ASSESSING THE CONTRIBUTIONS OF ADJUSTED NET SAVINGS TO SUSTAINABLE DEVELOPMENT IN NIGERIA

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Abstract
This study assessed the contributions of adjusted net savings of Nigeria to its sustainable development in the pre and post sustainable development goals adoption era. The ex-post facto research design was adopted and a twenty (20) year period comprising 2005 – 2014 for the pre SDGs adoption era and 2015 – 2024 for the post SDGs adoption era was covered. Results of the analysed data using inferential regression analysis statistical tool through e-view version 12 showed that Adjusted Net Savings insignificantly contributed to sustainable development in Nigeria in the pre and post the SDG adoption era, though the extent of such contribution was positive and negative in both eras respectively (coefficient 0.576273 and -0.101577; p-values 0.3225 and 0.1183 respectively). The study concludes that macroeconomic stability alone is not enough as a measure of a nation's economic wellbeing. The true measure of success will be how these reforms improve the daily lives of Nigerians, especially the poor and vulnerable. It was therefore recommended that measurement of government performance in terms of sustainable development should deemphasize the GDP metric and adopt such measures as inclusive wealth or comprehensive wealth and adjusted net saving which are more embracing than the GDP.

Key words: *Adjusted Net Savings, Inclusive Wealth Index, Pre and During SDG adoption era, Sustainable development.*

Introduction

The Nigerian governments have been spending money on projects and programmes purportedly designed to enhance the wellbeing of the people and achieve sustainable development, amidst pursuing aggressive revenue drive and persistently exploring borrowings from both domestic and external lenders. While these actions may have succeeded in raising the gross domestic product (GDP) of the nation, the wellbeing of the people cannot be said to be improving as expected. Or could it be that the metric in use (GDP) is not portraying the desired picture? This seems to justify the argument by Harris and Roach (2021) that if Economists accepted conventional estimates of the gross domestic product (GDP) as a befitting measure is not also reflective of the

wellbeing development picture of a nation, then their policy recommendations were likely to be wrong in the case of natural resource dependent economies. This is hinged on the belief that wrong accounting can lead to wrong decisions and policies and this is why this study adopted another metric, the inclusive wealth as a suitable measure of sustainable development in Nigeria.

Countries are often ranked on the basis of the GDP financial statistics, but Gaukroger *et al.* (2022) argued that the GDP was never intended to be a measure of wellbeing or progress, but as a channel to fill gaps in information readily available about the state of the economy. In 2010, Nigeria rebased her GDP and thus by 2014 Nigeria was adjudged to be the strongest and fastest growing economy in Africa by GDP. Regrettably, these rankings do not convey any form of economic progress to match its new found status in Africa as the continent's largest economy because a short time after this economic feat, the World Economic Forum, in its 2017/2018 global competitiveness report, ranked Nigeria at 132 out of 138 countries in terms of infrastructural stock, which ranking improved slightly in 2024 (123 out of 186) according to the Agusto store (2024), but deteriorated further in year 2025 when it peaked148 out of 168 (Global Peace Index, 2025). Little wonder why Osuji and Nwani (2020) described the economy of Nigeria as being monolithic and volatile, especially as the country's prevailing and popular identity at the moment (in year 2026) as the world headquarter of poverty had since displaced India as the country with the highest number of extremely poor people. In May 2023, the Federal government of Nigeria removed the controversial subsidy on fossil fuel and boom, the price of every commodity in Nigeria doubled as a result. Despite these disturbing realities about Nigeria, the country still appear to put up unguidedly with the earlier opinion of the International Monetary Fund (IMF) in 2022 that had adjudged the country as the biggest or largest economy in Africa.

Indeed, the economic and other wellbeing measures of Nigeria and Nigerians are of interest especially at appreciating how the country has made progress at attaining sustainable development through its implementation of the Sustainable Development Goals, which should impact on the country where objectively or judiciously implemented. Given that the adoption and consequent implementation of the sustainable development goals (SDGs) in Nigeria began in year September 2015, this study therefore cut across a period of twenty (20) years (2005 – 2024) comprising ten (10) years of pre SDGs adoption period in Nigeria (2005 - 2014) and ten (10) years of SDGs adoption period in Nigeria (2015 – 2024). While the study upholds sustainable development as its dependent variable which was thereafter measured as Inclusive wealth (a measure of total value of all the Assets that contribute to Nigeria's financial wellbeing), the independent variable of the study was the Adjusted Net Savings (ANS) of the Nigeria.

Accordingly, Adjusted net saving is an indication of how effective the government is in conserving its financial, produced, human, social and natural capital assets. A government that can adequately handle this mix effectively is believed to be working towards sustainable development. Thus, there is unproven scientific belief that changes in Adjusted Net Savings can influence the inclusive wealth index of a nation over time, hence the scholarship intervention of this study.

Objectives

The study assesses the contributions of adjusted net savings (ANS) to sustainable development in Nigeria in the pre and post sustainable development goals adoption era.

