International Journal of Economic Behavior and Organization
2024, Vol. 12, No. 4, pp. 254-267
https://doi.org/10.11648/j.ijebo.20241204.16

Research Article

The Impact of Private Investment on the Sustainable Development of Sub-Saharan African Countries: The Moderating Role of Institutional Quality

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Abstract

With an emphasis on the moderating effect of institutional quality, this study examines the effect of private investment on the sustainable development of Sub-Saharan African (SSA) nations. The analysis uses Generalised Method of Moments (GMM) and Feasible Generalised Least Squares (FGLS) methodologies to address potential endogeneity concerns and to improve the robustness of the results respectively. The study made use of panel data from 30 SSA nations from 2009 to 2019 obtained from World Develop-ment Indicators and Heritage Foundation. The results show that institutional quality and private investment have each have substantial and favourable impacts on sustainable development. Nevertheless, the results further demonstrates their combined influence have a negative impact on sustainable development, indicating that although both are advantageous separately; their combined influence might not always be in line with the objectives of sustainable development in the SSA context. This demonstrates a threshold effect by showing that the advantages of private investment in sustainable development decline in settings with inadequate institutional frameworks. The results imply that in order to guarantee that investments successfully support sustainable development, SSA nations should give priority to fortifying institutional frameworks in addition to encouraging private investment. These findings offer practical policy suggestions for creating a supportive atmosphere that optimises the positive developmental effects of private sector involvement.

Keywords

Generalized Method of Moments (GMM), Feasible Generalized Least Squares (FGLS), Private Investment, Sustainable Development, Institutional Quality

1. Introduction

Over the past few decades, the conversation surrounding sustainable development has placed more emphasis on the critical role that private investment plays in promoting economic expansion and well-being, especially in areas that are confronting major developmental obstacles. Sub-Saharan Africa (SSA) presents an exceptional opportunity for economic growth, but it faces enduring obstacles to sustainable development. Examining how private investment affects the trajectory of sustainable development in SSA countries and whether institutional quality modifies this relationship are

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Received: 3 November 2024; **Accepted:** 20 November 2024; **Published:** 31 December 2024

central to this conversation. A wide range of capital flows are included in private investment, including venture capital, portfolio investments, and foreign direct investment (FDI) as well as domestic entrepreneurship. These investments have an effect on environmental, social, and governance (ESG) factors as well as economic ones. ESG factors are becoming more and more acknowledged as essential to sustainable development. It is crucial to comprehend the relationship between private investment and sustainable development outcomes for Sub-Saharan African (SSA) countries, as they face pressing challenges in developing their infrastructure, creating jobs, and reducing poverty.

Nevertheless, the amount or nature of investments does not determine how well private sector investment advances sustainable development in Sub-Saharan Africa. The environment in which private investment functions is greatly influenced by institutional quality, which is characterised by elements like the efficacy of government, the rule of law, regulatory efficiency, and the ability to combat corruption [1] Weak institutions can hinder the potential advantages of private investment by aggravating risks, lowering investor trust, and limiting the ability to harness capital for sustainable development goals.

Despite having a youthful, expanding population and a variety of natural resources, Sub-Saharan Africa (SSA) has significant obstacles in the way of attaining sustainable development. The ability of SSA nations to draw in and make efficient use of private investment for development has historically been hampered by problems including poverty, poor infrastructure, and political instability [2]. The role of private investment, which includes both local and foreign capital flows, in SSA's economic growth and development is becoming more widely acknowledged. The United Nations Conference on Trade and Development (UNCTAD) reports that FDI inflows to Sub-Saharan Africa (SSA) have demonstrated resilience in the face of global economic concerns. Notable investments have been made in areas like manufacturing, energy, and infrastructure [3].

However, the effect of private investment on SSA's sustainable development results is complex and largely contingent on the calibre of institutions in each nation. The environment in which private investors operate is influenced by institutional quality, which is determined by metrics of governance, rule of law, and regulatory effectiveness. The potential advantages of private investment can be undermined by weak institutions that provide obstacles including corruption, ineffective bureaucracy, and unstable policies [4]. Research has shown that nations with more robust institutional frameworks typically draw in more sustainable investment, which benefits economic expansion, poverty alleviation, and environmental preservation [1]. On the other hand, as demonstrated by the differences in development outcomes among SSA nations, nations with weaker institutions frequently find it difficult to convert private investment into sustainable development outcomes [5].

