

The Impact of Circular Economy on Economic Development of Nigeria

Love Ogochukwu Ude^{1,2}, Anthony Obiora Ude^{2*}, Nwaoligbo Victoria Chinwendu³ & Obioma Vivian Ugwuoke³

¹Faculty of Business Administration, University of Nigeria, Enugu Campus

^{1,2} Department of Accountancy, University of Nigeria, Enugu campus

^{1,3}Department of Management, University of Nigeria, Accountancy Enugu campus

*Corresponding author: obiora.ude@unn.edu.ng

Abstract

The impact of circular economy on economic development of Nigeria. The specific objectives include to ascertain the impact of plastic waste on poverty rate in Nigeria and examine the impact of organic waste on poverty rate in Nigeria. The study adopted pre-test estimation of descriptive statistics, unit root test, cointegration test to ensure that the data set is stationary and fit for the analysis. Auto-Regressive Distributed Lag Model (ARDL) method of analysis was adopted for the estimation. The study uncovered that both in short and long run estimation, plastic waste recycling for the period of this study had positive and insignificant impact on poverty rate in Nigeria, organic waste recycling for the period of this study had negative and insignificant impact on poverty rate in Nigeria. The study concluded that circular economy does not have significant impact on economic development of Nigeria. This study recommended among others that the Nigerian government should implement federal prohibition and taxation on the use of plastic, ocean clean-up, technological innovation that will support the recycling industry in Nigeria, and the need for additional plastic research. Nigeria can apply the most recent plastic waste management strategies of developed countries like European and Asian nations as a model and adopt them to reduce plastic pollution.

Key word: Circular economy, Economic, Plastic waste, Organic waste, Poverty rate

INTRODUCTION

No economy remains without significant sustainability, advancement, development of new speculations and natural turn of events. As indicated by MacArthur (2013), a CE is a modern economy whose object is helpful; it points painfully on environmentally friendly power; screen, limit, and wipe out the utilization of harmful synthetic compounds; and kill squander through judicious plan. The CE expects to substitute "take-make-squander communicated as support to grave" designs with "support to support, importance shut circle of stream (Elegant and Rutqvist, 2015; Masi et al., 2017). Support to-support item or material cycles are worked with by different capabilities, for example, keep up with appearance, recuperation, reevaluate and fix, reuse, restoration, remanufacturing, and reusing (Goyal et al., 2018; Jaeger and Upadhyay, 2019; Elegant et al., 2020). The change to circularity likewise presents numerous monetary open doors through reserve funds from a decrease in the extraction of virgin materials, the formation of new positions, and their plan of more strong worth chains. It presents huge potential for worldwide monetary development and could produce \$ 4.5 trillion by 2030 (Silky and Rutqvist 2015). By diminishing the requirement for virgin materials, makers can acquire more prominent worth from less materials through assistance based plans of action and longer item life-cycles. The European Commission gauges a decrease in the requirement for new unrefined components by 17% to 24% by 2030, permitting a reserve funds of between € 340 billion and € 630 billion every year in the European Association alone (roughly 12 – 23 % of the genuine creation costs) and making 178,000 new positions by 2030 from squander the executives alone (CESME 2015). At the macroeconomic level, the worldwide economy could develop by \$ 4.5 trillion by 2030 from the round economy rehearses (Frilly and Rutqvist 2015)....SDG 12, Overall utilization and creation , a main impetus of the worldwide economy lay on the utilization of the common habitat and assets such that keeps on disastrously affecting the planet. Monetary and social advancement over the course of the past century has been joined by natural debasement that is jeopardizing the very frameworks on which our future improvement without a doubt, our very endurance depends.

In February 2021, the Parliament embraced a goal on the new round economy activity plan requesting extra measures to accomplish a carbon-nonpartisan, ecologically maintainable, harmful free and completely round economy by 2050, including more tight reusing rules and restricting focuses for materials use and utilization by 2030.ss In Walk 2022, the Commission delivered the principal bundle of measures to accelerate the progress towards a round economy, as a component of the round economy activity plan. The recommendations incorporate supporting feasible items, engaging buyers forward concurred change, investigating development item guideline, and coming up with a methodology on maintainable plastic, natural and electronic waste administration are the issue internationally. In Nigeria, plastic waste is being unloaded in channels and stream courses, and on waterfront lands. There is open consuming of plastics inside the urban communities. There is likewise deficient regulation on plastic waste, natural waste and electronic waste in Nigeria. At the center of these difficulties encompassing plastic waste is the absence of stock information. The Gatekeeper 09 April 2022 assembled that the propensity for littering the climate with a wide range of trash would be casted off assuming that it is understood that cash could be produced using squanders. Scroungers would rush after the sludges the manner in which canines would rush after bones, looking through squander containers to figure out recyclable squanders which will increment Nigerian Gross domestic