Hypothesis

H_o: The Adjusted Net Savings has not made any significant contribution to sustainable development in Nigeria in the pre and post Sustainable Development era.

Literature Review

Adjusted Net Savings (ANS)

Adjusted net saving is a sustainability measurement concept or indicator that measures the true rate at which a country is either saving or depleting its national wealth after adjusting the net national product for educational expenditure, forest depletion, carbon dioxide damage and damages caused by particulate matters. The idea of Adjusted Net Saving as a measure of sustainable development was supported by Polasky *et al.* (2019) who advocated for greater integration of both economic and sustainable development ideas. This is as McLaughin *et al.* (2023) stressed the need for greater integration of economic history and sustainability science. Batrancea *et al.* (2020) however noted that there was no reliable accounting method that could measure natural resources depletion and the impact of environmental damages on the economy.

In 2013, Professionals from 35 countries attempted to develop an approach called the Wealth Accounting and Valuation of Ecosystem Services (WAVES), which was part of a Global Programme on Sustainability (GPS). WAVES was a World Bank-led global partnership that aimed to promote sustainable development by ensuring that natural resources were accounted for in the development planning and economic accounts of nations. The GPS had three pillars namely Pillar I which aimed at improving global measurements regarding natural capital and ecosystem services; Pillar II which focused

on the capacity to produce and use natural capital to support policy and planning decisions, and lastly Pillar III which provided incentives to promote sustainability in the financial sector. However, the conceptualist argued that neither WAVES nor GPS provided adequate answers to the challenges posed by global warming and environmental degradation, but noted that the Adjusted Net Savings (ANS) attempted to reflect the factors that are responsible for economic growth and global warming (Khan *et al.*, 2020; Batrancea *et al.*, 2020). Batrancea *et al.* (2020) distinguished between Green GDP and the normal GDP and maintained that both are measurable indicators. However, Merko *et al.* (2019) reported that only the green GDP was measurable using the ANS method.

Qasim and Grimes (2018) described this measure as a World Bank indicator designed to measure sustainable development at the macro level on the long run. To Harris and Roach (2021), it is a national accounting measure that aimed at measuring how much a country was actually saving for its future. World Bank (2018) had opined that the ANS provided the nation –level Decision Makers with a clear relatively simple indicator on how sustainable their country's investment policies are. The World Bank further elucidated on the novelty of the Adjusted Net Savings by pointing out that it had broadened the view of what constituted Assets and investments as against the view of Assets and investment held by the conventional national accounts. The latter considered only the formation of fixed produced capital as an investment into the future, making that the value of Asset available to the society, just as depreciation in the value of human-made capital was considered a decrease in the value of the nation's Asset. Arguably, the Adjusted Net Savings considers both the natural and human-made capitals as Assets upon which the productivity and wellbeing of a nation rests. This implies that the depletion of non-renewable resources or the over exploitation of a renewable resource decreases the value of that resource as Asset. And such activity should be regarded as disinvestment in the future productivity or wellbeing of the nation. Similarly, the creation of an educated populace and a skilled workforce should be considered an increase in a nation's capital (World Bank, 2018).

The calculation of the Adjusted Net Savings starts with the calculation of gross savings in the domestic economy which is a summation of savings by the government, businesses and individuals. The fixed capital depreciation is thereafter deducted from the gross domestic savings to obtain net domestic or national savings. To the net national savings, the recurrent expenditure on education is added back, followed by the subtraction of the values of natural resource depletion such as mineral resource depletion and further subtraction of pollution damages caused by carbon dioxide emission and other particulate matters (Harris & Roach, 2021; Qasim & Grimes, 2018). Mathematically, this can be stated as follows:

ANS= NDS +EDE –FD-MD-ED-CD- PMD …….Eqn 1.

where:

ANS = Adjusted Net Saving;

NDS = Net Domestic Savings

EDE = Education Expenditure

FD = Forest Depletion

MD = Mineral Depletion

ED = Energy Depletion

CD = Carbon Dioxide Damage

PMD = Particulate Matter Damage

The features making ANS a popular indicator, according to Odugbesan and Rjoub (2019) are:

a. presents, in a simple clear positive or negative regime, a clear result with persistent negative results interpreted as declining sustainability that will have negative effects on welfare and development of a nation.
b. presents resources and environmental issues within a framework that finance Experts, development Planners and government Officials can easily understand.
c. makes growth-environmental tradeoff more explicit.

ANS thus makes it possible to explore series of policy questions that are considered key to understanding the sustainability agenda –fiscal and monetary policy issues, resources policies, pollution abatement and export of exhaustible resources of a nation.