Understanding how institutional quality influences the relationship between private investment and sustainable development outcomes in SSA is essential given these complications. Researchers aim to understand how differences in institutional quality affect the efficiency of private investment in advancing sustainable development goals by looking at empirical data and theoretical frameworks [6]. Therefore, by offering insights into how stakeholders and policymakers might improve institutional quality to create a more favourable climate for private investment and sustainable development in SSA countries, this study seeks to add to the body of existing work. SSA nations may be able to harness the transformative potential of private investment to expedite their sustainable development objectives by resolving institutional shortcomings and encouraging good governance practices [7].

The various forms of labour and capital are the primary focus of institutions' indirect effects on growth. One growth factor that directly affects the output growth rate and indirectly raises the productivity of the labour factor is the accumulation of in-kind capital, or resources for investment and stockpiling. Increases in household savings, company investment, budget expenditure-saving measures (such as rationalising transfers), and public sector investment are all necessary to boost material accumulation. Current income is just one of many factors that affect savings. The inclination to save rises as this income rises. This demonstrates intergenerational altruism (saving for offspring), the inclination to accumulate money over time or intertemporal preferences, and the innate ability to foresee the future. A stronger inclination to save and invest is encouraged by the growth of financial market institutions (banks, investment funds, insurance firms, pension funds, broking houses, and others) [8]. By lowering information acquisition costs, financial institutions promote wise investment decisions (economies of scale effects).

With an emphasis on the moderating role of institutional quality, this research attempts to investigate the relationship between sustainable development and private investment in SSA nations. It aims to determine how differences in institutional quality among SSA nations moderate the effect of private investment on sustainable development outcomes by examining empirical data and theoretical frameworks. Additionally, it seeks to pinpoint policy implications that can strengthen the beneficial effects of private investment while resolving institutional shortcomings impeding the advancement of sustainable development. By tackling these problems, this study adds to the body of knowledge in academia and the policy debate by shedding light on the intricate connection between institutional quality, private investment, and sustainable development in SSA. By doing this, it hopes to educate investors, international organisations, and legislators on how to encourage private investment in the area and create a more favourable atmosphere for sustainable development.

The rest of the paper is organized as follow: the first sec-

tion present the literature review; the second the methodology and model, the third, result discussion and finally the conclusion.

2. Literature Review

According to the World Commission on Environment and Development [9], sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". In order to maintain sustainability and equity over the long run, this idea highlights the integration of economic growth, social inclusion, and environmental conservation. It draws attention to the necessity of resource balance and intergenerational justice.

Evaluating progress in the areas of economics, society, and the environment is part of measuring sustainable development. Gross Domestic Product (GDP) and Inclusive Growth Indicators are common frameworks and indicators that measure economic growth in conjunction with income distribution and poverty reduction. Social Indicators: Monitoring access to essential services, equality, health, and education. Environmental Indicators: Tracking pollution levels, biodiversity, carbon emissions, and the utilisation of natural resources. Sustainable Development Goals (SDGs): Through particular targets and indicators, the 17 Sustainable Development Goals (SDGs) of the UN offer a thorough framework for gauging progress towards sustainable development [10].

2.1. Theoretical Review

2.1.1. Stakeholder Theory

Edward Freeman is the most prominent author associated with the development of stakeholder theory. His foundational work was published in 1984 in Freeman's seminal book, titled "Strategic Management: A Stakeholder Approach". Stakeholder theory posits that the success of a company should not be assessed solely by its financial performance or the interests of shareholders, but by the impact and interests of all parties (stakeholders) involved with the company. These stakeholders can include employees, customers, suppliers, communities, government, and other groups that have a stake in the organization's actions. Freeman argued that businesses should create value for all stakeholders, not just maximize profits for shareholders. The theory emphasizes ethical responsibility and a more inclusive approach to business strategy. Instead of focusing solely on profits, companies should consider the needs and well-being of other groups who are impacted by their actions.

