



DETERMINANTS OF SUSTAINABLE DEVELOPMENT IN NIGERIA

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Abstract

This study explored the determinants of sustainable development in Nigeria from 1981 to 2022, using the Adjusted Net Savings Rate (ANS) as a proxy for sustainable development and examining variables such as GDP per capita, total natural rent, unemployment rate, inflation rate, and terms of trade. To analyze the data, the study employed Fully Modified Ordinary Least Squares (FMOLS) and Granger Causality tests to identify determinants and causality directions among the variables. The findings highlighted a sustained long-term relationship between these factors, with GDP per capita and total natural rents emerging as key determinants of sustainable development. In contrast, the inflation rate, terms of trade, and unemployment rate were found to have no significant impact. The results also revealed bidirectional causality between sustainable development and GDP per capita, unidirectional causality between terms of trade and total natural resource revenue with sustainable development, and no causality between unemployment rate and inflation rate with sustainable development. The study recommends promoting economic development alongside increased savings and implementing fiscal policies to reduce public deficits as strategies to enhance sustainable development in Nigeria.

Keywords: *sustainable development, total natural resource rent, GDP per capita, terms of trade*

1. Introduction

The aspiration for sustainable development has become a central and widely accepted goal in contemporary human society (Henfrey et al., 2023; Liu, 2024). At both national and global scales, strategies aimed at promoting sustainable development are essential for fostering enduring economic growth, protecting environmental resources, and ensuring healthy living conditions and social inclusivity (Nunkoo et al., 2023). Achieving this requires a comprehensive approach that integrates economic, environmental, and social dimensions, emphasizing the well-being of both individuals and communities. In recent times, countries have increasingly mobilized efforts to enhance sustainability by adopting and intensifying policies to meet current needs and address future challenges. This includes investing in green technologies, advancing social equity, and implementing robust environmental protections, thereby creating a resilient framework for long-term prosperity and equity.

Since the United Nations launched the Sustainable Development Goals (SDGs) agenda in 2015, nations worldwide have committed to advancing sustainable development within their borders (Shulla & Leal-Filho, 2023). Nigeria, as part of this global initiative, has worked to align its

policies with these ambitious goals. However, the country's progress has been hindered by significant challenges, including pervasive corruption and ineffective implementation, resulting in poor outcomes across various targets. This raises a crucial question: Is Nigeria on track to achieve sustainable development, or are systemic issues thwarting its efforts? The ongoing difficulties in addressing environmental, social, and economic challenges cast doubt on whether Nigeria can truly secure a better future for its citizens amidst these persistent obstacles.

Sustainable development refers to a development approach that meets the needs of the present without compromising the ability of future generations to meet their own needs (Sachs, et al, 2022; Elavarasan, et al, 2022; Carlsen, 2022). It involves balancing economic growth, social progress, and environmental protection to ensure long-term prosperity, equity, and well-being for current and future generations. Sustainable development aims to address the interconnected challenges of economic development, social inclusion, and environmental sustainability, seeking to create a harmonious and balanced system that supports human well-being while preserving natural resources and ecosystems.

Globalization has significantly accelerated the adoption of the Sustainable Development Goals (SDGs), marking a pivotal moment in the formulation and execution of comprehensive and urgent action plans on a global scale. This shift is embodied in the ratification of the 2030 Agenda, which encompasses 17 SDGs designed to address critical areas such as environmental preservation, human well-being, and economic prosperity (Tomuschat, 2021). These goals serve as a rallying call for nations to implement strategies that balance ecological sustainability with social and economic advancement. To support this global endeavor, numerous international institutions and organizations produce highly regarded annual reports that assess countries' progress across various factors indicative of their sustainability potential. These evaluations, detailed in reports by Valencia et al. (2019) and Pimonenko et al. (2020), offer understandings into how well countries are meeting the SDGs and highlight areas where further action is required. These reports play a crucial role in guiding policy adjustments and fostering international cooperation to enhance the effectiveness of sustainability efforts.

However, amidst this commitment, understanding the specific determinants and

factors influencing sustainable development within Nigeria has become paramount. Although, several studies have looked at the determinants of sustainable development in different countries, (see for example Delgado-Ceballos, et al, 2023; Dat & Hung, 2023; Koirala & Pradhan, 2020; Kaimuri & Kosimbei, 2017), however, study on the determinants of sustainable development in Nigeria have not been fully examined. Amidst Nigeria's commitment to achieving Sustainable Development Goals (SDGs), understanding the specific factors shaping or hindering sustainable development remains crucial. This study examined the determinants of sustainable development in Nigeria.

