RESEARCH ARTICLE

The Threshold level of Institutional Quality in the Nexus between Financial Development and Environmental Sustainability in Nigeria

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Abstract

Empirics on the relationship between financial development and environmental sustainability remain ambiguous in the literature. The threshold level at which institutional quality facilitates the relationship between financial development and environmental sustainability in respect to the Nigerian economy is still an open question. This study investigates the threshold level of institutional quality in the link between financial development and environmental sustainability in Nigeria from 1986 to 2020. Times series threshold autoregression technique was applied to determine the threshold level of institutional quality. The result of the threshold revealed that 4.32 is the threshold level of institutional quality in Nigeria. Below the threshold level financial development is not stimulated to improve environmental sustainability but above the threshold level institutional quality stimulates financial development to improve environmental sustainability. This study suggests that institutional credibility and transparency should be enhanced beyond the threshold level to effect the needed change in increasing environmental preservation in Nigeria.

Keywords: Environmental sustainability; financial development; institutional quality; Nigeria

Introduction

Environmental sustainability is a global agenda that every country strives to attain to promote prosperity, human welfare, environmental sustenance, generational wealth and enhancement of human survival. Environmental sustainability deals with the ability to maintain the reproductive capacity of the ecosystem to meet the economic needs of future generations and sustain a safe environment for all. However, some developing nations have focused on economic growth while ignoring its environmental implications (Dada *et al*., 2022). For instance, the growth of industrial activities, use of automobiles, energy consumption and inappropriate waste management system contributes to the increase of greenhouse gasses and environmental degradation in Nigeria (Effiom & Uche, 2021). The World bank reports that Gas flaring in Nigeria caused numerous health and respiratory issues for individuals in the Niger-delta region of Nigeria (Ifere & Abim, 2019). The Nigerian economy is plagued by inconceivable environmental hazards and pollutants, which degradates the environment (Ojong, 2018). These pollutants are caused by Gas flares, flooding and dumping of wastes into rivers and seas (Ogar *et al*., 2018). Also, toxic wastes, industrial wastes, and plastics dumped into water bodies in Nigeria frequently decompose into micro-plastics and other chemical substances that endanger human lives (Ifere & Abim, 2019).

This occur as a result of negative environmental activities by Nigerians that causes climate vulnerabilities and increase in carbon emissions (Ojong, 2018). In mitigating climate irregularities and reducing carbon emissions, the financial sector plays a crucial role of mobilizing the capital required for investments in climate adaptation which increases resistance to climate change. It also provides the capital needed for climate mitigation which lowers greenhouse gas emissions especially in response to price signals like carbon taxes (Grippa, Schmittmann & Suntheim, 2019). To partially offset the cost of natural disasters and negative externalities, financial markets also offer financial protection through insurance and other risk-sharing tools like catastrophe bonds, climate bonds and green bonds. These bonds help to raise capital for climate, environmental and natural resource projects.

A well-regulated financial sector assists the economy to foster environmental sustainability by using green methods and green technologies in its daily activities to abate environmental damage (Hunjra *et al.*, 2020). More so, financial development can facilitate eco-investment and natural resource optimization that improves environmental sustainability (Baloch et al., 2021). The financial sector is charged with the responsibility of aiding the economy in the management of natural resources by funding projects that are channeled towards sustainable forestry (Khan *et al*., 2019). On the other hand, a poorly-regulated financial sector may boost environmental pollution. Financial development can spur economic growth and economic growth comes with environmental consequences (Acheampong, 2019). This is due to the fact that environmental resources are used as inputs for the production of goods and services leading to increased exploitation of natural resources (Khan *et al*., 2022). Financial institutions also provide financial support to the transportation and energy industries, which are responsible for a rise in carbon emissions (Dada *et al*., 2022). The transportation sector works with vehicles like cars, trucks, ships, trains, and airplanes. The use of these automobiles and planes emit carbon dioxide, which results from the combustion of environmentally hazardous fossil fuels (Dada *et al*., 2022). Nevertheless, the effect of financial development on the environment depends on the institutional distinguishing characteristics of an economy. According to Liu et al (2020), developing countries are faced with environmental challenges because of its poor quality of institutions. Weak institutions may not enforce environmental standards and monitor the activities of the financial sector when it is plagued with corruption and disrespect for the rule of law (Law & Ibrahim, 2016). The financial sector in Nigeria is not exempted from this weakness as Kanu et al (2020) noticed that the green bond markets in Nigeria is poorly successful in meeting up with the objectives of the environmental, social and governance policies of the Nigerian economy. Thus, the Nigerian financial system still functions under institutional policies that lack an orchestrated and well-defined coherent structure which has crippled its sustainability impact on the environment (Fagbemi & Ajibike, 2018).

The performance of Nigeria on environmental sustainability and financial development proxied by adjusted net savings and financial development index, is presented in Figure 1 and 2, respectively. Figure 1, show a declining trend of adjusted net savings from 1986 to 2020 depicting that Nigeria is not on the path of sustainability. The Nigerian economy is yet to improve its level of sustained growth to account for improvement in its environmental quality, resource maximization, savings behaviour and reduction in its consumption lifestyle. Also, Figure 2, which shows the trend of financial development in Nigeria, depicts that there are structural deficiencies in the financial sector as the performance of the broad-based financial system in Nigeria was below 30% for 35 years (1986 to 2020). Extant studies revealed that institutional quality is a critical factor that greatly influences the relationship between financial development and environmental sustainability (Gyamfi et al., 2020; Hunjra et al., 2021; 2020; Khan, welli & Khan, 2022). Nonetheless, weak institutions may not advance the quest to achieve a sustainable environment. In 2019, Nigeria was ranked the 2nd most corrupt country in West Africa and the 31st most corrupt country in the world (Corruption perception index, 2022). Corruption hinders the effectiveness of institutional quality in achieving environmental development (Khan et al., 2022). Nigeria's inadequate and ineffective policy implementation in terms of promoting development and enhancing environmental sustainability has been mostly