Stakeholder theory is highly relevant to understanding the role of private investment in sustainable development. The theory encourages businesses to consider the interests of all stakeholders not just shareholders when making decisions. This broader view is especially crucial in the context of sustainable development, which requires balancing economic growth with social and environmental responsibilities. Private investment, traditionally focused on financial returns for investors, can have significant implications for sustainability if managed with stakeholder considerations in mind. Stakeholder theory stresses that businesses must create value for a broad range of stakeholders such as employees, communities, consumers, governments, and the environment not just for investors. In the context investment in sustainable infrastructure (e.g., renewable energy, green buildings) can bring economic development, job creation, and community welfare. However, these investments must also address the social needs and environmental concerns of local populations, particularly those in vulnerable regions. It emphasizes the importance of considering the needs and interests of a broad range of stakeholders. By applying this theory, private investors can contribute to long-term, sustainable outcomes that balance economic, environmental, and social concerns. It provides a framework for ethical investment and shared value creation, aligning private capital with global sustainability goals while managing risks and promoting inclusive governance. This alignment helps ensure that private investment is a force for good, not just profit.

While Freeman is the primary figure behind stakeholder theory, many other authors have contributed to its evolution. Key contributions include: [11] in their influential article, "Creating Shared Value", they argued that businesses can generate economic value in a way that also produces value for society by addressing its needs and challenges. This extends Freeman's stakeholder theory by emphasizing the symbiotic relationship between business success and social good. [12] Worked on clarifying the normative, instrumental, and descriptive aspects of stakeholder theory, outlining the theory's ethical underpinnings and offering a more comprehensive framework for understanding stakeholder relationships. [13] in their work, "Managing the Corporate Social Performance Stakeholder Nexus", they expanded the stakeholder theory framework by looking at the dynamic and often competing interests of different stakeholders and the role of corporate social performance (CSP) in managing these interests. [14] Added a more practical perspective to stakeholder theory, showing how it could be used as a strategic tool for managing business ethics and corporate governance.

2.1.2. The Triple Bottom Line (TBL) Theory

The Triple Bottom Line (TBL) theory was introduced by John Elkington, a British sustainability expert and social entrepreneur. He is often credited with coining the term "Triple Bottom Line" in his 1997 book, Cannibals with Forks: The Triple Bottom Line of 21st Century Business.

The Triple Bottom Line (TBL) theory proposes that businesses should measure their success not only in terms of financial performance (profit) but also by their environmental impact (planet) and social responsibility (people). This model aims to expand the traditional financial accounting frame-

work to include environmental and social dimensions, thereby encouraging more sustainable business practices. The economic value created by the organization, focusing on the traditional financial bottom line (e.g., profit generation, return on investment, shareholder value). The social impact of the organization, include how it affects employees, customers, communities, and other stakeholders. This includes considerations of labor practices, human rights, community development, and equitable distribution of benefits. The environmental impact of the organization's activities includes how a company manages its ecological footprint, such as waste reduction, carbon emissions, resource usage, and sustainability practices. The TBL emphasizes that businesses can no longer focus exclusively on economic profits but should consider the broader impact they have on society and the environment.

The Triple Bottom Line (TBL) theory, introduced by John Elkington in 1997, has become a foundational framework for assessing the broader impacts of businesses, particularly regarding their role in sustainable development. By emphasizing three dimensions—Profit, People, and Planet—the TBL encourages businesses and investors to measure success not just by financial returns but also by their social and environmental impacts. This approach is particularly important when considering how private investment can contribute to sustainable development. Private investment is a major driver of economic growth and innovation. When private sector funds are directed into sectors that prioritize sustainability, such as renewable energy, green technologies, or sustainable agriculture, they contribute to long-term economic stability and growth while aligning with environmental and social goals. Private investment in green industries can lead to the development of technologies that reduce dependency on fossil fuels, decrease environmental degradation, and stimulate job creation in new sectors (e.g., solar energy, electric vehicles).

While John Elkington is the key figure associated with the Triple Bottom Line concept, several other scholars, economists, and sustainability experts have contributed to its development, refinement, and implementation in corporate practice. [15] Stakeholder Theory is a foundational idea for the TBL approach. Freeman argued that businesses should create value for all stakeholders, not just shareholders. This idea supports the People aspect of TBL by promoting consideration of the social impacts of business decisions. Freeman's Contribution: Stakeholder Theory provides the ethical and practical justification for companies to expand their focus beyond profit to include social responsibility and environmental sustainability. [16] In his work on "Creating Shared Value" (CSV) extended ideas relevant to TBL. Wieland suggested that companies can create economic value in a way that also creates value for society by addressing societal needs and challenges through business strategy. Wieland Contribution: The idea of shared value is consistent with the TBL model, especially the integration of social and environmental concerns into core business practices, showing that societal and business goals can align. [17] In "Capabilities Approach to development" which emphasizes individual well-being, freedom, and empowerment, aligns with the TBL's People dimension, focusing on improving lives through sustainable development, rather than merely wealth accumulation. His approach to development broadens the understanding of well-being beyond mere economic metrics, aligning with the TBL's focus on social impact. [18] In "Measuring Wealth beyond GDP" contributed to the critique of traditional economic measurement systems, including GDP. He argued for more comprehensive measures of well-being and economic development, which are closely aligned with the TBL framework's broader consideration of profit, people, and planet. Stiglitz's work on redefining how we measure economic success supports the idea that sustainability must include factors beyond pure financial performance, such as social and environmental impacts.