Following the introductory section, the paper is organized into distinct sections: Section 2 offers an extensive review of existing literature, providing an in-depth analysis of prior studies and discussions relevant to the research topic. Moving forward, Section 3 outlines the methodology adopted for this study, detailing the approach, tools, and procedures employed in data collection and analysis. In Section 4, the empirical findings derived from the study's analysis are presented, offering insights into the observed outcomes and relationships between variables. Finally, Section 5 consolidates the

conclusions drawn from the study's findings and offers recommendations based on these conclusions, providing actionable insights and suggestions for future considerations in this domain.

2. Literature Review

Sustainable development embodies a holistic approach to progress that seeks to meet present societal needs without compromising the capacity of future generations to meet their own needs (Maryanti, et al, 2022). It captures a fragile balance between economic growth, social equity, and environmental preservation, striving to foster a harmonious interplay between these facets. At its core, sustainable development acknowledges the intrinsic interconnectedness between human systems and the natural environment, advocating for responsible stewardship of resources, equitable distribution of benefits, and the preservation of ecological integrity (Delgado-Ceballos, et al, 2023). It aims to create a resilient and inclusive society that not only ensures the prosperity of current generations but also safeguards the potential for future generations to thrive in a thriving, healthy, and resource-abundant world.

A multitude of indicators linked to sustainable development are collated within

three overarching categories: social, environmental, and economic, often derived from their impact or interconnectedness (Martínez, et al, 2023). These indicators have evolved over time in response to the limitations of traditional measures like GDP and income in fully capturing economic progress. Notably, two relatively recent indicators include the Human Development Index (HDI), established by the UNDP in 1990, and the Index of Sustainable Economic Welfare (ISEW), devised by Daly & Cobb in 1989. The HDI is graded on a scale from 0 to 1, with 1 indicating high human development, encompassing longevity, knowledge, and the utilization of resources for a decent life. Longevity is gauged using life expectancy at birth data, knowledge via adult literacy and mean years of schooling, and resource utilization through GDP per person adjusted for purchasing power. While this composite index doesn't explicitly reveal income disparities, a high index in longevity implies broad access to healthcare, food, sanitation, and water. However, despite its widespread use and data availability, the HDI doesn't incorporate assessments of environmental degradation.

Figure 1 shows that over the years, Nigerian adjusted net savings has been fallen.