product and supportability by 2030. Plastic waste is an issue, and development is the arrangement. Making changes to end plastic waste, and you can go along with us the excursion. 2020, the worldwide plastic contamination upgraded because of fumble of individual defensive gear (PPE) and other fundamental plastic, natural waste to deal with the ecological contamination in Nigeria (Silva et al., 2020; Prata et al., 2020; Silva et al., 2021). Low and center pay nations emerging as the fundamental center point of plastic contamination as they don't have well lay out plastic waste administration procedures and offices coming about in 90% of all out plastic is being arranged in informal and ill-advised ways (Ritchie and Roser, 2020). Plastic, a flexible polymer, is utilized in different businesses including food bundling, farming areas, car enterprises, development areas, material ventures and wellbeing offices all over the planet. The creation and removal of plastic produces ozone depleting substances and unsafe waste. Plastic and the synthetics it radiates are developing ashore and in seas, lakes, waterways, ice, and air, and the subsequent harm to human and biological wellbeing is at present ineffectively perceived. Most plastic isn't recyclable and by far most doesn't biodegrade. Further, plastic items frequently separate into tiny sections called microplastics that can contaminate biological systems and damage life forms and the climate.

2.LITERATURE REVIEW

2.2 CONCEPTUAL FRAMEWORK

Independent Variables

Dependent Variables

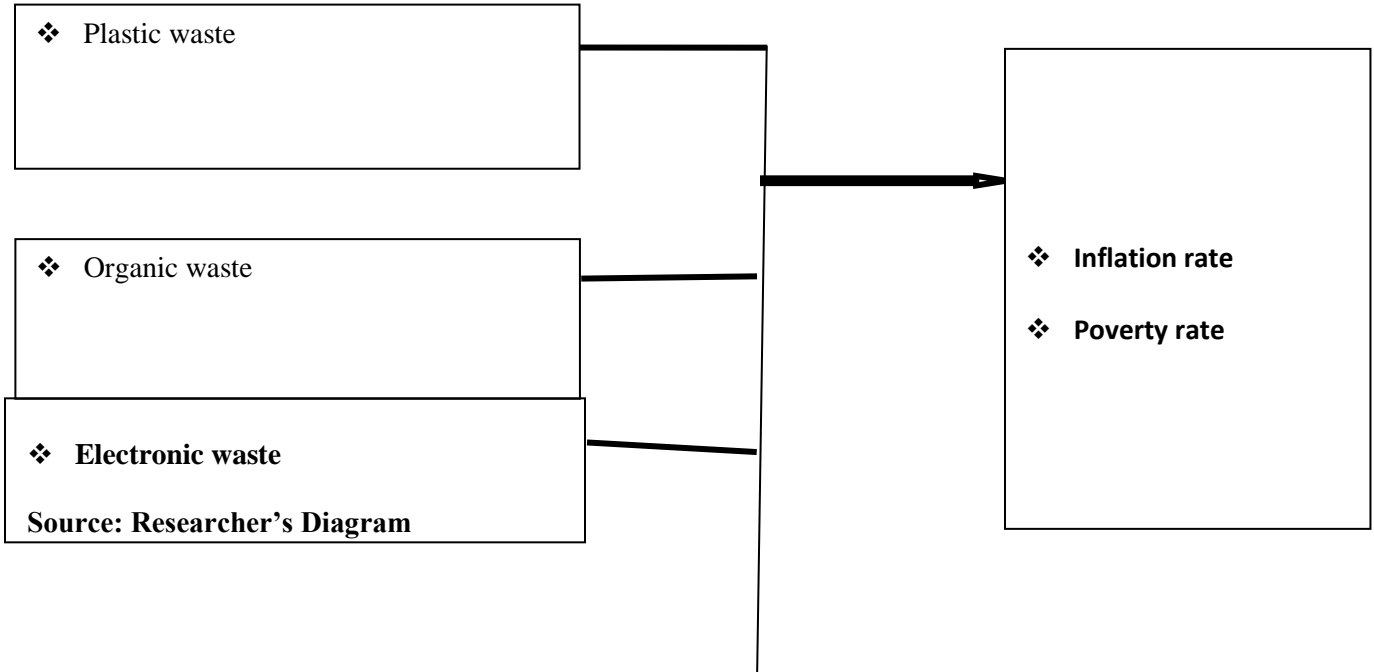


Figure 2.2.1 Conceptual Framework of circular economy and economic development

2.3 THEORETICAL LITERATURE/REVIEW

2.3.1 Resource-Based Theory propounded by Wernerfelt, (1984)

The asset based hypothesis is viewed as one of the speculations of key administration that is generally referred to especially as a result of its functional pertinence to contemporary administration rehearses.