2.2. Empirical Literature

The relationship between private investment and sustainable development in Sub-Saharan Africa (SSA) has garnered significant scholarly attention. This section reviews empirical studies focusing on this relationship, with particular emphasis on the moderating role of institutional quality.

2.2.1. Private Investment and Sustainable Development

Private investment is considered a crucial driver of economic growth and development. In SSA, private investment contributes to infrastructure development, job creation, and technological advancement. For instance, [19] found that foreign direct investment (FDI) positively impacts economic growth in African countries, provided there are conducive policy environments. Similarly, [20] emphasizes the importance of domestic investment alongside FDI, highlighting how both can lead to sustainable economic development. He argues that while FDI brings in capital and technology, domestic investment fosters local entrepreneurship and innovation. Recent studies by [21] indicate that the positive effects of private investment on economic growth are more pronounced in countries with better institutional frameworks. Their cross-country analysis reveals that private investment leads to higher GDP growth rates when supported by sound institutions. Specific case studies, such as the one conducted by [22], analyze the impact of investment in countries like Kenya and Ghana. These studies show that institutional reforms, including anti-corruption measures and property rights enhancements, have positively influenced investment inflows and sustainable development outcomes.

A study looked at the connection between results of sustainable development and private investment in renewable energy projects [23]. According to their findings, more private investment in renewable energy infrastructure like wind and solar power plants helps to improve energy access, lower

greenhouse gas emissions, and lessen the effects of climate change. In line with the objectives of sustainable development, these investments improved environmental sustainability in addition to stimulating economic growth. Additionally, [24] looked into how private sector investment affected EU sustainable development. According to their research, FDI, or private investment, has a big impact on sustainable development. Green investments were crucial in supporting the goals of sustainable development by fostering a healthy environment and general well-being.

2.2.2. Role of Institutional Quality

A study by [25] underscores the importance of governance in facilitating sustainable development through investment. They find that countries with strong legal systems and transparent governance structures tend to experience more significant benefits from private investments. [26] Found that institutional quality significantly and positively impacts sustainable development, as measured by adjusted net saving, in ten Arab countries from 1995 to 2019. Their study highlights that strong institutions are crucial for promoting sustainable development in these regions. [27] Used fixed effects and the system generalized method of moments (GMM) to analyze the impact of institutional quality on sustainable development. Their results indicate that institutional quality positively influences sustainable development. They found that this effect is more pronounced in lower middle-income countries compared to low-income countries, suggesting that improved institutional frameworks in the former group lead to greater advancements in sustainable development.

In their study spanning 65 developing economies across various regions from 1984 to 2019, [28] concluded that institutional quality plays a crucial role in promoting economic sustainability. The research highlights how effective governance, strong legal systems, and transparent institutions contribute significantly to sustainable economic growth. By fostering a stable environment for investment and development, these institutions help countries maintain long-term economic stability and resilience. The findings emphasize the need for policy reforms aimed at strengthening institutional frameworks to achieve sustainable development goals.

2.2.3. Institutional Quality as a Moderator

Institutional quality refers to the effectiveness of legal, political, and economic institutions in a country. Several studies highlight its critical role in shaping the impact of private investment on sustainable development. [29] Suggest that institutional quality can enhance or hinder the effectiveness of private investments in promoting growth and development. [30] Argue that strong institutions encourage investor confidence, leading to increased investments and sustainable growth. Their research shows that countries with better governance and lower corruption levels attract more investment, which translates into broader economic benefits. Empirical literature consistently demonstrates that private investment plays a vital role in the sustainable development of SSA. However, the presence of robust institutional frameworks significantly enhances this relationship. Improving institutional quality should be a priority for policymakers seeking to maximize the benefits of private investment for sustainable development in the region.