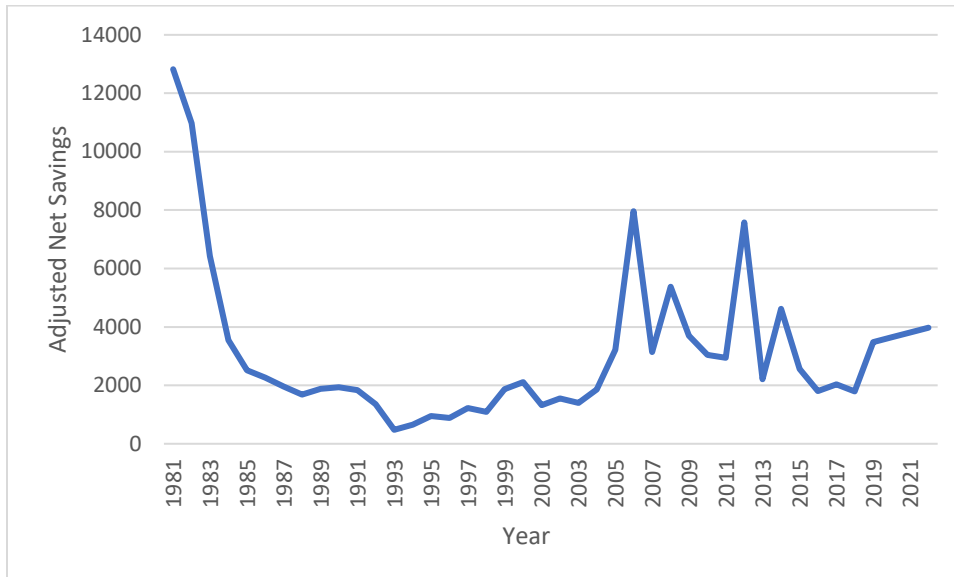


Figure 1: Adjusted Net Savings in Nigeria 1981 to 2022

Theoretical Framework

The theoretical background of this study is based on the Harold Domer Model. This model endeavors to employ principles from development economics to elucidate economic growth through the lens of savings levels and capital productivity. In its simplest interpretation, the theory posits that a nation with substantial savings possesses adequate funds accessible to firms for borrowing and subsequent investment. This investment, in turn, fosters an augmentation in the nation's capital stock, thereby spurring economic growth via increased production of goods and services. Conversely, a reduction in savings can yield the opposite effect. Capital productivity, measured through investment

productivity, becomes pivotal in this context. Essentially, an enhancement in capital productivity, achieved by a decline in the capital output ratio, signifies economic expansion as the economy generates greater outputs using fewer inputs (Sato, 1946). In straightforward terms, the rate of growth (g) is derived from the equation: Rate of growth (g) = Savings (s) / Capital Output ratio (c).

Therefore, for developing nations to foster growth, they must bolster domestic savings and facilitate technological advancements to decrease the capital output ratio. However, critics have extensively scrutinized this model. They argue that developing countries often contend with challenges like droughts and diseases, hindering the capacity to

stimulate domestic savings adequately, given the immediacy of these pressing needs. Additionally, detractors highlight the oversimplified nature of the model, emphasizing its disregard for pivotal factors such as labor productivity and corruption. Moreover, the model's premise, built on the assumption of fixed wages, is deemed unrealistic as wages are dynamic and exhibit stickiness, continuously changing over time.

Empirical Review

Sudipta et al (2024) investigated the determinants and consequences of firm-level Sustainable Development Goals (SDG) disclosure using a sample of 6,941 firm-year observations from 30 countries during the period from 2016 to 2019. They developed an SDG Disclosure Index based on 17 SDG indicators established by the United Nations. The study found that approximately 48.40% of firms had active stakeholder engagement programs, 53.90% maintained a sustainability committee, and 62.60% issued standalone sustainability reports. The findings indicated that Environmental, Social, and Governance (ESG) performance, stakeholder engagement, and the issuance of standalone sustainability reports positively influenced firm-level SDG disclosure. Additionally, the study revealed a positive association between higher levels of SDG

disclosure and increased firm value, highlighting that robust SDG reporting is linked to enhanced firm valuation

Bose et al.'s (2023) examination of firm-level Sustainable Development Goals (SDG) disclosure across 30 countries during 2016–2019, a sample of 6941 firm-year observations revealed insightful trends. Employing 17 SDG indicators outlined by the United Nations (UN), the study constructed an SDG Disclosure Index. Notably, findings indicated that almost half of the firms (48.40%) had active stakeholder engagement programs, 53.90% maintained sustainability committees, and 62.60% issued standalone sustainability reports. The study highlighted the positive impact of Environmental, Social, and Governance (ESG) performance, stakeholder engagement, and standalone sustainability reports on firm-level SDG disclosure. Additionally, it unveiled a favorable relationship between higher levels of SDG disclosure and increased firm value, substantiated through rigorous robustness tests.

Dat et al.'s (2023) article focused on sustainable development in Vietnam from 2011 to 2020, the primary objective was to identify key factors influencing sustainable development and propose pertinent policy

applications to meet sustainable development goals. Employing qualitative and quantitative methodologies alongside SPSS 20.0 software for data analysis, the authors surveyed 400 leaders and professionals across 40 provinces in Vietnam. The study utilized various statistical tools such as Cronbach's Alpha, exploratory and confirmatory factor analyses, as well as regression analysis. Notably, the research highlighted three critical factors significantly impacting sustainable development in Vietnam, emphasizing their essentiality in achieving sustainable economic, social, and environmental progress within the country. These findings provide crucial scientific insights, especially amidst the dynamic global landscape characterized by multifaceted changes, offering actionable recommendations for policymakers and provincial managers vested in steering sustainable development initiatives in Vietnam

Sofrankova et al.'s (2021) examined the determinants of sustainable development within EU(28) countries from 2011 to 2018. Leveraging indices such as the Global Innovation Index, Doing Business Index, Economic Freedom Index, Corruption Perception Index, and Human Development Index, the study utilized panel data regression analysis on secondary data. Notably, Finland

emerged with the highest score in sustainable economic development (84.5), whereas Romania attained the lowest position (56.5). Denmark exhibited the most favorable position in selected indices' average scores (80.5), while Greece recorded the least favorable results (57.6). The panel regression analysis identified key determinants impacting sustainable economic growth among EU(28) countries, highlighting variables encompassing innovation activity, business environment, corruption concerns, and human resources.