attributed to government instability (Okolo, 2020). Consequently, institutional weakness may allow the ecosystem to deteriorate since it lacks the competence to enforce environmental rules and regulations (Zakaria & Bibi, 2019). This means institutions need to improve its quality to a certain level of effectiveness to effect necessary changes in the financial system and in the environment as a whole. Then the question becomes, 'at what level of institutional quality, would the financial sector be empowered and controlled to facilitate environmental sustainability? This question is yet to be addressed in the literature with particular reference to Nigeria. Thus, this study advances the existing body of knowledge on financial development and environmental sustainability in a number of ways. First, this study employs a more robust measure of financial development which accounts for the access, depth and efficiency of both financial markets and financial institutions in the economy. Previous studies have applied private credit to GDP and stock capitalization to GDP as measures of financial development (Wackernagel & Galli, 2007; Li et al., 2022) which only captures the depth of financial development neglecting other aspects of the economy. Second, the effect of institutional quality on financial development and environmental sustainability is evaluated by determining the threshold level of institutional quality in the link between financial development and environmental sustainability in Nigeria. This incentive is drawn from the assumption that sound institutions are indispensable in boosting and enhancing the financial sector in the pursuit of environmental sustainability. Third, in contrast to cross-country analysis on financial development and environmental sustainability that is ambiguous in the literature, this study focusses on country-specific analysis. This is because extant studies neglected the fact that institutional framework, financial development and economic behaviour differ between countries.
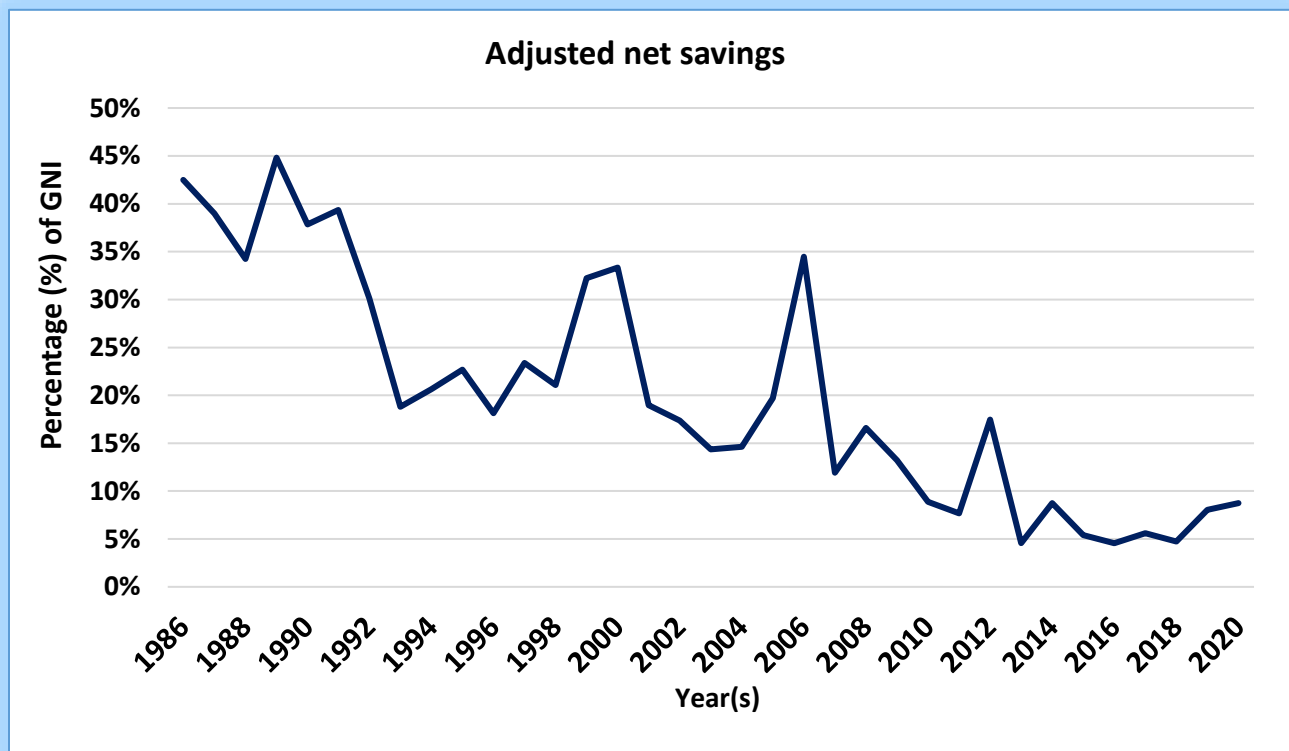

Figure 1: Adjusted net savings for Nigeria (1986-2020)
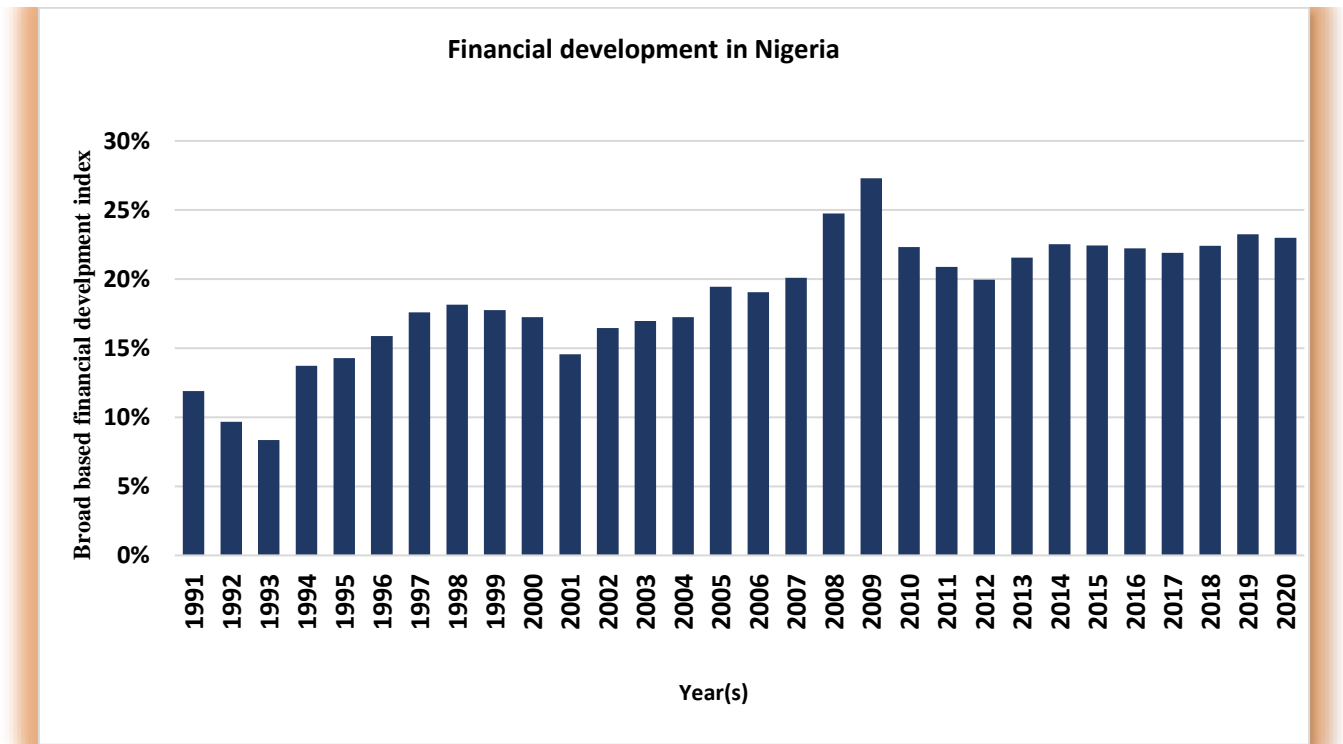**Source:** World Development Indicators (2022)

Financial development in Nigeria

Figure 2. Financial development in Nigeria (1986-2020).
Source: International Monetary Fund (2022)

Literature review

Theoretical underpinning

The foremost theoretical construct of sustainability is based on the theory of weak sustainability, propounded by Hartwick (1977) and Solow (1974). Hartwick (1977) and Solow (1974) proposed the savings-investment rule with the central assumption that natural capital and manufactured capital are perfectly substitutable. Hartwick (1977) evaluated the challenges of weak sustainability by defining the investment-savings rule, known as the "Hartwick's rule". Hartwick's rule for sustainability deals with reinvesting the rents actualized from the depletion in natural resources. Solow (1974) assumed that the maximal allocation and reinvestment of resources, can be used to compensate for the natural resources that were lost, so that stock of total capital will not be depreciated over time. One benefit of weak sustainability is that it promotes scientific and technological advancements, as natural and manufactured capital can be substituted easily to meet the demands of the economy and the environment. In practice, sustainability is typically assessed by utilizing the natural environment sustainably. Empirics on financial development and environmental sustainability in the literature, have found the significant effect of this theory on Malaysia, Asia and sub-Saharan African countries (Pardi et al., 2015; Koirala & Pradhan, 2019; Ojeyinka & Osinubi, 2022).