3. Methodology

This study examines the impact of private investment on sustainable development using panel data covering 30 African nations from 2010 to 2019. Thirty countries are included in the time span; totaling thirty multiply by ten to give three hundred observations. The World Development Indicators (adjusted net savings, remittances, private investment, consumption, labor force participation, and exports) serve as the primary source of data for this study while institutional quality is obtained from Heritage foundation. The selection of nations and the time span are determined by the availability of data. We use the adjusted net savings (as indicated by ANS) as a dependent variable in this study to serve as a stand-in for sustainable development. Quantifying sustainability has become a critical issue since the conventional notion of Gross Domestic Product (GDP) as an indicator for measuring growth is no longer suitable to reflect an economy's journey toward sustainable development. The World Bank developed the Adjusted Net Saving (ANS) rate in the 1990s as a way to measure sustainable development [31]. A nation's real saving rate is calculated by deducting expenditure on public education from GDP and net national savings, as well as by deducting environmental degradation and mineral depletion. It is usually expressed as a percentage of GNI, or gross national product. Economic theory states that the present worth of wellbeing is increasing in a country with a positive net saving rate and a sufficient diversity of assets included in the accounting. According to economic theory, a country's present value of welfare is increasing if its accounting includes a sufficiently wide range of assets and its net saving is positive. On the other hand, a continuously negative adjusted net saving indicates that the economy is not growing sustainably. Adjusted net savings have been utilized as a stand-in for sustainable development in the following previous studies: [31-34]. Export, labor force participation, private investment, and consumption are additional control variables used in this study. These are the functional and equation forms that describe this study:

$$ANS = f(PINV, CONS, REM, LFP, EXP, IQ, PINVIQ) \quad (1)$$

The model is written in equation forms as:

$$ANS_{it} = \alpha_1 PINV_{it} + \alpha_2 CONS_{it} + \alpha_3 REM_{it} + \alpha_4 LFP_{it} + \alpha_5 EXP_{it} + \alpha_6 IQ_{it} + \alpha_7 PINVIQ_{it} + \varepsilon_{it} \quad (2)$$

As indicated above, the dependent variable that best represents sustainable development is ANS_{it}. Remittances (REM_{it}), private investment ($PINV_{it}$), consumption expenditure ($CONS_{it}$), labor force participation rate (LFP_{it}), exports (EXP_{it}), institutional quality (IQ) and the ionteractoive term (PINVIQ) are the remaining variables. Where *t* is the sample period, ε is the error term, and the estimated parameters $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6$ and α_7, are all taken to be positive. The current realizations of the dependent variable in a dynamic system GMM process could be affected by its lag values. To put it another way, we use the system GMM to estimate the aforementioned model in order to solve the endogeneity issues, as is frequently recommended for adjustment dynamics [35, 36]. The main benefit of GMM estimate, according to [37], is its capacity to produce trustworthy results following endogeneity problem mitigation. By giving each variable a set of lagged values, the GMM solves the endogeneity problem among the variables. The inclusion of adjusted net savings allows for a more accurate assessment of sustainable development. Institutional quality demonstrates the private investment trickle-down effect. Private investment so function as a means to achieve the desired outcome through institutional quality. It is crucial to examine how household spending in the form of private investment impacts sustainable development because it is anticipated that household expenditures in the form of private investment is influenced by the quality of its institution. Without the labor force's participation, some of these variables can produce the necessary outcomes. Remittance inflows have the potential to encourage private investment, which in turn can raise productivity and output, both of which can improve exports. Therefore, in order to see how exports affect sustainable development, they must be included in the model. The dynamic model can be specified as:

$$ANS_{it} = \mu + \mu ANS_{it-1} + \alpha_1 PINV_{it} + \alpha_2 CONS_{it} + \alpha_3 REM_{it} + \alpha_4 LFP_{it} + \alpha_5 EXP_{it} + \alpha_6 IQ_{it} + + \alpha_7 PINVIQ_{it} + \varepsilon_{it} \quad (3)$$

where the lag value of the dependent variable (ANS) is measured by ANS_{it-1}. Table 1 presents the descriptions of the data set and variables.