Korala and Pradhan's (2019) exploration of sustainable development determinants across 12 Asian countries during 1990–2014, the study utilized panel data to measure adjusted net saving as a metric. Employing both random-effect and fixed-effect approaches in estimating a panel data model, the Hausman test favored the random-effect model's superiority. The results from the random-effect estimation revealed more robust significance and a better overall fit. Specifically, the findings highlighted the positive and significant influence of per capita income and financial development on sustainable development, juxtaposed against the negative and significant impact of inflation rate, natural resource rent, and time on the same. These outcomes highlight the

necessity of maintaining a balanced approach to natural resources as a pivotal factor in fostering sustainable development within these Asian countries.

Almagtome and Nima's (2018) investigation of cultural determinants affecting sustainable development in developing countries through cross-country analysis, Hofstede's cultural value theory served as a framework. The study aimed to explore the influence of national culture on sustainable development practices, utilizing annual reports from 96 sampled companies across Australia (38), Germany (37), and Iraq (21) for the financial year ending in 2015. The findings notably highlighted the substantial impact of cultural determinants on sustainable development practices within developing nations. Specifically, the study revealed that societies exhibiting high individualism, low masculinity, low power distance, low uncertainty avoidance, and high indulgence tended to show higher sustainability reporting scores, indicative of more robust sustainable development practices.

3. Methodology

Model Specification

$$ANS = f(GDPPC, TNR, TOT, UR, INFR,)$$

Moreover, the comparative analysis unveiled significant disparities in sustainability reporting scores between Iraqi companies and those in Australia and Germany, primarily attributed to cultural, political, and security differences among the countries.

Kamuri and Kosimber's (2017) empirical investigation focused on discerning the determinants of sustainable development in Kenya spanning from 1991 to 2014. Using the Adjusted Net Savings Rate (ANSR) as a metric for sustainable development, the study employed the Autoregressive Distributed Lag (ARDL) model and conducted bounds tests for cointegration to ascertain the presence of a long-term relationship among variables. Household consumption per capita exhibited a negative impact on sustainable development in the long run, alongside the negative influences of unemployment rate and energy efficiency in the short run. Interestingly, resource productivity, real gross domestic product per capita, and terms of trade were deemed insignificant in shaping sustainable development

The study followed after the model by Kaimuri and Kosimbei, (2017) with a slight modification. The functional form of the model is presented as follows:

1

Where:

ANS = Adjusted Net Savings measure for sustainable development

GDPPC = GDP Per capita

INFR = Inflation, consumer prices (annual %)

TNR = Total Natural Resource Rent

UR = Unemployment Rate

TOT = Terms of Trade

In econometric terms equation 1 is formulated as

$$ANS_t = \beta_0 + \beta_1 GDPPC_t + \beta_2 TNR_t + \beta_3 TOT_t + \beta_4 UR_t + \beta_5 INFR_t + \varepsilon_t \quad 2$$

Where: β_0 = Constant, $\beta_1 - \beta_4$ = Coefficient of the independent variables and ε_t = is the error term.

Equation 2 is reformulated in logarithmic to take the form

$$\log ANS_t = \beta_0 + \beta_1 \log GDPPC_t + \beta_2 \log TNR_t + \beta_3 \log TOT_t + \beta_4 \log UR_t + \beta_5 \log INFR_t + \varepsilon_t \quad 3$$

On apriori, we expect $\beta_1 > 0$; $\beta_2 > 0$; $\beta_3 > 0$; $\beta_4 < 0$ and $\beta_5 < 0$

Data Source and Requirement

The data for this study are Adjusted net savings, excluding particulate emission damage (current US\$) as proxy for sustainable development, GDP per capita (current US\$), Total natural resources rents (% of GDP), Terms of trade adjustment (constant LCU), Unemployment, total (% of total labor force) (modeled ILO estimate) and Inflation, consumer prices (annual %) covering the period 1981 to 2022. The data

were obtained from the World Bank, World Development Indicators (WDI, 2022).