Sustainable Development

One of society's greatest task that has become immense challenges, especially in developing countries in Africa, is to sustain everything that has been bestowed on it by nature and the innovative results of human ingenuity towards promoting economic growth and quality of life. Sabau (2020) opined that the inclusion of sustainability in development as a concept began in the 18th Century in the German forestry circles. The scholar however noted that the concept was a contested one especially as both concepts-sustainability and development, had different meanings to different people. Johnson *et al.* (2021) defined sustainable development as a process of building and managing a

portfolio of Assets including natural capital. But to Mensah (2019), the core aim of Sustainable Development was to achieve a balance among environmental, economic and social sustainability. Accordingly, sustainable development implies an equivalence between economic, social and environmental values such that key natural resources could be adequately replaced with another unrelated phenomenon. This concept had given rise to the strong-weak sustainability debate; a debate which has not yet abated to date (Yimaz & Godin, 2024). While weak sustainability stressed that man-made capital can be adequately replaced with natural capital and vice versa, the strong sustainability argued that there is a limit to the substitutability between natural capital and other types of capital (Liobikiene *et al.*, 2019). Thus, sustainable development indicators are used increasingly by national governments and international agencies for monitoring progress towards sustainability goals as well as comparing performances among countries. However, defining and measuring sustainability are two different things. And given the difficulty in defining sustainable development, it is not surprising that it has proven just as hard to agree on a single set of indicators for measuring it (Harris & Roach, 2021).

The Inclusive Wealth Index

The Inclusive Wealth Index (IWI) provides a framework for assessing national economic growth and development beyond gross domestic product (GDP). It is unique in measuring the societal value of all capital assets (or stocks) as a set of factors for achieving sustainable intergenerational wealth or wellbeing (Inclusive Wealth Report, 2024). According to Dasgupta (2021), wealth and wellbeing are two sides of the same coin. To this end, the United Nations Environmental Programme issues a report of the inclusive wealth of nations biennially called The Inclusive Wealth Report (IWR) which is a biennial effort to evaluate national capacities and performance in terms of measuring economic sustainability and well-being. Existing national statistical systems use Systems of Environmental-Economic Accounts which are geared towards measuring the flow of income. These flows critically depend on the health and resilience of capital assets like manufactured capital, human capital and natural capital (Inclusive Wealth Report, 2023). The Inclusive Wealth Report (2024) pointed out that IWI measures the societal value of all capital assets as a set of factors for achieving sustainable intergenerational wealth or wellbeing, and that the economic underpinning of the IWI is that it provides an overview of a country's real progress in the decrease or increase in the overall wellbeing of its present generation. In other words, the rising interest in Inclusive Wealth, according to Dasgupta (2021), is that Assets in their totality are the factors that determine intergenerational wellbeing, and not mere dependence on a nation's gross domestic product (GDP). The difference between inclusive wealth in one year and in the next year readily measures a nation's net inclusive investment in capital goods that year. The idea of inclusive wealth and inclusive investment extends

naturally to the global economy.

Theoretical Review

The Comprehensive Wealth Accounting Framework

This framework was not associated with a particular author, but borrowed much from the works of the Economists, Robert Solow and John Hartwick. The argument of the proponents of the comprehensive wealth framework was that the need to go beyond GDP is real because GDP is a short term focused measure and therefore insufficient as a core measure of the national progress of any country and assuch, the determinants of future wellbeing will always be outside the scope of GDP (International Institute of Sustainable Development, 2024). According to the International Institute for Sustainable Development (IISD) Natural Capital Accounting (NCA) and related wealth measures promote inclusive and sustainable development on the grounds that a country's wealth encompasses five types of capital namely financial, produced, human, social, and natural, and each is considered important because it is an input into the broad "societal production function" for wellbeing (African Development Bank, 2024). Natural capital accounting was designed to capture the economic contributions of natural assets such as forests, minerals, water, and biodiversity, and also incorporate their depletion or degradation so as to present a better measure of the economy beyond the GDP measure (Ovando, 2021). Sustainable development is therefore better accounted for using those more inclusive metrics than the GDP.

World Bank (2021) regrettably noted that all countries of the world produce GDP estimates but few measure wealth, and this poses a problem on the measurement of sustainability of the economy of a nation. A nation's wealth needs being measured because the minimum condition for economic development to be sustainable is that as long as real wealth per capita of a nation does not decline, future generations will inherit, at least, the same production and consumption opportunities as the present generation (The World Bank ,2021). Over time, it has been noticed that societal wellbeing was compromised to measure economic progress in the context of GDP alone, and the rapid industrialization, population explosion and urbanization that followed industrial growth and development across the globe created pressure on the natural resources to the extent of causing environmental degradation. The implication was that Countries may appear to thrive while draining its natural capital or expanding social disparities (Bhowmick, 2025). The continuous exploitation of natural resources without much concern about the aftermath effect, has made it appear as though one existing generation was developing at the expense of a future generation. Thus, the need to account for these impacts ondevelopments arises (Kousar *et al.*, 2025). This requires an accounting approach that could fix the national accounts of countries. In order to fix

the current national accounts, Yamaguchi, Islam and Managi (2023) opined that the value of any capital asset that is expected to contribute to the wellbeing of current and future generations be included.