Organizations adjust to changes in necessities, patterns, and conditions by reconfiguring their asset portfolios Barney, (1991). For quite a long time, researchers have shown that organizations face hardships in changing asset portfolios in light of the fact that their current assets and capacities limit headings for new asset speculations Dierickx, and Cool, (1989). Notwithstanding, for changes like the inception of a roundabout plan of action and an administrative shift toward the roundabout economy, asset based hypothesis sets that structure and supplementing an organization's asset portfolio gives a feasible benefit. This wellspring of a benefit is significant in light of the fact that a company's administration needs to continually assess, measure, and reconfigure the company's asset portfolio because of market and cultural necessities, social movements, and mechanical advances Sirmon, Hitt, and Ireland, (2007). An organization can reconfigure its asset portfolio by adding assets Barney, (1991), joining assets Helfat, and Peteraf, (2003), or subbing new assets for old assets Sirmon, Hitt, and Ireland, (2007). Vulnerability, high venture expenses, and rigidities connected with new asset speculations because of the execution of more prominent prerequisites drive asset ventures and the development of select assets inside an organization Dierickx, and Cool, (1989). These are exceedingly significant assets and abilities that can be experimentally considered and estimated with regards to the round economy.

Predictable with the extent of progress, the couple of studies that have analyzed the round economy have proposed that, to oversee and beat return stream difficulties, makers frequently need to depend on their accomplices' abilities and assets Huarng, (2013). The issue here is that the whole roundabout framework might fall in the event that only one accomplice in a coordinated effort deserts. This hazard is areas of strength for especially plans of action that emphasis on: (1) Asset recuperation through modern beneficial interaction and shut circle reusing (by which squander material is gone back over into new assets); and (2) item life expansion through remanufacturing and reuse (though this chance is fairly less of an issue in plans of action worked around sharing stages and selling items as a help where item possession is held) Elegant (2014).

For a roundabout plan of action, a few new kinds of assets and capacities are required that emphasis on the assortment or obtaining of in any case squandered materials/assets to turn these materials/assets into new types of significant worth or that emphasis on planning durable merchandise and broadening the existence of items. The trouble for this model lies in foreseeing the return streams from clients, yet this data is vital for guaranteeing that creation limit is ideal and that tasks have a reasonable measure of work Linder, and Williander, (2017). To reduce this issue, firms might have to put resources into following and following innovation to assemble data on the area and status of item returns and on the item life cycle Ketzenberg, Laan, and Teunter (2006). Exact data on the timing and nature of the item life cycle status or on returns is vital for overseeing return streams, especially when return rates are high or when life cycle contracts contain the center of the incentive Ketzenberg, Laan, and Teunter (2006). To guarantee exceptional yield rates, it is critical to decide how utilized items ought to be gathered and by whom as well as where collection focuses ought to be situated to guarantee client inclusion Murthy, Solem, and Roren, (2004). Despite the fact that producers frequently depend on associates and utilize outsider assortment firms, they at times share the obligation with these outsiders, in this way featuring the significance of exceptional yield streams.

2.3 Empirical Review

Hopewell, Dvorak and Kosior (2009), "Plastics reusing: difficulties and open doors", Philosophical Exchanges of the Imperial Society. Hydrocarbon-determined polymers have been used in different bundling applications, for example, pockets, films, frothed holders, unbending compartments, and numerous parts for clinical, food, and different purposes. Notwithstanding, mounting ecological contemplations expanded information on the unsafe results of ozone depleting substance outflows, landfills, and removal hardships. Rising oil costs are constraining analysts and organizations to deliver harmless to the ecosystem bundling. These new maintainability necessities are especially fit to biomass-based items, rather than petrol sources; obtained from biomass substances. More practical and execution situated.

Orphe, Diana, Sherif, Xing, Meng and Jianjun (2020) did a concentrate on Impacting Variables of Plastic Waste Contamination Decrease in Kinshasa. Plastic items, e.g., plastic sacks, plastic containers, and other plastic materials are generally utilized in individuals' day to day existence and modern creation overall since they are modest, simple to get, and advantageous for universally handy of transportation or development. The wide use of plastic items likewise brings a great deal of issues. The huge unfavorable results incorporate plastic waste contamination and misuse of assets, which represent a high danger to social turn of events and ecological security. In their exploration, a social review affecting 267 individuals was directed to look at how certain variables diminish plastic waste contamination in Kinshasa. Measurable Item

and Administration Arrangements were utilized to dissect the information accumulated from the study. The outcomes demonstrate that every one of the elements or procedures for decreasing plastic waste contamination emphatically affect plastic waste contamination decrease. The natural variables have the most noteworthy commitment to the control of plastic waste contamination with an effect of 88.8%, trailed by Government strategy with an effect of 42.3%. Monetary elements have the least effect commitment, with an effect of 36.0%. The finding and end could be utilized as a structure for carrying out plastic waste contamination the executives procedures or creating waste administration frameworks.