The relationship between financial development, institutional quality, and environmental sustainability was explained by previous studies using the environmental Kuznets hypothesis (Effiom & Uche, 2021; Gyamfi et al., 2020; Zakaria & Bibi, 2019). The environmental Kuznets hypothesis is flawed due to its inability to account for

the impact of institutional and structural factors that may have an impact on the environment (Dada et al., 2021). This is due to the fact that GDP, a crude indicator of development, is used by the Environment Kuznets Curve theory which is limited to explaining the relationship between economic growth and the environment. On the other hand, the weak sustainability theory explains the relationship between development and sustainability. Currently, the global society prioritizes sustainability over economic growth.

Financial development and environmental sustainability

There is a contention in the literature on the relationship between financial development and environmental sustainability. While some empirical result revealed that financial development positively influences the environment by improving access to advanced technologies (Shabaz, Hye, Tawari & Leito, 2013; Tamazian and Rao, 2010; Kumbaroglu, 2008; Tadesse, 2005), others argue that financial development increases environmental pollution (Omri *et al.*, 2015; Ozturk & Acaravci, 2013). For example, Shen *et al* (2021) noticed that financial development increases the emission of carbon while green technology helps to minimize environmental degradation. Another study also showed that financial development is detrimental to environmental sustainability as Roub *et al*. (2021) discovered that financial development boost environmental damage in Turkey for 56 years. The authors affirmed that financial development leads to an increase in fossil fuel consumption and agriculture really helps the environment when advanced agricultural equipment are used. Likewise, Adebayo *et al*. (2021) discovered that for 28 years, renewable energy increased the quality of the environment while economic growth increased environmental damage in Brazil.

The environment plays a key role in the survival of man as human activities takes place in the environment. The environment is so crucial to sustaining human life that every economy aims to preserve its resources. However, the high rate of natural resource deterioration has called for serious concern amongst economies in the world which has led to some empirical studies on environmental sustainability. In affirmation, Khan *et al.* (2022) revealed that control of corruption and government effectiveness increased carbon emission while regulatory quality and rule of law increases environmental quality in Iran. In the same vein, Hunjra *et al.* (2020) affirmed that financial development and foreign direct investment degradated the environment in Nepal, India, Bangladesh, Sri Lanka and Pakistan for 38 years. Developed and developing economies that aim at improving environmental sustainability, strives to tackle the issue of carbon emission. This is because a high carbon environment is harmful to both humans and the ecosystem. Jianguo *et al.* (2022) confirmed that technological innovations and institutional quality improves environmental quality. In addition, Kousar *et al.* (2020) noticed that financial development, trade openness and institutional quality reduced environmental degradation in Pakistan for 22 years.

Most of these studies are faulted on certain aspects. The theoretical approach of these studies was centred on the environmental kurtnet curve. The major weakness of this theory is that it is based on the assumption that all pollution will behave the same way both in lower and higher-income economies. In reality, economic and institutional peculiarity exist which can make some countries control and reduce environmental pollution more than others. The framework of the environmental Kutznet hypothesis lacks the ability to accommodate institutional and macroeconomic variables. More so, the environmental kutznet hypothesis lacks model adequacy as it is seen to be more of an empirical idea than a theoretical one (Stern, 2004).

Institutional Quality and Environmental Sustainability

The increasing activities and consumption pattern connected to economic growth and growing populations in the world has engendered environmental threats. This has drawn the attention of governmental institutions and scholars

around the world to look into possible solutions to these problems. However, there are mixed reactions on the nexus between institutional quality and environmental sustainability in the literature. Some empirical studies confirmed that institutional quality degrades the ecosystem (Hassan *et al*., 2020; Yamineva & Liu, 2019), while other results revealed that certain indices of institutional quality such as bureaucratic quality, quality of regulation and control of corruption improves environmental quality (Adams & Klobodu, 2017; Ulucak et al., 2020; Rizk & Slimane, 2018).

Ecological footprint was also employed by (Khan *et al.,* 2021) to capture the level of environmental sustainability in BRIC countries in order to examine that role of that financial development and institutional quality play in facilitating environmental quality. The authors applied the two step GMM and fixed and random effect on a 34-year period to conclude that some institutional factors enhance the environment while other factors impede environmental development. The reasons for the conflicting results in these studies could be as a result of differing institutional structures among countries.

Financial Development, Institutional Quality and Environmental Sustainability

Developed and developing economies that aim at improving environmental sustainability, strives to tackle the issue of carbon emission. This is because a high carbon environment is harmful to both humans and the ecosystem. In light of this, Jianguo *et al.* (2022) studied the effect of financial development, technological innovation, institutional quality, on environmental quality in 37 OECD countries for 30 years using the 2 step GMM approach. The authors affirmed that technological innovations and institution quality improves environmental quality. In addition, Kousar *et al.* (2020) evaluated the effect of financial development and institutional quality on environmental sustainability Pakistan for 22 years using the NARDL approach. The authors confirmed that financial development, trade openness and institutional quality reduces environmental degradation in Pakistan

These studies used carbon emission as a metric of environmental sustainability. Carbon emission only captures the carbon level of an economy neglecting the areas of energy, net forest and mineral resource depletion. Hence, these studies are faulted on the grounds of using a proxy that does not capture other basic aspects of the environment that can give a robust view of environmental sustainability.

Methodology

Theoretical framework

Environmental sustainability deals with making decisions to optimize the use of natural resources to maximize social welfare and improve environmental preservation. In the light of this, this study employs the weak sustainability theory propounded by Hartwick (1977) and Solow (1974) which is an extension of the Solow neoclassical growth model. Weak sustainability theory is centred on the assumption that manufactured capital and natural capital can be perfectly substituted. In order words, the assumptions of weak sustainability are expounded on the interchangeability between the market economy (manufactured capital) and the environment (natural capital). This theory requires that the economy maintains a sustained level of consumption pattern across generations based on the optimal use of natural resources. The underlying assumption of this theory is premised on the production function in which the level of a nation's output is determined by the level of its factor inputs. The fundamental notion of the production function is centred on physical capital (K) and labour (L) as the important factors of production but the neoclassicists (Solow, 1956; Stieglitz, 1969; Dagupsta & Heal, 1978; Solow, 1974) introduced

a variable (R), which represents natural capital. Romer (1990) extends the Solow model to include human capital. The production function is denoted as;

$$Y = F\ (\ K,\ H,\ R,\ T)\qquad\qquad(1)$$

Where Y is the annual real output (GDP), which is a dependent function of factor inputs such as manufactured capital (K), labour (L), land (T) and natural capital (R). Specifically, R is energy resources, mineral resources and net forest resources such as crude oil, coal bauxite, phosphate, copper, Gold, Zinc, diamond, trees, plants and timber. It is assumed that no production in any sector of the economy is possible without land and natural resources (Solow,1974). Hartwick (1977) and Solow (1974) introduced the assumption of "unbounded resource productivity" which states that national output is not totally constrained by the flow in resources. Solow (1956) proposed that in preserving natural resources, policies must be enacted to advance both human species and the ecosystem. Solow (1956) opined that for resources to be sustained overtime, each generation must consume less resources to reserve more resources for future generations to meet their own needs. As a result, Solow (1956) justify the application of the Cobb-Douglas production function which is expressed as;

$$Y_t = (K_T)^\alpha (R_t\ )^\beta (T_t)^\gamma (H_t)^{1-\alpha-b-\gamma}\qquad\qquad(2)$$

$$\alpha>0,\qquad \beta>0,\qquad \gamma >0\ ,\qquad \alpha+b+\gamma=1$$

α, β, γ are the respective output elasticities of capital, natural capital and land respectively which is characterized by a constant and unitary elasticity of substitution. All exponents are assumed to be positive ($\alpha>0$, $\beta>0$, $\gamma >0$). Subscript t denotes time period. Solow (1956) advocates that the substitution between manufactured capital and natural resources is possible when the output elasticity of manufactured capital is greater than the output elasticity of natural resources ($\alpha > b$), this way a constant level of consumption can be sustained. Similarly, Stieglitz (1969), incorporates total factor productivity (A) into the Cobb-Douglas product function. Thus, equation 3.3 is modified and augmented with total factor productivity and presented as

$$Y_t = A(K_T)^\alpha (R_t\ )^\beta (T_t)^\gamma (H_t)^{1-\alpha-b-\gamma}\qquad\qquad(3)$$

