and carbon emission in Nigeria. *The IUP Journal of Applied Economics*, 14 (4), 61-75.
- Muftau, O., Iyoboyi, M., & Ademola, A. S. (2014). An empirical analysis of the relationship between CO2 emission and economic growth in West Africa. *American Journal of Economics*, 4 (1), 1-17.
- Pesaran, H.M., & Shin, Y. (1999). Autoregressive distributed lag modeling approach to cointegration analysis. In: Storm, S. Ed., *econometrics and economic theory in the 20th century: The Ragnar Frisch Centennial Symposium*. Cambridge University Press, Chapter 11.
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289- 326.
- Iyoboyi., M. & Sabitu, A. (2020). Economic growth, unemployment and poverty: implication for inclusive growth architecture in Nigeria. *Gusau International Journal of Management and Social Sciences, Federal University*, 3(1), 135-155.
- Shah, S. M. I., Kazmi, S. M. A K., Ayaz, S., & Samiullah, M. S. (2022) Restricted Co-integration Analysis of Financial Development and Economic Growth: Evidence from Pakistan. *iRASD Journal of Management*, (4),2, 182- 188.
- Umar., & A. Zakari, J. (2020). Corruption and domestic investment relationship in Nigeria: an empirical investigation, *Gusau International Journal of Management and Social Sciences, Federal University*, 3(1), 101-117.
- World Bank (2021, 2022). World Development Indicator.

Zakari, J., & Umar, A. (2020). Spending and Public Debt Nexus in Nigeria: The Role of External Reserves, *Gusau International Journal of Management and Social Sciences, Federal University*, 3(1), 169-181.