Nwabuisi and Ihenetu (2020). directed an examination on condition of plastic contamination in Nigeria and measure to handle them: a survey. Marine life forms, researchers, legislative and non-legislative associations face a huge test because of the omnipresence of plastic and microplastics in the sea-going environment, especially in Nigeria where there is practically no strategy set up to resolve the issue of microplastic contamination. The review planned to introduce the situation with plastic contamination in Nigeria and some policies to check the hazard. Information examination uncovers that Bayesa, Katsina, Lagos, and Oyo are the four expresses that create most of the plastic waste in Nigeria. The review makes a few strategy ideas and proposals, for example, the government disallowance and tax collection on the utilization of plastic, sea tidy up, mechanical development that will uphold the reusing business in Nigeria, and the requirement for extra plastic exploration. Nigeria can apply the latest plastic waste administration methodologies in European and Asian countries as a model and embrace them to lessen marine plastic contamination.

Adamu, Rozilah and Bala (2015) the review introduced an evaluation of the asset possibilities of treating the soil natural waste materials emerging from the metropolitan strong waste stream from urban areas in Nigeria. Through a survey of quantitative information, the synthesis of metropolitan strong waste emerging inside urban communities in Nigeria was analyzed to recognize the possibilities for fertilizing the soil natural materials from the waste stream creation. The concentrate likewise distinguished various advantages of treating the soil overall and with specific reference to the Nigerian circumstance which incorporates, among others a decrease of the immense amount of strong waste for definite removal, lessening air contamination and ground water leachate and furthermore business age and expanded pay. Thusly, the review prescribed a conscious government strategy to advance treating the soil of natural strong squanders material and showcasing of fertilizer compost to substitute the ongoing strategies of bringing in synthetic manure with endowment for homegrown farming as a technique to accomplish economical waste administration in Nigeria.

Olujobi, Ufua, Olokundun and Olujobi (2021) did a concentrate on transformation of natural squanders to power in Nigeria: lawful point of view on the difficulties and possibilities. The review investigates the requirement for change of squanders to energy for a practical power area and ecological improvement in Nigeria, to diminish ozone harming substance discharges and to offer motivations for interests in environmentally friendly power sources, and to relieve the worries on removal of unsafe squanders in the country. The review embraces a library-based doctrinal legitimate exploration strategy with a calculated methodology, depending on existing writing. It investigates the strength of existing regulations and other legitimate arrangements restricting on the act of waste administration to drive in Nigeria. Likewise, it completes a similar evaluation of the sustainable framework through natural squanders to power in different nations. The vital finding of the review is that assuming reasonable measures are taken by the Nigerian government to control garbage removal, it will limit squanders from the different sources in

similarity with the legitimate and administrative prerequisites and this can be used to produce power. The review proposes a model for changing squanders over completely to power to support the steadily heightening requests for energy and to battle environmental issues in Nigeria. The examination finishes up with proposals for the combination of guidelines and non-administrative impetuses for transformation of squanders to power in Nigeria's power area and backers sound legitimate system on wellsprings of energy with rigid implementation of energy regulations for stable power age and manageability in Nigeria's power area.

3. Research Method

3.1 Model Specification

The model specification is to examine the impact of circular economy on economic development of Nigeria. The baseline model – autoregressive distributed lag (ARDL) model was adopted following similar study by Oke (2016). To incorporate the variables of the study in Oke (2016) model we extended the variables of this study to accommodate two models to suit our study. This study incorporated the following variables such as plastic waste (PLCW), organic waste (OGCW), to measure circular economy whereas poverty rate are the measures of economic development of Nigeria. And we controlled for interest rate (INTR) and exchange rate (EXR). However, haven stated the variables; we captured the relationship that exists between them in the equation below.

$$\ln PVR = \beta_0 + \beta_1 \ln PLCW_t + \beta_2 \ln OGCW_t + \beta_3 \ln ETCW_t + \beta_4 \ln INTR_t + \beta_5 \ln EXR + \varepsilon_t \quad \text{--- (1)}$$

Where \ln entails that the variables are in natural logarithm, β_0 is the constant, β_1 to β_5 represents the coefficients, PVR represents poverty rate, PLCW is plastic waste, OGCW is organic waste, INTR is interest rate and EXR is exchange rate. t represents time, while ε_t represents the white noise error term. Based on the above model which we adopt, we express our model further as follows;