Total factor productivity play an immense role in the production output of an economy. The type of equipment used in production can affect the quality of an environmental. Hence, Solow (1974) suggests that technological development is needed for environmental quality to be sustained. Thus, the exogenous growth rate of total factor productivity (A) is defined as;

$$g_{A=\frac{A(t)}{A(t)}}= AOe^{gt+fo}\qquad\qquad(4)$$

Total factor productivity grows at an exogenous rate of g which carries a vector of F and O. F and O are added to depict the impact of the financial sector and institutional quality on technological progress as technological advancement improves the efficiency of investment, innovating capacities and natural resource optimization in the economy that enhances environmental sustainability. Stieglitz (1974) argues that technological progress is instrumental in compensating for the depletion in natural resources as technological progress can aid in the reduction of environmental pollution. Natural resources are found on a fixed portion of land (T) supply which denotes that in the long-run, the use of land cannot increase or decrease in supply. Hence the growth rate of land remains unchanged. This is illustrated in equation 3.5

$$g_T = \frac{\dot{T}_t}{T_t} = 0 \tag{5}$$

Land is frequently inhabited by man and used for a variety of purposes. Even with the increase in migration and the rise of cities, excessive land use has no impact on its size. But, when humans use natural resources on land excessively, it become depleted. Natural resources deplete overtime due to the activities of humans as resources are being used up and exploited beyond their regenerative capacity. The rapid depletion of natural resources is mostly accelerated by the expanding global population. According to Romer (1990), pollution caused by production activities and other environmental issues can be a major impediment to sustainability. In the case of exhaustible resources, annual depletion rate of natural capital such as energy resources and mineral resources is assumed to be negative because when these resources are used up, they cannot be gotten back as excess extraction of these resources reduces its availability for future generations. Annual rate of natural capital depletion can be positive if net forest resources such as trees can regrow and can be improved by effective fertilization. Hence the dynamics of natural capital as developed by D' Alessandro (2007) is denoted as

$$g_R = mR\left(\frac{R}{CT} - 1\right)\left(I - \frac{R}{CC}\right) - F + W^V \tag{6}$$

Equation (6) illustrates the growth rate of the stock of natural resources, where m stands for the rate of resource regeneration, CC for the carrying capacity of the environment, CT for the extraction threshold, W for the investment in restoring degraded resources, and F for the quantity of resources that can be utilized for economic activity. The long-term feasibility of achieving equilibrium with the stock of natural resources is demonstrated by the dynamics of natural capital (Kornafel & Telega, 2020). The topic of environmental sustainability is covered in this aspect. The Hartwick and Solow model of weak sustainability, however, stipulates that the rents gotten from the sale of natural resources should be invested in enhancing manufactured capital (K) and human capital (H). In other to accumulate capital, households, firms and government saves (S) a constant fraction of their income (Y) in a closed economy (C+I+G). This gross savings (Sy_t) comprises of both private and public domestic saving. Hence, the dynamics of manufactured capital is expressed as

$$g_k = \frac{dk}{dt} = S_k Y_t - \delta k_t \tag{7}$$

From equation (7), g_k denotes the growth rate of manufactured capital were S_k denotes the fraction of income invested in manufactured capital to replace worn out capital (δkt). As much as an economy strives to improve and expand its capital base, its human capital resource stands as an important part of the capital base. Romer (1990) added human capital to this model to depict how important investment in education is to the national output of an economy. The assumption of Romer (1990) on human capital is given as; $H_t = L(t) P(E)$. Where L denotes number of workers and P (•) is a function depicting years of education per worker. Labour is assumed to grow at an exogenous growth rate of n ($Lt=\varepsilon^{nt}$). The quality of labour (P>0) is improved by the quality of education and health services offered to the populace. Romer (1990) made the assumption that as a worker acquires more education, his human capital increases (P' (•)>0). This is because education equips individuals with the knowledge of sustainability. Education keeps communities and cities informed on how consumption patterns and lifestyle affects the environment. This would help individuals to curb their excessive consumption that negatively affects the environment. Hence, the dynamics of human capital is expressed as;

$$g_{H=\frac{dH}{dt}} = S_h Y_t - \delta k_t \tag{8}$$

Human capital accumulates based on the level of investment that has been made to the educational and health sectors. S_H denotes the income invested in human capital while δ represents the rate at which the quality of education and health care services depreciates in value due to lack of investment which affects the productivity of the labour force. In the steady state, national output (Y) total factor productivity (A), natural capital (R) and land (T) all grow at a constant rate (g). The steady state is based on the optimum level at which all factor inputs are sustained. To derive the steady state, we take logs of equation (2)

$$InY_t = InA_t + \alpha InK_t + \beta InR_t + \gamma InT_t + (1 - \alpha - \beta - \gamma)InH_t \qquad (9)$$

The action of each factor input on the balanced growth path is shown by the steady states. Capital per labor (K/L) and output per labor (Y/L) are expected to be constant across time on the balanced growth path. As a result, k/y, which is represented as per-capita income, is also constant across time. This is due to the fact that in the steady state, the manufactured capital determines the output (Y)/(K). More investment is utilized to replace worn-out capital (δ) on the balanced growth path. In this sense, the pace of increase of manufactured capital;

$$g_k = \frac{dk}{dt} = \left(\frac{S_k Y_t}{K_t}\right) \qquad (10)$$

Equation 10 depicts the income per capita also known as the net savings rate. However, to examine the behavior of all factor inputs on the balanced growth path, the growth rates of each factor inputs is applied on equation 3.9

$$g_y = g + fo + \alpha \left(\frac{S_k Y_t}{K_t}\right) + \beta g_R + \gamma g_T + (1 - \alpha - \beta - \gamma) g_H \qquad (11)$$

Since savings is a paramount factor that influences the increase in output, the savings model helps to explain how the current generation is storing up wealth and preserving the environment for future generations. The savings model is derived by arranging the net savings rate to the right side, this becomes,

$$\left(\frac{S_k Y_t}{K_t}\right) = g + fo + \alpha g_y + \beta g_R + \gamma g_T + (1 - \alpha - \beta - \gamma) g_H \qquad (12)$$

From equation 12, $\left(\frac{S_k Y_t}{K_t}\right)$ represents environmental sustainability, g represents total factor productivity, f represents financial development O represents institutional quality, αg_y represents per capita income, βg_R represents natural resource rents and $(1 - \alpha - \beta - \gamma) g_H$ represents human development.