The comprehensive wealth framework follows the strong sustainability argument which holds that certain natural capital stock such as the ecosystem, clean air, biodiversity, climate and environmental stability are so crucial and critical, to the extent that increase in man-made capitals and financial capital cannot adequately compensate for them. That is wgy the comprehensive income accounting holds that such should be brought into account and given its right place in judging the wealth of a nation. Perhaps, the United Nations (UN) took cognizance of this observation and thus included SDG 13- Climate Action, SDG 14- Life Below Water, and SDG 15- Life on Land, as part of the sustainable development goals (Oyeranti & Obijole, 2025). Measuring the sustainability of wellbeing requires introducing a time dimension, that is assessing whether the capacity to provide wellbeing can be secured in the future. From an *economic perspective*, the capacity to provide wellbeing in the future is most readily interpreted in terms of the capital (wealth) available to underpin future wellbeing. From an *accounting perspective*, the link between wellbeing and sustainability can be reflected by recording monetary and non-monetary data about a range of capitals namely economic, natural, human and social capital, and the associated changes in benefits (including loss of benefits) across the economic, environmental and social dimensions using a common set of accounting rules and assumptions about how these benefits might change in the future (SNA, 2025). Comprehensive wealth accounting is the method of accounting for the long run economic potentials of a country by incorporating into the traditional accounts the other make- up of the nation's entire stock of wealth such as natural capital, human capital and ecosystem capital with the aim of measuring wellbeing and sustainability (Harris & Roach, 2021). One fundamental concept emphasized by Ecological Economists was the natural capital. Most economic models of the production process focused on two factors of production namely capital and labour, but Ecological Economists have reintroduced and broadened the classical concept of "land" renaming it as natural capital amidst defining natural capital as the entire endowment of land and resources available to us, including air, water, fertile soil, forests, fisheries, mineral resources, and the ecological life support systems without which economic activity, and indeed life itself, would not be possible. (Harris & Roach, 2021).

For the purpose of this study, the use of comprehensive wealth and Inclusive wealth interchangeably became relevant in measuring sustainable development especially as it gives better measurement of prosperity than the GDP.

Empirical Review

Öztürk (2026) investigated key drivers of sustainable development in African economies using Adjusted Net Savings (ANS) as an indicator of long-term sustainability. Using a panel dataset covering ten countries such as Egypt, Morocco, Tunisia, South Africa, Kenya, Tanzania, Uganda, Ghana, Senegal, and Botswana, and applying relevant tests as Augmented Mean Group (AMG) estimator, System GMM, and the Dumitrescu–Hurlin panel causality test on Adjusted net saving as a percentage of gross national income excluding particulate emission as the dependent variable while the independent variables included C_{O2} intensity (carbon dioxide emissions per kilogram of oil equivalent energy use), GDP per capita (lnGDPpercapita), renewable energy consumption (RenEnergy), and trade openness (Tradeopen). The findings indicated that income level was the main determinant of sustainable development in African countries, but the effectiveness of the energy transition varied across nations. Although renewable energy investments held strong potential to enhance environmental sustainability in the long run, their current impact remained limited due to efficiency and financing constraints.

Halkos and Aslandis (2025) conducted a review study and explored how embracing socio-cultural pluralism could support more inclusive,more meaningful and accepted environmental decisions that encourage public perceptions. The study monitored 103 studies from Scopus and web of Science database from 2010 to 2025. Key literatures were surveyed and their chosen methods and context specific findings were noted and compared along two frameworks namely the conventional economic approach and emerging socio,-cultural framework with implications for policy making. The study concluded that spiritual capital was a valuable asset through which the ecosystem could be understood.

Kouzar *et al.* (2025) carried out a bibliographic study of inclusive wealth as a measure of sustainable development .The study aimed to identify the most influential publications on inclusive wealth using citation analysis; analyze the co-authorship analysis among authors, affiliations and countries in the domain of inclusive wealth; assesses the impactful historical contributions and current prevalent themes in inclusive wealth through co-citation analysis and to explore the forthcoming trends using co-word analysis in the fields of inclusive wealth. Employing data collected from the Web of Science (WoS) database and analysed using bibliometric software, VOSviewer 1.6.18, which was used to conduct quantitative analysis. This presented the network visualization of all the documents, sources, countries and organizations respectively, in citation co-authorship, co-citation and co-word analysis. The study covered publications from the inception of the key word inclusive wealth to December,2024. The key search field was Inclusive Wealth and the search keywords were “Inclusive

Wealth" or "Inclusive Capital" or "Comprehensive Wealth" or "Sustainable Wealth" or "Wealth Accounting" or "Natural Capital Accounting" or "Inclusive Growth" or "Inclusive Development" or "Sustainable Prosperity." The analysis of the most cited documents and the leading institutions highlighted how the field of inclusive wealth had evolved and indicated that early contributions focused heavily on linking inclusive development to broader social and environmental themes, setting a strong conceptual foundation for later research. The dominance of institutions from England, the Netherlands and the USA reflected the concentration of academic leadership in high-income countries which according to the Scholars, suggested that much of the discourse had been shaped by Global North perspectives. The findings demonstrated that inclusive wealth research had moved from early conceptual discussions to more applied, region-specific studies, marking an important maturation in the academic conversation.