Hypothesis one states that “plastic waste has no significant impact on poverty rate in Nigeria”. Thus, the relevant linear equation that explained this relationship is expressed as follows;

$$\ln PVR = \beta_0 + \beta_1 \ln PLCW_t + \beta_2 \ln INTR_t + \beta_3 \ln EXR + \varepsilon_t \quad \text{--- (2)}$$

Where PVR represents poverty rate,

PLCW = plastic waste

INTR = interest rate

EXR= exchange rate

β_0 is the constant,

β_1 to β_3 represents the coefficients

t denotes the time and

ε_t denotes the error term

Hypothesis Two states that “organic waste has no significant impact on poverty rate in Nigeria”. Thus, the relevant linear equation that explained this relationship is expressed as follows;

$$\ln PVR = \beta_0 + \beta_1 \ln OGCW_t + \beta_2 \ln INTR_t + \beta_3 \ln EXR + \varepsilon_t \quad \text{--- (3)}$$

Where PVR represents poverty rate,
 OGCW = organic waste
 INTR = interest rate
 EXR= exchange rate
 β_0 is the constant,
 β_1 to β_3 represents the coefficients
 t denotes the time and
 ε_t denotes the error term

3.2 Pre-Test Analysis

Descriptive Statistics

This test will examine the mean, the median and the standard deviation, and other statistical properties of the dataset.

Unit Root Tests

To check the stationarity of this study to avoid generating a spurious result, this study adopted Augmented Dicky Fuller (ADF) unit root tests at the 5 percent significance level to determine the order of integration of the variables under consideration.

Co-integration Tests

Co-integration test was carried out to ascertain whether there could be long-run equilibrium relationship between the dependent variables and the independent variables.

3.3 Estimation Technique

The analysis in this study was carried out by analyzing the impact of circular economy on economic development in Nigeria using the autoregressive distributed lag (ARDL) model as the baseline model. The ARDL model was proposed by Pesaran and Shin (1995) further extended by Pesaran et al. (2001) and is preferred to other estimation technique since it has numerous advantages over similar estimation techniques like Engle and Granger (1987) and Johansen (1991) among others. The peculiarity of the model entails that it can be applied in research studies irrespective of the order of integration of the model variables I(0) or I(1), however, autoregressive distributed lag (ARDL) model is most suitable on the combination of the order of integration of the model variables I(0) and I(1), also when the researcher is faced with small sample size, it gives more realistic statistically significant estimates when compared to other estimation techniques, and it can estimate both long-run and short-run relationships at once (Bahmani-Oskooee and Ng 2002; Kyophilavong et al. 2013; Pesaran and Shin 1999).

Autoregressive Distributed Lag (ARDL) Test Approach

Autoregressive distributed lag (ARDL) approach as proposed by Pesaran et al. (2001). The generalized ARDL (p, q) model is specified as:

$$Y_t = \gamma_0 + \sum_{i=1}^p \beta_i Y_{t-i} + \sum_{i=0}^q \beta'_{j+1} X_{t-i} + \varepsilon_{it}$$

Where Y'_t is a vector and the variable in (X'_t) are allowed to be purely I(0) or I(1) or cointegrated; β and β' are coefficients; γ is the constant; $j=1, k$; p, q are optimal lag orders; ε_{it} is a vector of the error terms- unobservable zero mean white noise vector process (serially uncorrelated or independent).

The following ARDL representation of the equation will be estimated in order to test the existence of long run relationship between circular economy and economic development in Nigeria:

$$\Delta PVR_t = \beta_{0i} + \sum_{i=1}^{n1} \beta_{1i} PVR_{t-i} + \sum_{i=0}^{n2} \beta_{2i} \Delta PLCW_{t-i} + \sum_{i=0}^{n3} \beta_{3i} \Delta OGCW_{t-i} + \sum_{i=0}^{n4} \beta_{4i} \Delta INTR_{t-i} + \sum_{i=0}^{n5} \beta_{5i} \Delta EXR_{t-i} + \epsilon_t \quad (4)$$

H₀: β₁ = β₂ = β₃ = β₄ = β₅ = 0 i.e there is no co-integration among these variables.

H_a: β₁ ≠ β₂ ≠ β₃ ≠ β₄ ≠ β₅ ≠ 0 i.e there is co-integration among these variables.

According to Pesaran et al. (2001) the decision rules are the lower critical bound values denote all the variables are 1(0) signifying no co-integration. The upper bound values denote that all variables are 1(1) signifying cointegration.