Model specification

In line with the theoretical framework, the relationship between, environmental sustainability, financial development and institutional quality has been presented. A set of control variables are included into the model. These variables are per capita income, natural resource rents, trade openness and foreign direct investment. Per-capita income is an important aspect of an economy that influences the environment. As a tool for assessing a population's level of living and quality of life, per-capita income calculates the average annual income per person in a nation. Per-capita income is included into the model to evaluate how the income of each individual has contributed to the environmental development of the economy. For a resource dependent nation like Nigeria, the level to which Nigeria depends on its natural resources to generate income, will depict the level to which it's level of environmental sustainability is being undermined (Koirala & Pradhan, 2020). Natural resource rents is included in this model to reveal how well natural resources have been utilised and sustained to build the economy. Trade openness helps in achieving environmental sustainability through its capacity to boost a country's means of

generating wealth. It facilitates environmental development as it aids in the allocation of scarce resources and grants easy access to advanced technologies that promote environmental preservation (Alshery & Belloumi, 2020). Trade openness is added to this model to show the extent to which the economy is open to international trade and how trade has contributed to the sustainability of the environment. The inflow of foreign investment can to a large extent affect the environment. The inflow of green technology into an economy can enhance the environment. However, foreign direct investment creates an avenue were obsolete or advanced technology can be made available to individuals and firms which can affect the demand and use of energy in an economy.

$$ES = F(FD, INST, PCI, NRR, TO, FDI) \qquad (13)$$

The use of polluting equipment from foreign and indigenous companies can deteriorate the environment but the use of green technology can improve environmental protection. Foreign direct investment is added to this model to show how foreign direct investment has affected environmental quality in the economy,
Equation 13 can be expressed in econometric form as follows;

$$InES_T = \alpha_0 + \beta_1 InFD_t + \lambda_2 InINST_t + \delta_3 InPCI_t + \phi_4 InNRR_t + \eta_5 InTO_t + \varphi_6 InUFDI_t + \varepsilon_t \qquad (14)$$

ES stands for environmental sustainability which is the dependent variable while a_o is the intercept which represents the difference between the mean of ES_T and the product of the slope and mean of $FD, INST, PCI, NRR, TO$ and FDI. While $\beta_1, \lambda_2, \delta_3, \mu_4$ and $\phi_5, \eta_6, \varphi_7$ are slope coefficients that captures the influence of financial development, institutional quality, per-capita income, natural resource rents, trade openness and foreign direct investment on environmental sustainability in time t. Financial development is captured using financial development index, institutional quality is measured using institutional quality index, per-capita income is measured as GDP per capita, trade openness is measured using the ratio of total exports and imports to nominal GDP, natural resource rents is measured using natural resource rents and foreign direct investment is measured using Foreign direct investment, net inflows (BoP, current US$). ε_t denotes the disturbance term which helps to address other variables outside the model that can influence the outcome of the dependent variable. All variables are transformed into their logs to address their size differences and interpret their elasticity. Subscript t depicts the number of years in the study which would be analysed from 1986 to 2020.

Estimation strategy

To achieve this study objective, threshold regression is applied. Threshold models are applied help to explain an underlying process that causes an economy to encounter changes. These changes are explained by a parameter from a threshold model. This parameter is called the threshold parameter (Madni & Wu, 2021). Threshold extends the linear regression to allow coefficients to differ across regions. Those regions are identified by a threshold variable being above or below a threshold value. These regions are also called regimes. By adding a threshold, the linear regression is expanded to include regime variations in the coefficients.

Specifying the linear regression for this study, is shown as;

$$InES_T = \alpha_0 + \beta_1 InFD_t + \lambda_2 InINST_t + \delta_3 InPCI_t + \phi_4 InNRR_t + \eta_5 InTO_t + \varphi_6 InFDI_t + \varepsilon_t \qquad (15)$$

To obtain the threshold level of institutional quality, the work of Wu and Madni (2021) is adopted

$$InES_T = \begin{cases} \alpha_0^1 + \beta_1^1 InFD_t + \varepsilon_t, & INS_t < T \\ \alpha_0^2 + \beta_1^2 InFD_t + \varepsilon_t, & INS_t \geq T \end{cases} \qquad (16)$$

In equation 3.21, institutional quality is used as the threshold variable. $INST_t < T$ denotes the first regime were institutional quality is the below the threshold, while $INST_t \geq T$ indicates the second regime were institutional quality is above the threshold as the sample is being splitted into 2 regimes. The discreet threshold technique is used to determine the number of thresholds. T represents the threshold parameter as β_1^1 indicates low regime for the first sample while β_1^2 indicates high regime for the second sample split

Data, Measurements and Sources

This study used annual time series data from 1986 to 2020, to evaluate the effect of financial development and institutional quality on environmental sustainability in Nigeria. The study period covered the SAP and Post-SAP periods in Nigeria as well as the period when the 17 sustainable development goals were made to help global economies implement sustainable development and achieve environmental sustainability. Adjusted net savings is measured as net savings, plus current expenditure on education, minus rents from depletion of natural capital and damages from carbon dioxide emissions which is divided by gross national income at market prices. Adjusted net savings overcomes the challenge of using carbon emission because it incorporates the three pillars of sustainability. These three pillars are; the economic pillars, the social pillars and the environmental pillars of sustainability. However, Previous empirical results hypothesized that few variables can influence environmental sustainability. For this study, environmental sustainability is controlled along with per-capita income, natural resource rents, trade openness to create a robust and realistic estimation. To tackle omitted variable bias, these control variables are added because they are connected with the changes that can likely persist between financial development, institutional quality and environmental sustainability. This study used the Financial Development index to assess financial development in accordance with recent literature (Svirydzenka, 2016; Khan, 2019; Liu et al., 2019; Dada et al., 2022). This index measures the accessibility, depth, and efficiency of financial markets and financial institutions. The financial institution (FI) index and the financial market (FM) index make up this proxy, which was produced by the International Monetary Fund (2019). The indexes here vary from 0 to 1. While 0 depicts weak financial sector, 1 depicts strong financial sector. The control variables in this study such as per-capita income, foreign direct investment, natural resource rents and trade openness were all sourced from World Development Indicators (2022). Institutional quality is measured using four institutional quality index from the International Country Risk Guide. This institutional index are, control of corruption, law and order, government stability and bureaucratic quality. These four sub-indexes are chosen because of its peculiarity to the Nigerian economy due to its effect on Nigeria's institutional system (Fabemi, 2018; Olaniyi & Oladji, 2020). Control of corruption and law and order are scaled from 0-6, government stability is scaled from 0 to 12, while bureaucratic quality is scaled from 0 to 4. Following the works of Olaniyi & Oladji (2020), the four institutional indicators are re-scaled from 0 to 10.

Results and discussions

Descriptive statistics

The results of the descriptive statistics for this study, is shown in Table 1. It is important to know the behaviour of a series before carrying out further analysis. To examine the behavior of the series, descriptive statistics is used to

describe the data set of adjusted net savings, ecological footprint, institutional quality, financial development and foreign direct investment using mean, median, standard deviation, minimum, maximum values and Jarque Bera statistics. Table 1 show that all the series display some level of consistency as their mean and median values fall within their minimum and the maximum values. The average value of adjusted net savings for the sample period stands at 20.1% which is quite lower than 50% on a percentage scale. This depicts the high rate of natural resource depletion in Nigeria which has reduced the availability of adequate resources for future generations. The best environmental performance the Nigerian economy ever had was in 1989 with a 44.8% value in adjusted net savings and the lowest performance in 2016 dropping to 4.55% in value over the 35 years of observation.

Financial development index for Nigeria shows a value of 0.18 which depicts a weak financial system.This suggests that the financial system in Nigeria is crippled by deficiencies in financial operations and structural weakness in the financial markets. In 2008, Nigeria experienced its highest level of financial development with a value of 0.27 and its lowest level of development in 1997 with a value of 0.11. The standard deviation for financial development is quite low compared to its mean. This means that the financial sector in Nigeria has not recorded significant changes in its level of development across the years in the sampled period.