Table 1. *Summary of Variables description and data sources.*

Variables	Definition	Measurement	Data Sources
Adjusted Net Savings (ANS)	It is gross national savings less the value of consumption of fixed capital.	Measure in % of GNI	World Development Indicators
Remittances (REM)	Remittances receive consist of all current transfers in cash or in kind made or received by resident households to or from nonresident households.	Measure in % of GDP	World Development Indicators
Consumption (CONS)	Consumption expenditure is the sum of household final consumption expenditure and general government final consumption expenditure.	Measure in % of GDP	World Development Indicators
Private investment (PINV)	Private investment covers gross outlays by the private sector (including private nonprofit agencies) on additions to its fixed domestic assets.	Measure in % of GDP	World Development Indicators
Exports (EXP)	Exports represent the value of all goods and other market services provided to the rest of the world.	Measure in % of GDP	World Development Indicators
Labour force participation (LFP)	It comprises people ages 15 and older who supply labor for the production of goods and services during a specified period.	People who are currently employed + people who are unemployed but seeking work + first-time job-seekers of age 15 year plus.	World Development Indicators
Institutions (IQ)	It includes government expenditure, property rights, business freedom, fiscal health, monetary freedom, investment freedom, trade freedom, labor freedom, tax burden, judicial efficacy, and government integrity.	Economic Freedom Index ranked in scale of 0-100	The Heritage Foundation

Source: Authors generation

4. Presentation of Results and Discussion

A thorough summary of the descriptive characteristics of the variables under study is given in Table 2. Given that the variables' mean and median consistently fall between the maximum and minimum bounds of the series, the descriptive statistics of the series demonstrate the high degree of consistency displayed by the variables (i.e., how stable or predictable the values in a data series are). The fact that the mean and median in this case are extremely near to one another and consistently fall between the lowest and maximum bounds of the data series indicates the consistency of the variables. The majority of the series' comparatively low standard deviation values suggest that their mean deviations from the actual mean values is quite tiny. When the mean and median are both at the dataset's extreme boundaries, or lowest and maximum, it indicates that the data distribution is not skewed and that the values are concentrated around a central value. When there is little variation in the data, it is common for the alignment to indicate that the values are largely stable or predictable. The real mean is only slightly deviated from by the mean deviations, which are essentially the absolute differences between the actual values and the mean. The low standard deviation and this are compatible. The data points tend to remain near the mean rather than diverge significantly from it. Stable and predictable data is characterised by low variability. According to this description, the data series is lowly variable, steady, and predictable. Closely spaced mean and median, low standard deviation, and modest mean deviations all point to a dataset in which values are reliably contained within a tiny range surrounding the central value. This may indicate that there is little variability in the data due to outside influences or that the underlying process or phenomenon being measured is generally steady.

Table 2. *Summary of descriptive statistics.*

Variables	Obs	Mean	Std. dev.	Min	Max
ANS	300	5.589489	10.34422	-23.16276	32.97298
REM	300	3.498213	4.559894	.0001871	27.30192
PINV	300	22.52814	7.171929	8.984055	52.41832
CONS	300	87.51304	12.82531	52.21826	134.5501
EXP	300	27.40139	11.99851	5.17204	61.54312
LFP	300	66.412	9.951177	45.49	86.507
IQ	300	55.89133	7.938513	21.4	77
PINVIQ	300	1265.432	436.6061	262.5872	2793.896

Source: Authors generation

The correlation matrix is shown in Table 3, where the correlation coefficient between two variables is shown in each cell. The pairwise relationships between eight variables are shown in the correlation matrix below. The minimum inverse associations between REM and ANS (-0.0836) and PINV (-0.0693) are indicated by the weak negative correlations between them. Its substantial positive correlation (0.5968) with CONS indicates that CONS tends to rise along with REM. It has negative associations with IQ (-0.3167) and LFP (-0.1765) and a modest positive connection with EXP (0.0317). PINV and ANS have a somewhat favourable association (0.4602) and PINVIQ has a substantial correlation (0.9255) with PINV. It shows a minor positive association with LFP (0.2656), a small positive correlation with REM (-0.0693), a moderate negative correlation with CONS (-0.3074), and small negative correlations with IQ (-0.2734). The interaction term between PINV and IQ, or PINVIQ, exhibits a strong positive correlation with PINV (0.9255), as anticipated; it also exhibits a moderate positive correlation with ANS (0.4272) and IQ (0.4616), as well as a moderate negative correlation with CONS (-0.3779), indicating a tendency for CONS to decrease as PINV and IQ interact more. PINVIQ appears to have the strongest connections with PINV and IQ, both positively. The link between ANS and CONS is strongly inverse. There is a noticeable correlation between PINV and IQ as well as the interaction of the two variables (PINVIQ). A small number of relationships (such as those between ANS and CONS, PINVIQ and PINV/IQ) are significant, but the majorities are weak or moderate.