Error Correction Model (ECM)

Once the cointegrating relationship is established, the short run dynamics is also analyzed. The error correction model representation of the ARDL model is specified in the equation below:

$$\Delta PVR_t = \alpha_{0i} + \sum_{i=1}^{n1} \alpha_{1i} \Delta PVR_{t-i} + \sum_{i=0}^{n2} \alpha_{2i} \Delta PLCW_{t-i} + \sum_{i=0}^{n3} \alpha_{3i} \Delta OGCW_{t-i} + \sum_{i=0}^{n4} \alpha_{4i} \Delta INTR_{t-i} + \sum_{i=0}^{n5} \alpha_{5i} \Delta EXR_{t-i} + \lambda ECM_{t-i} + \epsilon_t \quad (5)$$

Where λ is the speed of adjustment parameter, ECM is the residual obtained from the long run estimation.

α_{1i}, α_{2i}, α_{3i}, α_{4i}, α_{5i} are the short-run dynamic coefficient of the model's adjustment long-run equilibrium.

Table 4.3 Descriptive Statistics

	PLCW	OGCW	PVR	EXR	INTR
Mean	3.700017	3.383448	52.76774	155.5342	13.72581
Median	3.333632	3.036874	46.30000	132.1500	13.50000
Maximum	6.593346	6.507158	88.00000	425.9800	26.00000
Minimum	0.431782	0.131028	40.10000	17.30000	6.000000
Std. Dev.	1.829499	1.831226	13.24166	114.6633	3.864558
Skewness	0.161249	0.226771	1.178365	0.820009	0.749157
Kurtosis	1.840726	1.944272	3.393491	2.908419	5.130153
Jarque-Bera	1.870232	1.705339	7.374136	3.484973	8.760723
Probability	0.392540	0.426275	0.025045	0.175084	0.012521
Sum	114.7005	104.8869	1635.800	4821.560	425.5000
Sum Sq. Dev.	100.4120	100.6017	5260.248	394430.2	448.0444
Observations	31	31	31	31	31

Source: Researcher's Eview 9,2024

Note: PLCW=Plastic waste, OGCW= Organic waste, PVR =Poverty rate, INTR =Interest rate and EXR = Exchange rate. Table 4.3 present the descriptive statistics for the period of 1992 to 2022. The table explains the aggregative averages of the mean, median and standard deviation, a measure of spread and variation which were used for consistency and robustness checks of the results. The skewness, kurtosis and Jarque-Bera probability values demonstrated the series normality test. The minimum row showed the lowest values of each variable and the maximum row gave the highest values of each variable. Plastic waste (PLCW), Organic waste (OGCW), Poverty rate (PVR), Interest rate (INTR) and Exchange rate (EXR) were positively skewed. Poverty rate (PVR), and Interest rate (INTR) exhibited leptokurtic behaviour while while Plastic waste (PLCW), Organic waste (OGCW), and Exchange rate (EXR) exhibited platokurtic behaviour.

4.2 Stationary Test Results

Since, most time series information displays a non-fixed trademark, the singular factors are finished through fixed assessment, explicitly unit root, to make the factors fixed and amendable for additional investigation. The outcomes are summed up on table underneath.

Table 4.4 Augmented Dickey-Fuller (ADF) Unit Root Test

Variables	ADF Statistic.	Critical value @ 5%	Order of integration	Inference
PLCW	-4.001165	-2.967767	I(1)	Stationary
OGCW	-19.51142	-2.967767	I(1)	Stationary
PVR	-5.011810	-2.967767	I(1)	
EXR	-3.785483	-2.967767	I(1)	Stationary
INTR	-9.515805	-2.967767	I(1)	Stationary

Source: Researcher's Eview9, 2024

Table above presents the summary results of the ADF unit root tests. The result in table 4.4 revealed that Plastic waste (PLCW), Organic waste (OGCW), and Poverty rate (PVR), Interest rate (INTR) and Exchange rate (EXR) are stationary at order (1).

Table 4.6 Presents Correlation Test for Poverty rate: Correlation reveals the degree of relationship which exists between the dependent and independent variables. Correlation is equally used to infer- multi-collinearity among the variables. The outcomes of the correlation analysis carried out are presented in the table below.

	PVR	PLCW	OGCW	INTR	EXR
PVR	1				
PLCW	-0.598716	1			
OGCW	-0.589503	0.998438	1		
ETCW	-0.565431	0.985423	0.983434		
INTR	0.383177	-0.374594	-0.355464	1	
EXR	-0.510627	0.918659	0.931079	-0.188489	1

Source: Researcher's Eview9, 2024

Following the correlation analyses in the table above, plastic waste (PLCW), organic waste (OGCW), and exchange rate (EXR) is negatively correlated to poverty rate (PVR). This revealed that these explanatory variables moved in the opposite direction with the explained variable. Interest rate (INTR) is positively correlated to poverty rate (PVR). This indicated that the independent and dependent variables migrated on the same direction. Thus, when the coefficient is positive, it indicates that the independent variables moved on the same direction with the dependent variable while negative coefficients indicate that the independent variables moved on the opposite direction with the dependent variable. There is moderate negative relationship between plastic waste (PLCW), organic waste (OGCW), exchange rate (EXR) and poverty rate (PVR). Weak positive correlation was observed between interest rate (RIR), and poverty rate (PVR).