The results for Nigeria's institutional quality is 3.72 which is below the average on the scale of 0-10. In essence, the quality of institutions in Nigeria are poor and less productive in respect to its control of corruption, law and order, bureaucratic quality and government stability. Nonetheless, the highest level of institutional development in the Nigerian economy was recorded in 1996 with an institutional performance of 4.8 and its lowest level of institutional development in 1986 with an institutional performance of 2.65.

Table 1: Descriptive statistics

Var	Unit of measurement	Mean	Median	Max	Min	Std.dev	J.B	Prob	Obs
ANS	ANS (% of GNI)	20.108	18.142	44.816	4.5575	12.176	2.70	0.25	35
FD	FD index scale (0-1)	0.1873	0.1815	0.2730	0.1188	0.0388	0.84	0.65	35
INS	INS index scale (1-10)	3.7200	3.5675	4.8950	2.6575	0.5135	0.77	0.68	35
FDI	FDI net inflows (Bop, Us$)	2.8E+9	1.8E+9	8.8E+9	1.9E+8	2.6E+9	5.96	0.06	35
PCI	GDP per-capita (current, Us$)	1317.6	786.80	3200.9	270.02	922.82	3.74	0.15	35
NRR	Total NRR (% of GDP)	15.329	15.645	31.770	4.7909	6.2374	0.62	0.73	35
TOP	Trade (% of GDP)	34.694	34.457	53.277	9.1358	0.6512	1.02	0.59	35

Source: Author's computation (2023)

It is also displayed from the results that the standard deviation of institutional quality is lower than its average value. This connotes that Nigeria which is challenged with poor quality of institutions, has not experienced a wide variety of changes in its institutional system throughout the study period.

For the control variables, FDI show a net inflow of investment worth $2.8billion dollars in respect to Nigeria's balance of payment. This shows that the inflow of equity capital, reinvestment of earnings, long term and short-term capital from foreigners into Nigeria throughout the period observed, is quite high. As a result, the highest inflow of foreign investment into Nigeria was noticed in 2011, with a net inflow of $8.8billion dollars. According to World investment report (2012), Nigeria was Africa's top destination for foreign direct investment in 2011, drawing in foreign investors from Europe and the United States. The lowest inflow of foreign direct investment into Nigeria was discovered in 1986 with a net-worth of $193million. The value of standard deviation for Foreign direct

investment is lower than its average value. This denotes that the Nigerian economy have not experienced large changes in its inflow of investment in the years observed in the study.

The average per capita income for Nigeria stands at $1,317. This implies that Nigeria is a lower-middle-income country from sub-Sahara Africa as classified by the World Bank. The Nigerian economy generated its highest level of per capita income in 2014 with a value of $3,200 and its lowest in 1993 having a value of $270. Nigeria which is tagged as a low income economy, has noticed little changes in its levels of per-capita income from 1986 to 2020. Besides, the total natural resource rents from the sale of oil, natural gas, coal and mineral resources in Nigeria only accounts for 15% of Nigeria's GDP. Natural resource rents contributed immensely to the GDP of the Nigerian economy in 1993, accounting for 31% of Nigeria's GDP. However, in 2016, natural resource rents drop to its lowest level of economic value only accounting for 4.7% of Nigeria GDP. The results of for natural resource show that its average value is higher than its standard deviation. This implies that there have been slight differences in the contribution of natural resource rents to Nigeria's GDP throughout the years observed in the study.

The average sum of Nigeria's trade openness throughout the 35 years examined, is 34.6%. This indicates that the openness of the Nigerian economy to trade relationships is below the average as the sum of Nigeria's imports and exports accounted for less than 50% of Nigeria's GDP. Nigeria's trade relationships with other countries in the world improved the gross domestic product of the Nigerian economy by 53% in 2011. This was the highest contribution of Nigeria's trade openness to GDP which occurred as a result of the high inflow of foreign direct investment into Nigeria in 2011. However, Nigeria's trade openness contributed minimally to the GDP in 1986 by increasing the market value of goods and services produced in Nigeria by 9.1%. Furthermore, the standard deviation of trade openness is lower than its mean value. This denotes that few changes have been noticed in the levels of import and export of goods and services in and out of Nigeria from 1986 to 2020. The results of the Jarque Bera statistics reveal that all the variables are normally distributed as they are all above the 5% level of significance.

Correlation matrix

The results of the correlation matrix between the explanatory variables are shown in Table 2 using Pearson correlation coefficient. Correlation matrix is a statistical tool used to examine the degree of association between two variables. It is also used to check for multicollinearity amongst variables. The problem of multicollinearity exist when two or more predictor variables in a multiple regression model are highly correlated. Following the works of Abaidoo and Agyapong (2023), the threshold limit of 85% for the correlation coefficients was used. From the results it can be seen that there are no issues of multicollinearity in the results as none of the correlation coefficient is above the threshold limit of 0.85. This suggests that multicollinearity is not present among the explanatory variables in the model.

Unit root test

The unit root test of the response and predictor variables are displayed in Table 3. It is important to examine the stationary properties of a series before further analysis is conducted. This is because a pre-estimation test will help to ascertain which methodology is appropriate to estimate the series. Stationarity test is also important because using time series data that are non- stationary, will lead to spurious result. One basic disadvantage of a spurious result is that it cannot be used for prediction, forecasting and hypothesis testing. In other words, a spurious result is completely unreliable and can lead to wrong conclusions. To prevent this statistical error, unit root test is performed on the series in the study. Table 3 shows the unit root test on the variables of the study using Dickey Fuller Generalized Least Square (Elliot, Rothenberg and stock, 1996) and the Ng and Perron test (Ng & Perron, 2001).

Table 2: Correlation matrix

Var	FD	INS	FDI	NRR	PCI	TOP
FD	1.0000					
INS	-0.3680	1.0000				
FDI	0.6453	-0.2007	1.0000			
NRR	-0.5202	0.5689	-0.0384	1.0000		
PCI	0.8325	-0.3647	0.7335	-0.4491	1.0000	
TOP	- 0.0260	0.4654	0.2645	0.4729	-0.0417	1.0000

Source: Author's computation (2023)

Table 3: Unit root test results

Unit root test (individual intercept)

	DF-GLS			Ng and Perron		
Variable	Levels	1st diff	Order	Levels	1st diff	Order
ANS	-0.7993	-9.9726***	I(1)	0.4847	0.2026**	I(1)
EFP	-0.5812	-9.0946***	I(1)	0.9095	0.1915**	I(1)
FD	-1.1441	-4.2747***	I(1)	0.3836	0.1828**	I(1)
INS	-1.4375	-4.1497***	I(1)	0.4544	0.1810**	I(1)
PCI	-0.2900	-4.5855***	I(1)	0.7289	0.1729**	I(1)
NRR	-1.2355	-4.5900***	I(1)	0.3660	0.1748**	I(1)
TOP	-1.7851*	_____	I(0)	0.3575	0.1636***	I(1)
FDI	-1.6171	-2.7016***	I(1)	0.3360	0.2531*	I(1)
Level of sign.		CRITICAL VALUES				
1%	-2.6347	-2.6347		0.1740	0.1740	
5%	-1.9510	-1.9510		0.2369	0.2369	
10%	-1.6109	-1.6109		0.2750	0.2750	

Note: ***,**,* represents the 1%, 5% and 10% of significance respectively
Source: Author's computation (2023)

The DF-GLS and Ng and Perron unit root tests was selected for this study because the conventional Augmented Dickey Fuller (ADF) and Phillip Perron (PP) unit root test are susceptible to power distortions with processes that possesses low moving average (Arltova & Fedorova, 2016) While DF-GLS tests is the modified version of the ADF

tests, Ng and Perron is the modified version of the Phillip-Perron tests. ADF and PP test have lower power in the case of a root process that is close to a unit root. That is to say, their low power capacity reduces the validity and reliability of their tests which can lead to wrong conclusions. However, the DF-GLS and NG and Perron tests are classified as efficient unit root test because they exhibit higher power compared to ADF and PP test. For robustness sake, the study employed both intercept and intercept and trend options. The DF-GLS results with intercept show that adjusted net savings, ecological footprint, financial development, per-capita income, institutional quality, natural resource rents and foreign direct investments are non-stationary at levels I(0) but stationary at first difference I(1). This suggests that the mean, variance, and covariance of their series is not constant overtime and also that the series are time variant.