Sugiawan, Kurniawa and Managi (2023) conducted a study aimed at providing empirical evidences linking the progress of the SDGs and changes in wellbeing as proxied with the Inclusive wealth. The study worked on panel data covering 147 countries for the period 2000 – 2019. Using the SDG Index which measures country's progress in achieving the optimum SDGs performance with a maximum value of 100 and applying same to data obtained from the Sustainable Development Report 2022, the researchers applied the machine learning model and observed that the changes in wealth were well predicted by the changes in the individual SDG scores. The IW index might be considered as one of the most reliable measures of sustainable development, as it offered a more comprehensive assessment of sustainability based on the accumulation of capital assets that mattered for wellbeing but not without flaws. Thus, the IW index complemented the shortcomings of the SDGs and safeguarded the inclusive development of the three main pillars, i.e., economy, society, and environment, which in turn led to the sustainability of economic development both in the short and long-run.

McLaughlin, Ducoing and Oxley (2023) attempted a compilation of historical sustainability trend using genuine saving (alternative name for adjusted net saving) for a significant number of countries and in the process observed that the destiny of natural resources rents and environmental degradation which showed that countries which had based their economic development on the exploitation of their natural wealth, have been incapable of maintaining a constant rate of savings, thus hampering their future wellbeing. Also, the study observed that the treatment of CO_2 and how it was priced had an enormous impact on the sustainability signal.

Oyeranti and Obijole (2023) investigated the relationship between sustainable development and natural capital depletion in Nigeria. The study used time series data from 1990 to 2020 on adjusted net saving, including particulate emission damage as a

percentage of Gross National income. While adjusted national income was used as a proxy for sustainable development, natural capital depletion proxied by total natural resources rents as a percentage of GDP seeved as the explanatory variable for capturing Natural capital (NC). The gross national income per capita (GNI) and the inflation rate (INF) were considered as control variables. The Autoregressive Distributed Lag (ARDL) model and the Bounds test approach to co-integration were adopted in the study. The estimated ARDL model revealed a positive relationship between natural capital depletion and sustainable development in Nigeria. However, it is important to note that the coefficient of this relationship was not statistically significant. This suggests that while there may be some association between the depletion of natural resources and improvements in adjusted net savings, this relationship lacked statistical robustness. Thus, the study finds a long-run relationship among the variables.

Ud Din, Khan, Khan and Nilofar (2022) examined the association between Sustainable Development, Adjusted Net Savings, Financial Development, Economic Growth and resources rent in three South Asian emerging economies of Bangladesh, India and Pakistan for the period 1990 to 2020. They adopted the panel ordinary least squares technique and panel generalized method of moment and observed a positive significant effect of sustainable development goal index, financial development and economic growth on the adjusted net saving, while the inflation rate and natural resource rent had negative and significant effect on sustainable development goals.

DiMaria, Peroni and Sarracino (2022) carried out a study on the feasibility of using subjective wellbeing and adjusted net savings to contribute to the computation of a productivity like indicator. The study used Data Envelopment Analysis to evaluate data from 23 European countries from 2005 to 2018. Productivity was taken as a measure of how efficiently inputs were used in the production process as well as technological developments. Result indicated that including subjective wellbeing among the inputs and the outputs of production meaningfully contributed to the measurement of total factor productivity.

Sarracino and O'Connor (2022) conducted a research on the measure of wellbeing efficiency that assesses countries' ability to transform inputs into subjective wellbeing (Cantril ladder). The study used six inputs namely real GDP per capita, healthy life expectancy, social support, freedom of choice, absence of corruption, and generosity as identified in the World Happiness Reports, and applied Data Envelopment Analysis to a sample of 126 countries. Efficiency scores revealed that high ranking subjective wellbeing countries such as the Nordics, were not strictly the most efficient ones. Also, the scores were uncorrelated with economic efficiency. This suggested that the implicit assumption that economic efficiency promotes wellbeing was not supported. Subjective wellbeing efficiency can be improved by changing the amount (scale) or composition

of inputs and their use (technical efficiency).

In similar vein, Fink and Ducoing (2021) executed research on long term Genuine Saving estimation of Norway for the period 1865 to 2018 which unlike some previous estimations allowed for negative natural resource rents and included genuine savings augmented by technological change overtime. It concluded that Norway experienced unsustainable development prior to the second World War period which was driven by substantial natural resources depletion, but since 1946 the genuine savings remained positive as a result of high level of net national savings and increase in human capital investments.