Estimation Techniques

Unit root test was first conducted for all the variables using both the Augmented Dickey Fuller and Phillip Perron. This is because time series data are prone to spurious regression and a way out of it is to carry out a unit root test, The study employs the Fully Modified Ordinary least square estimation

techniques to determine the effect and determinants of sustainable development in Nigeria.

4 Empirical Results

Descriptive Statistics

The descriptive statistics of the variables used is presented in Table 1. As reported, the mean value of adjusted net savings a proxy for sustainable development is \$3110.097 million with a standard deviation of \$2646.594 million. The minimum and maximum values stood as \$477.638million and \$12822.390 million. The average value for Per capita income is \$1350.354 with standard deviation of \$881.876. The minimum and maximum values are \$270.028million and \$3200.953million. The

average value for total natural resources rent is as a percentage of GDP is 14.058% with standard deviation of 6.978%. The minimum and maximum values are 2.590% and 34.270%. The average value for terms of trade is \$-49580.240 million with standard deviation of \$679527.300million. The minimum and maximum values are \$-1596232.000million and \$1484199.000million. The average value for unemployment rate is 4.077% with standard deviation of 0.537%. The minimum and maximum values are 3.700% and 5.999% respectively. The average value for inflation rate is 18.901% with standard deviation of 16.657%. The minimum and maximum values are 5.388% and 72.836% respectively.

Table 1: Descriptive Statistics

	ANS	GDPPC	TNR	TOT	UR	INFR
Mean	3110.097	1350.354	14.058	-49580.240	4.077	18.901
Median	2110.689	992.745	13.605	59525.230	3.901	12.877
Maximum	12822.390	3200.953	34.270	1484199.000	5.999	72.836
Minimum	477.638	270.028	2.590	-1596232.000	3.700	5.388
Std. Dev.	2646.594	881.876	6.978	679527.300	0.537	16.657

Unit Root Test

Table 2 displays the results of the unit root tests conducted for all the variables, utilizing both the Phillip Perron (PP) and the Augmented Dickey Fuller (ADF) Unit Root

Test. The findings indicate that the adjusted net savings (ANS), terms of trade (TOT) and inflation rate (INFR) were stationary at levels I(0). However, GDP per capita (GDPPC), total natural resources rent (TNR) and

Unemployment rate (UR) were stationary only after their first difference.

Table 2: Unit Root Test

	Phillip Perron			Augmented Dickey Fuller		
	Levels			Levels	1st	Order of
	I(0)	1st Difference	Order of Stationarity	I(0)	Difference	Stationarity
ANS	-2.964 (0.046)		I(0)	-3.012 (0.042)		I(0)
GDPPC	-1.099 (0.707)	-4.472 (0.001)	I(1)	-0.812 (0.805)	-4.472 (0.001)	I(1)
TNR	-2.601 (0.101)	-6.571 (0.000)	I(1)	-2.244 (0.195)	-6.675 (0.000)	I(1)
TOT	-3.165 (0.029)		I(0)	-3.286 (0.022)		I(0)
INFR	-3.334 (0.019)		I(0)	-4.278 (0.002)		I(0)
UR	1.063 (0.997)	-3.783 (0.006)	I(1)	-1.857 (0.308)	-3.838 (0.000)	I(1)

Source: Researcher's computation, 2023

Correlation

Table 2 showcases the interconnections among the utilized variables. According to the findings, there's a significant and positive correlation observed between GDP per capita and sustainable development, with $(r = 0.734^{***}, p < 0.05)$. This implies that as GDP per capita increases, there's a corresponding rise in the measure of sustainable development. The strength of this association, as indicated by the high positive

correlation coefficient, shows the noteworthy relationship between higher GDP per capita and greater progress towards sustainable development goals in the context of this analysis. The findings indicate a significant and negative correlation between total natural resources rent and sustainable development, as evidenced by a correlation coefficient of -0.564 , which is statistically significant at the 0.05 level $(r = -0.564^{***}, p < 0.05)$. This suggests that as the total natural resources