Table 4 : Unit root test (Individual intercept and trend)

	DF-GLS			Ng and Perron		
Variables	Levels	1st diff	Order	Levels	1st diff	Order
ANS	-4.8135***	_____	I(0)	0.1712*	____	I(0)
EFP	-1.0334	-9.7106***	I(1)	0.3674	0.1991***	I(1)
FD	-3.0038*	_____	I(0)	0.1773*	____	I(0)
INS	-1.9363	-4.5917***	I(1)	0.3833	0.1778*	I(1)
PCI	-1.2523	-4.9138***	I(1)	0.3956	0.1713*	I(1)
NRR	-3.3067**	_____	I(0)	0.2110*	_____	I(0)
TOP	-2.5377	-5.8335***	I(1)	0.2385	0.1735*	I(1)
FDI	-2.0752	-8.1787***	I(1)	0.2001	0.1833*	I(1)
Level of sign.		CRITICAL VALUES				
1%	-3.7700	-3.7700		0.1400	0.1400	
5%	-3.1900	-3.1900		0.1700	0.1700	
10%	-2.8900	-2.8900		0.2300	0.2300	

Note: ***,**,* represents the 1%, 5% and 10% of significance respectively
Source: Author's computation (2023)

Table 3 and Table 4, revealed that there are mixed order of integration in the series. Since the variables are a mixture of I(1) and I(0), a threshold autoregression model can be used

The Threshold level of institutional quality in the link between financial development and environmental sustainability in Nigeria.

The outcome of the threshold analysis is presented in Table.5. Threshold regression is a linear regression that shows regime variations in the coefficients, when a threshold variable is above or below a threshold parameter. For this study, a single threshold parameter is considered which display two regimes. In estimating the threshold, adjusted net savings is used as the pivotal variable which measures environmental sustainability while institutional quality is the threshold variable and financial development is the dependent variable. The first regimes show when institutional quality performs below the threshold parameter while the second regime show when institutional quality perform at or above the threshold limit. Discreet threshold technique was applied to arrive at the threshold value of 4.32.

The basic reason why two regimes are chosen for this study, is to ascertain the regime were institutional quality in Nigeria influenced financial development to improve environmental sustainability and also to ascertain the regime

were institutional quality influenced financial development to reduce environmental sustainability in Nigeria in the 35 years of the study. The results in Table 5 show that when institutional quality is below the threshold value of 4.32 in the first regime, financial development in Nigeria exert a negative and insignificant effect on adjusted net savings. However, when institutional quality is above the threshold value of 4.32 in the second regime, financial development exerts a positive and significant effect on adjusted net savings. In order words, when institutional quality is below the threshold, financial development reduces environmental sustainability by 0.08%. However, when institutional quality is above the threshold, financial development increases environmental sustainability by 4.52%. This affirms that the financial sector in Nigeria can help in fostering environmental sustainability when sound institutions are in place to ensure that environmental standards are being followed. Hence, below the threshold value of 4.32, financial development impedes environment sustainability. Nigeria's environmental performance may have been impacted and decreased by institutional quality, through her poor bureaucracy, and corruption, which is a significant but often overlooked factor. In other words, Institutional failure in Nigeria has resulted in the financial sector's inefficiencies as well as the deterioration of the ecosystems. This indicates that the institutional framework in Nigeria has to improve beyond the threshold level before it can stimulate the financial sector to promote environmental sustainability. more so, below the threshold level of 4.32, there is a high tendency for institutions in Nigeria to give room for corrupt, illegal and unsustainable environmental practices that is detrimental to environmental development.

On the average, Nigeria's quality of institutions has performed below the threshold level. As shown in Table 1, the average value of Nigeria's institutional quality index which is 3.72, is less than the threshold value of 4.32. Hence, the Nigerian economy has operated below the threshold value for the 35-year period that is covered in the study. The International Country Risk Guide data used for this study reveal that Nigeria was above the threshold value in 1992, 1993, 1994, 1995, 1996 and 1997. Notwithstanding, the best institutional performance was observed in 1996, while the lowest level of institutional performance was recorded in 1986 which was displayed in Table 1. This indicate that there have been a high level of institutional inconsistency and inefficiency in Nigeria.

Table 5 : Threshold analysis

Dependent variable : Adjusted Net Savings							
Panel A : Estimates							
Regime 1 (INS < 4.32 (29 Obs)				Regime 2 (INS ≥ 4.32 (6 Obs)			
Var	Coef	T-stat	prob	Coef	T-stat	Prob	
LFIN	- 0.0817	-0.1729	0.8640	4.5240**	2.4005	0.0235	
C	6.8725	2.4358	0.0088	14.794	4.2925	0.0002	
Non-threshold variables							
Var	Coef	Std.error	T- stat		Prob		
LFDI	0.0572	0.1474		0.3833	0.1778*		
LPCI	- 0.7512	0.2496		0.3956	0.1713*		
LNRR	0.7835	0.2244		3.4907	0.0017		
LTOP	- 0.6255	0.2220		-2.8167	0.1735*		
Panel B : Diagnostic test							
Jarque Bera	0.5410						
Serial correlation	0.6902						
Heteroscedasticity	0.4050						
Ramsey rest test	0.1988						
Dependent variable : Adjusted Net Savings							

Panel A : Estimates							
	Regime 1 (INS < 4.32 (29 Obs)			Regime 2 (INS ≥ 4.32 (6 Obs)			
Var	Coef	T-stat	prob	Coef	T-stat	Prob	
LFIN	- 0.0817	-0.1729	0.8640	4.5240**	2.4005	0.0235	
C	6.8725	2.4358	0.0088	14.794	4.2925	0.0002	
	Non-threshold variables						
Var	Coef	Std.error		T- stat	Prob		
LFDI	0.0572	0.1474		0.3833	0.1778*		
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	Non-threshold variables						
Var	Coef	Std.error		T- stat	Prob		
LFDI	0.0572	0.1474		0.3833	0.1778*		
LPCI	- 0.7512	0.2496		0.3956	0.1713*		
LNRR	0.7835	0.2244		3.4907	0.0017		
LTOP	- 0.6255	0.2220		-2.8167	0.1735*		
Panel B : Diagnostic test							
Jarque Bera		0.5410					
Serial correlation		0.6902					
Heteroscedasticity		0.4050					
Ramsey rest test		0.1988					

Note : ** $p < 0.05$, ***$p < 0.01$, and *$p < 0.1$ denotes 1%, 5% and 10% level of significance.

Source: Author's computation (2023)

Out of the 35 years observed, Nigeria operated below the threshold value for 29 years, showing that the institutional structure in Nigeria has been indeed weak and less productive overtime. This is why below the threshold level, financial development reduces environmental sustainability since institutions are weak to impose the norms of environmental sustainability on the financial sector, unregulated financial markets in Nigeria divert loans to highly polluting companies that deteriorate the environment.

The Nigerian economy has been more focused on improving economic growth without considering the side effects of these economic expansion on environmental conservation. The increase in financial services and access to credit is having environmental and societal consequences in Nigeria. The demand for transportation increases along with the use of energy when individuals and businesses have easy access to credit.