Batrancea *et al*. (2020) investigated the contribution of adjusted net savings to sustainable economic growth for 10 Central and Eastern European and Baltic nations that were former Soviet bloc nations known as transition economies, using panel data analysis for the period 2005–2016. GDP served as the dependent variable while the independent variables were gross national income (GNI), adjusted net savings carbon dioxide damage (ASCDD),adjusted savings energy depletion, (ASED),adjusted saving gross savings(ASGS) adjusted saving mineral depletion (ASMD), and adjusted savings net forest depletion(ASNFD) . Data were retrieved from the world development indicators of the World bank and subjected to pooled ordinary least square test, fixed effect and random effect, Hausman and fully modified least square tests. The results indicated that adjusted net savings impacted on the GDP across the 10 countries analyzed. The study therefore called on national authorities to implement policy changes in these countries to achieve sustainable economic growth and make an efficient transition from a brown economy towards a green economy.

Mota and Cunha-e-sa (2019) investigated the relationship between comprehensive measures of savings and changes in future consumption in OECD countries. This relationship is at the basis of the interpretation of adjusted net savings as a weak sustainability indicator, and so, evidence of its validity provides support to the use of this indicator. The study constructed various measures of comprehensive savings for 20 OECD countries to include depletion from non-renewable resources, human capital investment and technological progress, focused mainly on the role of technical progress and human capital, in the form of changes in education level. The results showed no strong evidence in favour of green adjustments in the conventional net savings, but there was compelling evidence for the inclusion of technological progress. The result suggested that to construct an indicator of weak sustainability from conventional net savings, some estimate of future technological progress is needed.

Rudenko-Sudarieva and Shevchenko (2019) studied the fundamental issues concerning the Adjusted Net Savings with a view to identifying the impacts of the factors on ANS as a major indicator of welfare and wealth in modern turbulent environment and

to look for new measures of economic development in any country. It was found that each country had its own features and conditions for the formation of savings, which were selected with consideration of the impact on GDP and on adjusted net savings.

Koirala and Praham (2019) carried out a study to examine the factors that determine sustainable development measured by adjusted net savings. Using panel data for 12 Asian countries for the period 1990-2014 and subjecting the data to estimation using both the random effect and fixed effect approaches, the Hausaman test points to the fact that the random effect showed superiority over the fixed effect model as it showed a more significant overall fit. The result from the model indicated a positive and significant effect of per capita income and financial development on sustainable development and a negative and significant effect of the inflation rate, natural resource rent and time on the sustainable development. The result suggested that maintaining a proper natural resource balance is necessary for sustainable development.

Qasim and Grimes (2018) analysed the relationship between subjective wellbeing (SWB) and the World Bank's measure of a country's economic sustainability, adjusted net savings (ANS). The study modelled SWB at individual level and at aggregated group level as a function of past ANS levels, after controlling for a country's initial levels of SWB. The empirical models utilised World Values Surveys (WVS) data for self-reported life-satisfaction (the proxy for SWB). Results showed that ANS was negatively associated with future SWB outcomes over relatively short timespans (10-15 years) but this relationship was neutralised, or even reversed, for a longer time span (20 years). According to the researchers the results demonstrated an important challenge in political economy. Governments that choose to save less in the short term may be able to spend more on the wellbeing of the current generation (i.e. current voters) but they diminish the reserves available to improve future generations' wellbeing. At a more technical level, the results reinforced the concept that ANS is a useful sustainability indicator for infinite (or at least very long) time horizons, but it is not good in the short run.

Qasim, Oxley and McLaughin (2018) tried to extend the World Bank's (WB) measure of Genuine Savings (GS) for New Zealand by using a longer time-series of data, 1950 – 2015; so as to improve GS estimates for New Zealand by adding additional dimensions to GS i.e. forestry; with a view to investigating the relationship between several GS measures and the discounted values of GDP per capita and consumption per capita, used to proxy wellbeing; test a series of hypotheses which relate GS to the change in future well-being using the framework proposed by Ferreira. The paper made a contribution to the literature on GS, particularly in the context of New Zealand, by considering patterns of GS and wellbeing over a longer time span of data than had been previously used and added to a relatively small, but growing literature on tests of GS

using long- or relatively long- time series data. It concluded, based on the data used here, that New Zealand's GS had been positive (i.e. weakly sustainable), since the start of the data series, even without allowing for the contribution of technological advancement. However, it also concluded that the effects of a growing population and a savings-gap, had led to a 'wealth dilution' effect needed to maintain real wealth per capita, as they estimated that there was an average savings gap (GS as a percentage of Gross National Savings) over the period 1955 - 2015 of 0.5% per annum.

Methodology

The *ex-post facto* research design was adopted. This is so because it recognizes the use of available public data of past events that are accessible and as a result, cannot be altered by the Researcher. Bearing the intent of this study in mind, the Researcher strived to understand the extent to which the predictive variable (Adjusted Net Savings)) explained the quality of variations the dependent variable (sustainable development as proxied with the Inclusive Wealth Index) has witnessed in the pre and post SDGs adoption periods.

Data were obtained from relevant reports and statistical bulletins of the World Bank, the Central Bank of Nigeria, the National Bureau of Statistics, and the United National Environmental Programme for various years by means of the "identify and extract" approach. Assuch, data for Adjusted Net Savings and Inclusive Wealth were extracted from the United Nations Environmental Programme (UNU-IHDP) report for various years. However, the study covered a period of twenty (20) years comprising 2005 – 2014 for the pre SDGs adoption era and 2015 – 2024 for the during the SDGs adoption era.