rent increases, there is a corresponding decrease in the measure of sustainable development. The substantial negative correlation coefficient stresses the impactful association wherein higher reliance on natural resource rents is linked to a diminished level of progress toward sustainable development goals. Terms of Trade exhibit a positive and significant correlation with sustainable development, denoted by a correlation coefficient of .306, which is statistically significant at the 0.05 level ($r = .306^{***}$, $p < 0.05$). This indicates that as Terms of Trade increase, there is a corresponding elevation in sustainable development. Conversely, the Unemployment rate demonstrates an inverse

and significant relationship with sustainable development, indicated by a correlation coefficient of -.119, though the significance level is above 0.05 ($r = -.119^{***}$, $p > 0.05$). This suggests that as the Unemployment rate rises, there is a decrease in sustainable development, despite the significance level being just above the threshold. Additionally, the Inflation rate shows an inverse and significant association with sustainable development, illustrated by a correlation coefficient of -.392, which is statistically significant at the 0.05 level ($r = -.392^{***}$, $p > 0.05$). This implies that higher inflation rates are linked to reduced sustainable development outcomes.

Table 2: Correlations

		ANS	GDPPC	TNR	TOT	UR	INFR
Pearson							
ANS	Correlation	1.000					
	Sig. (2-tailed)						
	N	42					
Pearson							
GDPPC	Correlation	.734**	1.000				
	Sig. (2-tailed)	(0.000)					
	N	42	42				
Pearson							
TNR	Correlation	-.564**	-.555**	1.000			
	Sig. (2-tailed)	(0.000)	(0.000)				
	N	42	42	42			

	Pearson						
TOT	Correlation	.306*	0.297	0.071	1.000		
	Sig. (2-tailed)	(0.049)	(0.056)	(0.655)			
	N	42	42	42	42		
	Pearson						
UR	Correlation	-0.119	.336*	-.355*	-0.199	1.000	
	Sig. (2-tailed)	(0.452)	(0.029)	(0.021)	(0.206)		
	N	42	42	42	42	42	
	Pearson						
INFR	Correlation	-.392*	-.386*	0.147	-.462**	0.109	1.000
	Sig. (2-tailed)	(0.010)	(0.012)	(0.353)	(0.002)	(0.490)	
	N	42	42	42	42	42	42

Note: *** denote significant at 5%

Cointegration

To determine whether the existence of a long run relationship exists among the variables used, the Johansen cointegration test was used. Table 3 provides the outcome of the

results. As reported, the trace statistics shows 3 cointegrating equations. This shows that a long run relationship exists among the variables.

Table 3: Johansen Unrestricted Cointegration Rank Test (Trace)

Hypothesized	Trace	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.775	121.253	95.753	0.000
At most 1	0.480	61.559	69.818	0.000
At most 2	0.345	35.359	47.856	0.429
At most 3	0.270	18.417	29.797	0.535
At most 4	0.126	5.824	75.494	0.000
At most 5	0.010	0.417	3.841	0.517

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

Source: Researcher's computation, 2023

Regression Result

The empirical outcomes presented in Table 4 highlight the determinants influencing sustainable development in Nigeria. According to the findings, GDP per capita exhibits a positive impact on sustainable development, signifying that a 1% rise in GDP per capita corresponds to a 0.570% increase in sustainable development. This observed relationship proves statistically significant with a p-value below 0.05, stressing the substantial influence of GDP per capita on sustainable development within the Nigerian context. These results align with previous studies by Koirala and Pradhan (2020) as well as Kaimuri and Kosimbei (2017), further affirming the pivotal role of GDP per capita as a major determinant contributing to sustainable development in Nigeria.

The findings highlight a notable adverse impact of Total Natural Resource rent on sustainable development, indicating that a 1% escalation in Total Natural Resource rent corresponds to a 0.441% decline in sustainable development. This significant result emphasizes the substantial role played by Total Natural Resource rent as a

determinant influencing sustainable development in Nigeria. These outcomes align closely with parallel research conducted by Fu and Liu (2023) and He and Deng (2023), consolidating the understanding that heightened reliance on Total Natural Resource rent significantly impedes the progress toward achieving sustainable development goals within the Nigerian context.