4.3 Co-Integration Test

This study carried out two cointegration test to ascertain the validity and authenticity of decision.

Table 4.7 Bound Test

ARDL Bounds Test

Date: 05/01/24 Time: 08:11

Sample: 1993 2022

Included observations: 30

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	6.849997	5

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Source: Researcher's Eview 9, 2024

From the table above, a Bound test cointegration was carried out. The Bound test result revealed that F-statistics of 6.849997 is greater than lower bound of 2.62 and upper bound of 3.79 test under 5% level of significance. Hence, this study establishes that there is a presence of cointegration and further establishes the existence of long run relationship between the dependent and independent variables in the model.

TEST OF HYPOTHESES

4.4 Tabula Presentation of Analysis

Table 4.6 Summary of ARDL regression result of poverty rate as the explained variable

Short run estimation PVR ↓				Long run estimation PVR ↓			
Variables	Coefficient	t-statistics	p-value	Variables	Coefficient	t-statistics	p-value
D(LPLCW)	19.074904	1.996924	0.0590	LPLCW	9.680958	1.074711	0.2947
D(LOGCW)	-74.983765	-2.029439	0.0553	LOGCW	-39.944053	-1.159702	0.2592
D(LETCW)	-8.622002	-1.047739	0.3067	LETCW	-12.807387	-1.060338	0.3010
D(INTR)	0.033531	0.972100	0.3421	INTR	0.049808	1.031749	0.3139
D(EXR)	0.894745	1.948151	0.0649	EXR	1.329082	2.248413	0.0354
ECM(-1)	-0.673205	-4.002553	0.0006				

Source: Researchers' Eview 9, 2024.

The table above presents the short run and error correction model of circular economy and economic development variables. The negative coefficient of the error correction term (-0.673205) for poverty rate indicates that the study conforms to theoretical exposition of the Error correction modeling with the negative value of the Error Correction term and significant at 5% level of confidence. The speed of adjustment from the disequilibrium as warranted by the ECT (-1) is corrected at the speed of -67% yearly. Specifically, this shows that the disequilibrium in economic development in the long

run is corrected at the speed of 67% back to equilibrium from the short run of circular economy and economic development indicators.

Short run LPLCW (plastic waste on poverty rate) result showed that the finding is positive and statistically insignificant at a confidence of 5% level which is represented by the p-value of 0.0590 which is greater than 0.05. The coefficient of plastic waste is 19.01, indicating that a unit increase in poverty rate in Nigeria is due to 19.01 increase in plastic waste.

Short run LOGCW (organic waste on poverty rate) result showed that the finding is negative and statistically insignificant at a confidence of 5% level which is represented by the p-value of 0.0553 which is greater than 0.05. The coefficient of organic waste is -74.9, indicating that a unit increase in poverty rate in Nigeria is due to -74.9 decrease in organic waste. The short runs for the control variables interest and exchange rate are positive and statistically insignificant.

4.5 LONG RUN TEST OF HYPOTHESES

4.5.1 TEST OF HYPOTHESIS ONE

Decision Rule: Accept null hypothesis if P-value is greater than 0.05 and reject null hypothesis if P-value is less than 0.05.

Restatement of the Hypothesis in Null and Alternate forms:

H₀₁: Plastic waste has no significant impact on poverty rate in Nigeria.

H_{a1}: Plastic waste has a significant impact on poverty rate in Nigeria.

Auto-Regressive Distributed Lag Model (ARDL) Result of Hypothesis One

The Auto-Regressive Distributed Lag Model (ARDL) results of hypothesis one revealed that plastic wasterecycling for the period of this study had positive but insignificant impact on poverty rate in Nigeria. This revealed that the increase on plastic wasterecycling do not significantly impact on poverty rate in Nigeria.

Decision; Based on the results above, since the p-value is greater than 5% level of significant the null hypothesis is retained which states that plastic waste has no significant impact on poverty rate in Nigeria.

4.5.3 TEST OF HYPOTHESIS TWO

Decision Rule: Accept null hypothesis if P-value is greater than 0.05 and reject null hypothesis if P-value is less than 0.05.

Restatement of the Hypothesis in Null and Alternate forms:

H₀₂: Organic waste has no significant impact on poverty rate in Nigeria.

H_{a2}: Organic waste has a significant impact on poverty rate in Nigeria.