Inclusive wealth = HC + PC+ NC……Eqn 2

where:

HC = human capital.

PC = produced capital.

NC = Natural capital

Inclusive wealth index = Inclusive Wealth +exogenous adjustments (Carbon damages including blue carbon accounting, Oil capital gains, Total factor productivity (UNEP, 2023). A positive change in inclusive wealth indicates a positive change in human well-being. A country's inclusive wealth is the social value (not dollar price) of all its capital assets, including natural capital, human capital and produced capital. A positive change in inclusive wealth signifies positive well-being across generations (UN, 2022).

Countries' inclusive wealth and inclusive wealth index data are available on UNU-IHDP website.

This study was adapted to the pattern in the model estimated by Alinska et al. (2018) represented as GDP = $\alpha_0+\beta_1 GGR_t+\beta_2 TGGE_t+\beta_3 GGGD_t+\beta_4 GFCF_t+\beta_5$ $GDERD_t$ $+\beta_6 GGST_t+\beta_7$ $FCEH_t+ \xi_t$……Eqn 3.

As a result, the model was restated to suit the intent of this study for the pre and post SDGs adoption era. For the pre SDGs adoption period, the study applied the following model as estimated:

IWIi= f (ANS) which can now be translated into the following econometric equations:

$IWI_{it}=\alpha_0+\beta_1 ANS_{it} +\mu_{it}$ ……Eqn 4

However, the model for during the SDGs adoption period was estimated as:

$IWI_t= \alpha_0+ \beta_1 ANS_{it}+ \mu_{it}$ …….Eqn 5

Where:

IWI = Inclusive Wealth index (proxy to the dependent variable).

ANS = Adjusted Net Savings (the independent variable).

SD== Sustainable Development (dependent variable).

$\beta_0 - \beta_6$ = regression Coefficient.

μ = Error Term.

t = Time (post adoption period).

it = Time (pre adoption period).

Data extracts were subjected to descriptive tests to measure central tendencies such as mean, mode, median, kurtosis as well as measures of variability, and then inferential tests to make decisions and conclusion using the econometric view version 12.

Analyses And Result Discusiions

Descriptive Statistics

Table 1: Descriptive statistics of LAIW, LANS.

	LAIW	LANS
Mean	11.3703	7.43558
Median	11.4886	7.04723
Maximum	13.3405	9.85136
Minimum	9.07008	6.41215
Std. Dev.	1.39355	0.87509
Skewness	-0.3518	1.22482
Kurtosis	1.55294	3.52251
Jarque-Bera	4.20738	10.1948
Probability	0.12201	0.00611
Sum	443.44	289.988
Sum Sq. Dev.	73.7955	29.0996
Observations	39	39

Source: E-views 12 output.

Table 1 showed that LAIW was negatively skewed while LANS was positively skewed. The kurtosis compares distribution of the variables with that of Gaussian distribution. A kurtosis value of 3.52251 implied that adjusted net savings was at peak relative to a normal distribution and can be described as leptokurtic. According to E-views 10.2 manual 'the kurtosis of the normal distribution is 3'. "If the kurtosis exceeds 3, the distribution is peaked (leptokurtic) relative to the normal, but if the kurtosis is less than 3, then the distribution is flat (Platykurtic) relative to the normal". Hence, a kurtosis of 1.55294 implies that inclusive wealth individual kurtosis is less than 3 which means that the distribution is flat (platykurtic) relative to normal.

Regression Estimates

OLS Pooled Result of LAIW, LANS

Table 2: OLS Test Results (pooled samples)

Variables	Coefficient	Std. Error	T-statistic	Probability
LANS	-0.352870	0.250247	-1.410090	0.1679
C	20.94304	2.262664	9.255923	0.0000

R^2 0.798226, Adjusted R^2 0.767654, F-statistic 26.10988, Prob.(F-statistic) 0.000000, DW 0.964060 (see appendix).

The estimated OLS model shown in Table 2 revealed that the logged values of adjusted net savings had insignificant negative coefficient.

Chow test

Table 3: Chow Breakpoint Test Result

Chow Breakpoint Test: 2015S1
Null Hypothesis: No breaks at specified breakpoints
Varying regressors: All equation variables
Equation Sample: 2005S1 2024S1

F-statistic	4.031984	Prob. F(6,27)	0.0052
Log likelihood ratio	24.95004	Prob. Chi-Square(6)	0.0003
Wald Statistic	24.19190	Prob. Chi-Square(6)	0.0005

The Chow Test result in Table 3 showed that there is a structural breakdown on the model because the F-statistic revealed a significant probability value. Hence, the rejects the null hypotheses of no breaks at specified breakpoints, thus spliting the sample at breakpoint which is 2015 and estimated the model separately for the pre and post break point.