Table 3. *Correlation matrix.*

Variables	ANS	REM	PINV	CONS	EXP	LFP	IQ	PINVIQ
ANS	1.0000							
REM	-0.0836	1.0000						
PINV	0.4602	-0.0693	1.0000					
CONS	-0.6047	0.5968	-0.3074	1,0000				
EXP	0.1466	0.0317	0.0095	-0.1359	1.0000			
LFP	0.1264	-0.1765	0.2656	-0.1431	-0.3099	1.0000		
IQ	0.0680	-0.3167	-0.2734	0.1111	-0.1793	0.2204	1.0000	
PINVIQ	0.4272	-0.1795	0.9255	-0.3779	0.0850	0.1698	0.4616	1.0000

Source: Authors generation

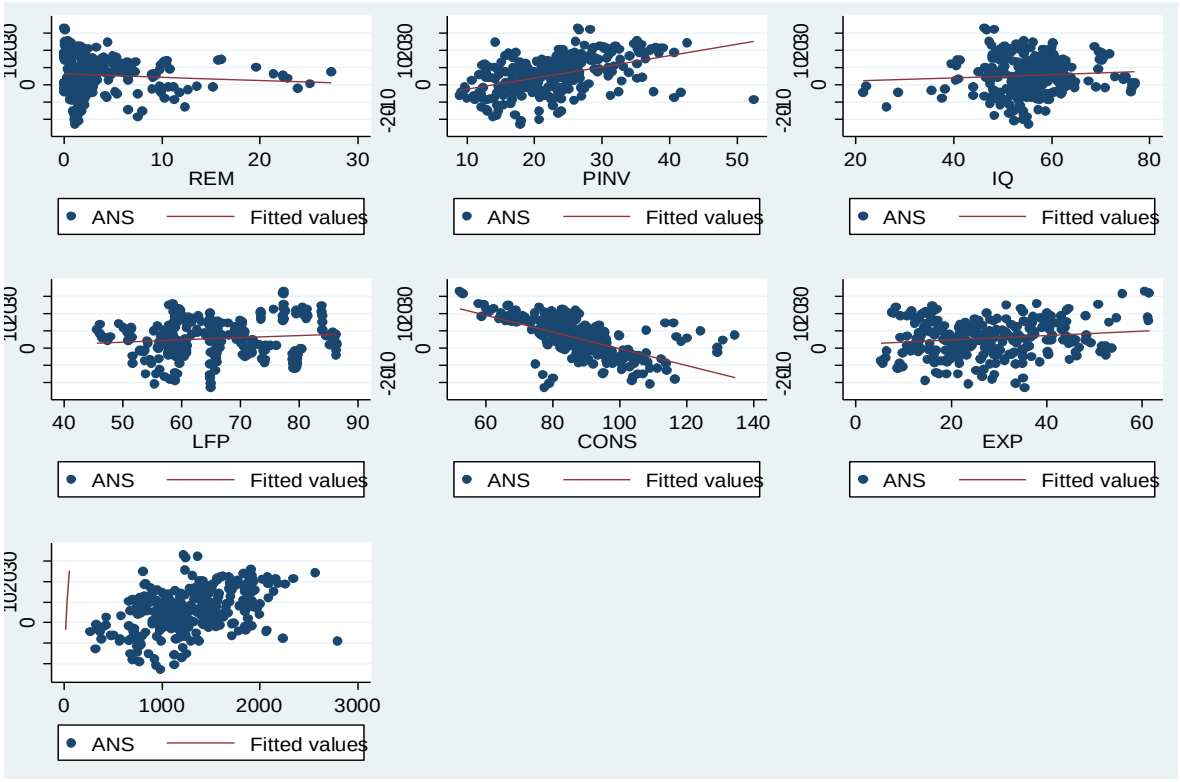

Figure 1. *Scatter plot of Adjusted Net Savings and the Independent Variables.*

Table 4 below displays the findings of the unit root analysis performed using the IM-PESARAN-Shin test. Since the majority of economic time series variables are non-stationary, a stationarity test was performed to make sure the results were adequate. It is suggested that non-stationary time series data cannot be used for precise decision-making since using them results in an apparent but erroneous regression. Exports and remittances don't vary after the initial discrepancy, but since the variables are all time series, it's important to look at their statistical characteristics before estimating the model. One of the most important pre-tests for time series analysis is the unit root because non-stationary variable analysis can lead to deceptive regression, which renders the results incorrect and untrustworthy. The findings of the IM-PESARAN-Shin Unit roots testing are shown in Table 4. Remittances (REM), exports (EXP), institutional quality (IQ), and the interacting term (PINVIQ) are stable following the initial difference, whereas all other variables are stationary at level, according to the results of the IM-Pesaran-Shin Unit roots test, which are displayed in Table 4 below.