The outcome indicates a positive but statistically insignificant effect of Terms of Trade on sustainable development. Precisely, a 1% augmentation in Terms of Trade corresponds to a mere 0.038% increase in the country's sustainable development. This lack of statistical significance implies that despite the observed positive relationship, Terms of Trade does not emerge as a substantial determinant shaping sustainable development in Nigeria. The findings suggest that, while there is some impact, Terms of Trade may not wield significant influence in driving sustainable development within the Nigerian context. The findings are in tandem with Kaimuri and Kosimbei (2017). The value of unemployment rate impacted negatively and insignificantly with

sustainable development in Nigeria. The findings revealed that 1% point increase in unemployment rate is associated with a decrease in sustainable development by

the value of unemployment rate impacted negatively and insignificantly with sustainable development in Nigeria. The findings revealed that 1% point increase in inflation is associated with a decrease in sustainable development by 0.794%. The result was insignificant, this means that

although, inflation rate have adverse effect on the sustainable development in Nigeria, however, it is not a major factor that determines sustainable development in Nigeria, the study supported the outcome Koirala and Pradhan, (2020). The R-Squared value shows that about 58% in the variation of sustainable development is accounted for by GDP per capita, Total natural rent, terms of trade, unemployment rate and inflation rate.

Table 4: Empirical Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPPC	0.570	0.126	4.529	0.000
TNR	-0.441	0.153	-2.894	0.007
TOT	0.038	0.035	1.064	0.295
UR	-0.794	0.598	-1.328	0.193
INFR	-0.052	0.117	-0.449	0.656
C	9.234	0.683	13.529	0.000
R-squared	0.581	Mean dependent var		10.367
Adjusted R-squared	0.522	S.D. dependent var		0.287
S.E. of regression	0.199	Sum squared resid		1.387
Long-run variance	0.0326			

Source: Researcher's computation, 2023

Causality Test

Table 5 displayed the Granger Causality test result in order to see the direction of causality between sustainable development and the other variables. From the result, a

bidirectional causality exists between adjusted net savings and GDP per capita. Unidirectional causality exist between TNR and ANS as causality runs from TNR to ANS and not vice versa. Also, a one way causality was found between TOT and ANS as

causality runs from ANS to TOT and no feedback while no evidence of causality between unemployment rate and sustainable

development in Nigeria as well as between INFR and ANS.

Table 5: Granger Causality Test Result

Null Hypothesis:	Obs	F-Statistic	Prob.	Decision
GDPPC does not Granger Cause ANS	40	5.833***	0.006	Reject H ₀
ANS does not Granger Cause GDPPC		3.199***	0.026	Reject H ₀
TNR does not Granger Cause ANS	40	3.007***	0.012	Reject H ₀
ANS does not Granger Cause TNR		0.728	0.489	Accept H ₀
TOT does not Granger Cause ANS	40	0.047	0.954	Reject H ₀
ANS does not Granger Cause TOT		4.238***	0.011	Accept H ₀
INFR does not Granger Cause ANS	40	0.894	0.826	Accept H ₀
ANS does not Granger Cause TFR		0.239	0.501	Accept H ₀
UR does not Granger Cause ANS	40	0.337	0.715	Accept H ₀
ANS does not Granger Cause UR		0.046	0.954	Accept H ₀

Note: *** denotes significance

Conclusion and Recommendations

The study investigated the major determinants of sustainable development in Nigeria for the period covering 1981 to 2022. The data used were adjusted net savings as a proxy for sustainable development, GDP per capita, total natural resources rent, terms of trade, inflation rate and unemployment rate. Fully Modified OLS estimation techniques along with Granger Causality test was used. The study concluded as follows. Firstly, a long run relationship exists between

sustainable development and the other variables over the long term. Secondly, among the variables examined, GDP per capita and total natural resources rent emerge as significant drivers of sustainable development, while the unemployment rate, terms of trade, and inflation rate do not bear significant weight in this regard. Thirdly, a two-way causal link exists between sustainable development and GDP per capita. Furthermore, causality extends from total natural resource rent to sustainable

development without feedback. Causality also operates from sustainable development to terms of trade without feedback, but evidence is lacking for causality between sustainable development and unemployment, as well as inflation rate in Nigeria. Given the findings the study recommended that policies aimed at mitigating inflation and unemployment rates should be encouraged while managing natural resource rent more efficiently. Strategies fostering economic growth, such as investment in human capital and infrastructure, coupled with initiatives to enhance trade relations, are also crucial. Additionally, sustainable resource management practices should be instituted to ensure that natural resources are utilized responsibly. These actions could pave the way for fostering sustainable development in Nigeria by leveraging positive influencers and mitigating negative impacts.