Estimation of the OLS Model for the Pre period of 2005 - 2014

Table 4: Ordinary Least Square result for Pre breakpoint era

Variables	Coefficient	Std. Error	T-statistic	Probability
LANS	0.576273	0.561876	1.025621	0.3225
C	18.63595	8.405380	2.217145	0.0437

R^2 0.493481, Adjusted R^2 0.312581, F-statistic 2.727923, Prob.(F-statistic) 0.063512, DW 1.062476

The estimated OLS model shown in table 4 revealed that the logged values of adjusted net savings had insignificant positive coefficients.

Estimation of the OLS Model for the Post period of 2015 - 2024

Table 5: Ordinary Least Square result for Post breakpoint era

Variables	Coefficient	Std. Error	T-statistic	Probability
LANS	-0.101577	0.060725	-1.672729	0.1183
C	7.357339	0.971790	7.570915	0.0000

R^2 0.955369, Adjusted R^2 0.938203, F-statistic 55.65485, Prob. (F-statistic) 0.000000, DW 0.862776. (see appendix).

The estimated OLS model shown in table 5 revealed that the logged values adjusted net savings had insignificant negative coefficients

Test of Hypothesis

H_o: The Adjusted Net Savings has not made any significant contribution to sustainable development in Nigeria in the pre and post Sustainable Development era.

H_i: The Adjusted Net Savings has made significant contribution to sustainable development in Nigeria in the pre and post Sustainable Development era.

Table 2, showing the result of the estimated OLS model test result for pooled samples, indicated that the logged values of adjusted net savings (LANS) had statistically insignificant and negative effect on sustainable development in Nigeria (p-value 0.1679 > 0.05; coefficient -0.352870). However, the need to statistically confirm whether to rely on the OLS test result of the pooled samples (comprising the pre and post SDG adoption era) as in Table 2 or to perform a separate linear OLS regression test for each

of the SDG adoption era, led the study to conduct the Chow Test.

Looking at Chow test result in Table 3, a structural break on the model was observed because the p-value of the F-statistic (0.0052) was less than 0.05, thus revealing a significant probability value. Hence, the study rejects the null hypotheses of "no breaks at specified breakpoints" which implied that the pooled sample OLS test result should not be used. Therefore, the study proceeded to split the sample at breakpoint at year 2015 and estimated the model separately for the pre and post break point to align with the actual intent of the study.

The separate OLS regression results of the pre and post SDG break points on Tables 4 and 5 respectively revealed that adjusted net savings (LANS) had insignificant effect on sustainable development in Nigeria (p-values 0.3225 and 0.1183 respectively) in the pre and post SDG adoption era, though the extent of such insignificance differed. While the insignificance of the effect of adjusted net savings (LANS) was positive in the pre SDG adoption era (coefficient 0.576273), the situation in the post SDG adoption era was negative and weak (coefficient -0.101577).

Decision: Accept the null hypothesis if the p-value is greater than 0.05, otherwise reject and accept the alternate hypothesis. Since the p-values obtained in both eras are greater 0.05 (0.3225 and 0.1183 respectively), the null hypothesis is accepted and this means that the Adjusted Net Savings insignificantly contributed to sustainable development in Nigeria in the pre and post the SDG adoption era, though the extent of such contribution was positive and negative in both eras respectively (coefficient 0.576273 and -0.101577; pvalues 0.3225 and 0.1183 respectively).

The former result may apply where the government allocates fund appropriately and avoided high environmental depletion in relation to revenue drive. The latter negative consequence may not be far from the attitude of the government to misappropriation and misapplication of scarce national funds to line items of expenditures. While no regime had been deemed to be corruption free in Nigeria, the spate of corruption and reckless spending in the post SDG adoption era (2015 – 2024) appear to be disturbing. For instance, while in year 2013, the Goodluck Jonathan led administration approved the sum of N13 billion Naira for the RUGA programme, the successor who took over office in year 2015 approved another N50 billion Naira for the same programme. On another note in year 2016, the home grown school feeding programme commenced in Nigeria and was without controversy until Nigerians woke up to read in the fourth quarter of year 2020 that the federal government spent a whooping ₦523.3 million to feed school children while the entire nation was on COVID-19 pandemic nationwide lockdown. It is pertinent to note that the federal government may make intentional efforts to increase net domestic saving but at the expense of other components of

Adjusted Net Savings such as education expenditure, energy depletion, forest depletion, mineral depletion, carbon dioxide damage and particulate matter damage. And these negligence, no doubt, will certainly work against environmental sustainability, thereby making negative contribution to sustainable development.

Conclusion and Recommendation

The Nigerian government has taken bold steps to stabilize the economy, and these efforts are beginning to yield results, but macroeconomic stability as represented by the gross domestic product (GDP) alone is not enough. The true measure of success will be how these reforms improve the daily lives of Nigerians, especially the poor and vulnerable.

Based on the findings made, the study recommended that:

1. measurement of government performance in terms of sustainable development should deemphasize the GDP metric and adopt such measures as inclusive wealth, comprehensive wealth and adjusted net saving which are more embracing than the GDP.

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