The preliminary stages of financial development are the stages of development in the financial sector that mostly considers financial deepening far more than environmental protection. This is the case of the Nigerian financial system as Yinusa (2020) recounts that the Nigerian financial sector is still developing and is not fully strengthened. Institutional quality plays an important role in increasing the environmental performance of the financial sector in Nigeria by incorporating environmental reforms into the financial system to lessen the harmful effects of the increasing demand for energy by firms in Nigeria. Sibanda et al. (2023) argued that the level of institutional quality operating in African countries has not been effective enough to tackle the issues of carbon emission and environmental pollution like the developed countries. Institutional quality is the backbone of environmental performance in any economy and its efficiency is of utmost relevance in meeting the conditions of sustainability in a country (Madni & Wu, 2021). High quality institutions ensure that effective environmental policies are effected and implemented (Federal Ministry of Environment Nigeria , 2019). Nevertheless, a lot of economies are faced with environmental challenges due to economic and industrial expansion which are caused by development in the financial sector (Ibrahim & law, 2015).

Financial markets and financial institutions in Nigeria increase environmental pollution when institutions operate at a low level of productivity. This can be seen in the years when institutional quality in Nigeria performed below the threshold which was between 1986 to 1991 and 1998 to 2020. If institutions in Nigeria do not perform above the threshold level, financial markets and financial institutions will degradate the environment and worsen environmental issues in Nigeria. This is because institutional factors such as control of corruption, rule of law and bureaucratic quality to a large extent determines how the financial sector impacts the environment. Abid (2016) argued that institutional quality can significantly reduce carbon-dioxide and curb environmental pollution. The findings of this study are in line with that of Madni and Wu (2021) on OBOR economies. The authors affirm that when institutional quality performs beyond the threshold level, Carbon emissions would be significantly reduced and environmental quality would be preserved even in the face of rising industrialization.

The results of the non- threshold variables show that per capita income and trade openness have a negative and significant effect on environmental sustainability. In other words, an increase in per-capita income will result to a 0.7% decrease in environmental sustainability. Also, a 1% increase in trade openness will lead to a 0.6% decrease in environmental sustainability. This means that an increase in per-capita income will worsen environmental sustainability in Nigeria. This exemplifies that trade relationship has also exposed the Nigerian economy to obsolete technology as well as a result of dumping in the attempt to acquire cheap production equipment that are highly substandard. Re-affirming this outcome, Solarin et al (2017) discovered that trade openness reduces environmental quality in Ghana. On the other hand, natural resource rents show a positive and significant effect on environmental sustainability. A 1% increase in natural resource rents will lead to a 0.78% increase in environmental sustainability. Sibanda et al (2023) reckoned that natural resource rents have helped to improve the economy of developing economies.

To examine the reliability of the results in the threshold auregression, a diagnostic test was obtained which is shown in panel B of Table 5. In the test, the model showed a normal distribution with a probability value of 0.54. This means that there are no structural issues in the model. Also, the results revealed that the residuals are homoscedastic and are free from serial correlation issues. This was determined using the Breush Pagan and the serial correlation LM test. The Ramsey reset test also indicates that the tests are well specified.

Figure 3 and 4 is the graphical presentation of the results in Table 5, showing the development of the financial sector in regime 1 and 2. The first regime show that the financial sector had a negative effect on environmental sustainability as the graph shows a break year in 2006 were institutional quality performed below the threshold level of 4.32 having a value of 3.73 as observed by the ICRG data in 2006. Low regime of institutional quality in Nigeria is displayed in the diagram from 2006 to 2020. While the second regime show a break year in 1992 where the institutional quality in Nigeria performed at the threshold level having a value of 4.32. This could be as result of the environmental laws made in 1992. The environmental impact assessment Act was established in 1992 to make the public and private sector of the economy not to authorize projects without considering its effect on the environments. Hence, the level at which institutional quality stimulates the financial sector without neglecting the relevance of environmental development is crucial for any economy.
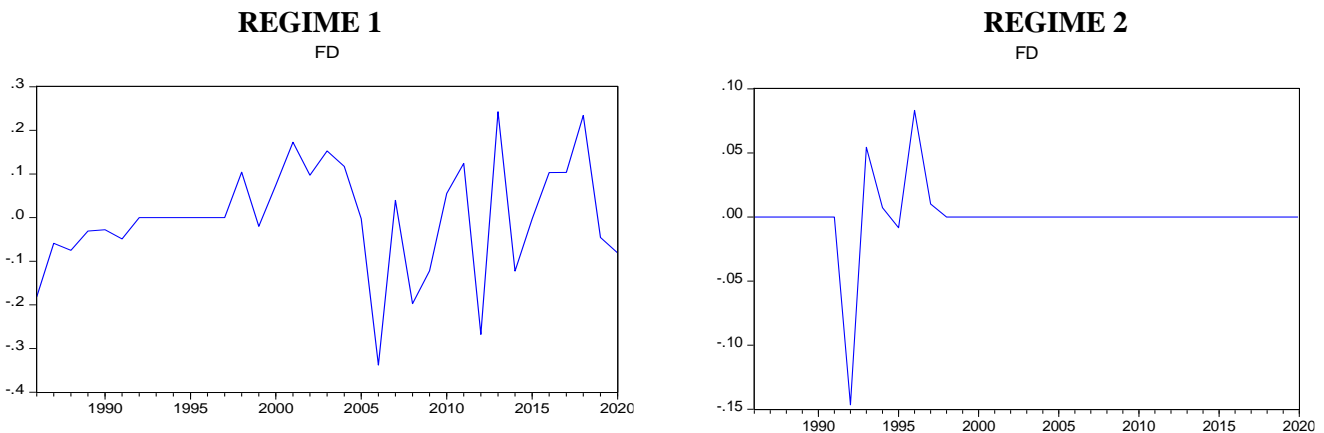

Figure 3: Financial development (INS <4.32 (29(Obs)
Figure 4: Financial development (INS >4.32 (6 Obs)

Conclusion

This empirical study examined the threshold level of institutional quality in the link between financial development and environmental sustainability. Specifically, this study evaluates the threshold level of institutional quality in the nexus between financial development and environmental sustainability in Nigeria from 1986 to 2020 using the threshold autoregression model. The outcome of the findings revealed that when institutional quality is below the threshold, financial development decreases environmental sustainability. Trade openness and per-capita income decreases environmental sustainability in Nigeria while foreign direct investment and natural resource rents increases environmental sustainability in Nigeria. Institutional quality enables the financial sector to improve environmental sustainability in Nigeria. Institutional quality needs to be enhanced in other to strengthen the environmental performance of the financial sector in Nigeria. The institutional weakness in the institutional framework of the Nigerian economy needs to be tackled and removed to ensure that environmental standards are met.

This study provides some important policy recommendation. First, The Nigerian government should work towards achieving a low carbon economy in Nigeria. To achieve this, policy makers should regulate the environmental practices of both individuals and firms. In addition, environmental agencies should be involved in carrying out random checks on industries and on residential and commercial areas to discipline individuals or companies that

flout environmental orders. The monetary authority should employ regulatory measures by carrying out random checks on the activities of financial markets to ensure that the financial sector direct financial institutions to channel their loans to industries that use cleaner technologies. Hence, it is important that institutional credibility and transparency is enhanced to effect the needed change in increasing environmental preservation. Hence, the institutional body in Nigeria should ensure that institutional quality is improved beyond the threshold level as deliberate efforts should be made towards improving bureaucratic quality and promoting law and order.

Declarations

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