Auto-Regressive Distributed Lag Model (ARDL) Result of Hypothesis Two

The Auto-Regressive Distributed Lag Model (ARDL) results of hypothesis two revealed that organic waste recycling for the period of this study had negative but insignificant impact on poverty rate in Nigeria. This revealed that decrease on organic waste recycling do not have significant impact on poverty rate in Nigeria.

Decision; Based on the results above, since the p-value is greater than 5% level of significant the null hypothesis is retained which states that organic waste has no significant impact on poverty rate in Nigeria.

4.3 Discussion of findings

The findings of the research were interpreted and compared with the objectives and questions ascertain.

Objective I: Ascertain the impact of plastic waste on poverty rate in Nigeria.

The result obtained from test of hypothesis four revealed that plastic wasterecycling for the period of this study had positive but insignificant impact on poverty rate in Nigeria. This revealed that the increase on plastic wasterecycling do not significantly impact on poverty rate in Nigeria. Hence increase in plastic wasterecycling had positive implication to poverty rate but not felt significantly. Plastics squanders are additionally unsafe to human wellbeing; they might contain hurtful acids which might prompt passing. Nigeria, which is the greatest oil sending out country in Africa, depends predominantly on the returns of the oil exchange for its Gross domestic product and based technique in developing her economy. Notwithstanding, with the declination of oil costs and expansion in plastic squanders, the world is tending towards energy and economical turn of events. In this way, a pressing requirement for reusing plastic squanders into an answer for abundance creation is central in Nigeria. This study concurred with research done by Babayemi and Dauda, (2018) who noticed that plastic recuperation and reusing rates are poor in African countries, which could be credited to ill-advised strong waste administration, a huge issue that contributes fundamentally to plastic contamination. Likewise, Leal et al. (2021) recognized the requirement for additional examination to fathom individuals' inspiration to buy biodegradable plastic items. In many emerging countries in Africa, ill-advised strong waste administration is a critical issue that contributes fundamentally to plastic contamination (Babayemi et al., 2019; Babayemi&Dauda, 2018).

Objective II: Examine the impact of organic waste on poverty rate in Nigeria.

The result obtained from test of hypothesis five reveal that organic waste recycling for the period of this study had negative but insignificant impact on poverty rate in Nigeria. This revealed that decrease on organic waste recycling do not have significant impact on poverty rate in Nigeria. This clearly shows that organic waste recycling has not been felt in the economy and there is no influence of it on employment nor poverty reduction. There is a great neglect of organic waste recycling in Nigeria and there should be policies to that regard to impact positively on poverty rate. This study is in accordance with the investigation of Wrixon, Mallory and Tilley (2021) who directed a concentrate on Neediness, governmental issues and plastic: Natural waste arranging in Blantyre's public business sectors. Like other unfortunate nations across Africa, Malawi battles with strong waste administration (SWM). Particularly taking into account the high extent of natural waste, fertilizing the soil is a promising an open door to handle the issue. Taking into account these issues, the review presents an examination of the political elements around SWM at business sectors in Blantyre, Malawi, and to comprehend what these elements may possibly mean for the arranging of natural waste to work on the development of manure.

Conclusion

The study evaluated the impact of circular economy on economic development of Nigeria. The objectives include to: ascertain the impact of plastic waste on poverty rate in Nigeria. examine the impact of organic waste on poverty rate in Nigeria. The study adopted pre-test estimation of descriptive statistics, unit root test, cointegration test to ensure that the data set is stationary and fit for the analysis. Long-run relationship was estimated after the presence of cointegration was identified. Auto-Regressive Distributed Lag Model (ARDL) method of analysis was adopted for the estimation. The study revealed that both in short and long run estimation, plastic waste recycling for the period of this study had positive and insignificant impact on poverty rate in Nigeria, organic waste recycling for the period of this study had negative and insignificant impact on poverty rate in Nigeria. Hence, Nigerian government have not utilized circular economy to reduce poverty rate in Nigeria to a significant extent. Thus, the study concludes that circular economy do not have significant impact on economic development of Nigeria. This study recommended that the Nigerian government should implement federal prohibition and taxation on the use of plastic, ocean clean-up, technological innovation that will support the recycling industry in Nigeria, and the need for additional plastic research. Nigeria can apply the most recent plastic waste management strategies of developed countries like European and Asian nations as a model and adopt them to reduce plastic pollution.

The concentrate likewise, prescribed that a conscious government strategy to advance treating the soil of natural strong squanders material and showcasing of manure excrement to substitute the ongoing strategies of bringing in compound compost with sponsorship for homegrown farming as a methodology to accomplish economical waste administration in Nigeria. There is an incredible should be intentional on reusing of natural waste to work on the wellbeing of the economy.

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