References

- Carlsen, L., & Bruggemann, R. (2022). The 17 United Nations' sustainable development goals: A status by 2020. *International Journal of Sustainable Development & World Ecology*, 29(3), 219-229.
- Dat, P. T., & Hung, H. T. (2023). Determinants of Sustainable Development: A Case Study in Vietnam. *Montenegrin Journal of Economics*, 19(2), 97-107.
- Delgado-Ceballos, J., Ortiz-De-Mandojana, N., Antolín-López, R., & Montiel, I. (2023). Connecting the Sustainable Development Goals to firm-level sustainability and ESG factors: The need for double materiality. *BRQ Business Research Quarterly*, 26(1), 2-10.
- Elavarasan, R. M., Pugazhendhi, R., Irfan, M., Mihet-Popa, L., Campana, P. E., & Khan, I. A. (2022). A novel Sustainable Development Goal 7 composite index as the paradigm for energy sustainability assessment: A case study from Europe. *Applied Energy*, 307, 118173.
- Fu, R., & Liu, J. (2023). Revenue sources of natural resources rents and its impact on sustainable development: Evidence from global data. *Resources Policy*, 80, 103226.
- He, J., & Deng, Z. (2023). Revisiting natural resources rents and sustainable financial development: Evaluating the role of mineral and forest for

- global data. *Resources Policy*, 80, 103166.
- Henfrey, T., Feola, G., Penha-Lopes, G., Sekulova, F., & Esteves, A. M. (2023). Rethinking the sustainable development goals: Learning with and from community-led initiatives. *Sustainable Development*, 31(1), 211-222.
- Koirala, B. S., & Pradhan, G. (2020). Determinants of sustainable development: Evidence from 12 Asian countries. *Sustainable Development*, 28(1), 39-45.
- Liu, Y. (2024). Reviving the aspiration, fostering impactful research, and contributing to the sustainable development and societal impact at Asian Business and Management. *Asian Business & Management*, 23(1), 1-8.
- Martínez, A. P., Jara-Alvear, J., Andrade, R. J., & Icaza, D. (2023). Sustainable development indicators for electric power generation companies in Ecuador: A case study. *Utilities Policy*, 81, 101493.
- Maryanti, R. I. N. A., Rahayu, N. I., Muktiarni, M., Al Husaeni, D. F., Hufad, A. C. H. M. A. D., Sunardi, S., & Nandiyanto, A. B. D. (2022). Sustainable development goals (SDGs) in science education: Definition, literature review, and bibliometric analysis. *Journal of Engineering Science and Technology*, 17, 161-181.
- Nunkoo, R., Sharma, A., Rana, N. P., Dwivedi, Y. K., & Sunnassee, V. A. (2023). Advancing sustainable development goals through interdisciplinarity in sustainable tourism research. *Journal of Sustainable Tourism*, 31(3), 735-759.
- Pimonenko, T., Bilan, Y., Horák, J., Starchenko, L., & Gajda, W. (2020). Green brand of companies and greenwashing under sustainable development goals. *Sustainability*, 12(4), 1679.
- Sachs, J. D., Kroll, C., Lafortune, G., Fuller, G., & Woelm, F. (2022). *Sustainable development report 2022*. Cambridge University Press.
- Shulla, K., & Leal-Filho, W. (2023). Achieving the UN Agenda 2030: Overall actions for the successful implementation of the Sustainable Development Goals before and after the 2030 deadline.

Sofrankova, B., Kiselakova, D and Onuferova, E (2021). An empirical view on the determinants of sustainable economic development : Evidence from EU(28) member States, SHS Web of Conferences 91,01008.

Sudipta, B., Khan, H. Z., & Bakshi, S. (2024). Determinants and consequences of sustainable development goals disclosure: International evidence. *Journal of Cleaner Production*, 434, 140021.

Tomuschat, C. (2021). The 2030 Sustainable Development Goals: The Quest for a Perfect World Order. *International Community Law Review*, 24(5), 507-552.

Valencia, S. C., Simon, D., Croese, S., Nordqvist, J., Oloko, M., Sharma, T., ... & Versace, I. (2019). Adapting the Sustainable Development Goals and the New Urban Agenda to the city level: Initial reflections from a comparative research project. *International Journal of Urban Sustainable Development*, 11(1), 4-23.