Table 4. Summary of IM-PESARAN-Shin Unit roots.

Variables	At Level		First Difference		Decision
	statistics	p-value	statistics	p-value	
ANS	-2.0690	0.0193*			I(0)
REM	0.0554	0.5221	-5.1796	0.0000***	I(1)
CONS	-1.6058	0.0542*			I(0)
PINV	-2.4465	0.0072**			I(0)
LFP	-2.0724	0.0191*			I(0)
EXP	-1.0139	0.1553	-4.0808	0.0000***	I(1)
IQ	1.0514	0.8535	-5.2262	0.0000***	I(1)
PINVIQ	1.0192	0.8460	-4.0703	0.0000***	I(1)

*** p<0.01, ** p<0.05, * p<0.1
Source: Authors generation

Table 5. The Pedroni's cointegration tests.

Test Stats.	Statistic	p-value
Modified Phillips–Perron t	10.2946	0.0000
Phillips–Perron t	-22.5683	0.0000
Augmented Dickey–Fuller t	-16.2904	0.0000

Source: Authors generation

The Pedroni Cointegration Test is used to establish whether a long-run equilibrium relationship exists between two or more non-stationary time series variables, i.e., whether they are cointegrated. Cointegration suggests that there is a stable long-term relationship between the individual time series and that any short-term deviations from this relationship are only transient, even if the time series are non-stationary (that is, their means and variances vary over time). P-values of 0.0000 indicate that the result is extremely significant for each test statistic (such as the v-, rho, and PP-statistics, among others). The test strongly rejects the null hypothesis that there is no cointegration at conventional significance levels (e.g., 1%, 5%, or 10%) because the p-values are 0.0000. The time series in the dataset are therefore determined to be cointegrated. This suggests that the variables have a long-term relationship, that temporary deviations from their equilibrium relationship are the result of trends or random fluctuations, and that the variables move together over time.

The findings in Table 6 demonstrate a causal relationship between the independent and dependent variables. Adjusted net savings and remittances, adjusted net savings and labour force participation, adjusted net savings and export, adjusted net savings and institutional quality, and adjusted net savings and the interaction term (PINVIQ) have all been found to be bidirectionally causal. This is demonstrated in Table 6. On the other hand, there is evidence of a unidirectional causal relationship between adjusted net savings and consumption as well as private investment.

Table 6. Granger non-causality Test [36].

Null Hypothesis:	Wald test	p-value	Direction of relationship observed	Conclusion
REM does not Granger-cause ANS	21.9377	0.0000***	REM→ANS	Bidirectional causality
ANS does not Granger-cause REM.	5.8572	0.0535**	ANS→REM	
CONS does not Granger-cause ANS.	2.1375	0.3434		Unidirectional causality
ANS does not Granger-cause CONS.	5.1188	0.0773**	ANS→CONS	
PINV does not Granger-cause ANS.	37.1707	0.0000***	PINV→ANS	Unidirectional

Null Hypothesis:	Wald test	p-value	Direction of relationship observed	Conclusion
ANS does not Granger-cause PINV	0.4172	0.8117		causality
LFP does not Granger-cause ANS.	9.7777	0.0075**	LFP→ANS	Bidirectional causality
ANS does not Granger-cause LFP	8.8719	0.0118**	ANS→LFP	
EXP does not Granger-cause ANS.	7.4170	0.0245**	EXP→ANS	Bidirectional causality
ANS does not Granger-cause EXP.	36.4684	0.0000***	ANS→EXP	
IQ does not Granger-cause ANS	6.9198	0.0314**	IQ→ANS	Bidirectional causality
ANS does not Granger-cause IQ.	4.4e+03	0.0000***	ANS→IQ	
PINVIQ does not Granger-cause ANS.	31.7838	0.0000***	PINVIQ→ANS	Bidirectional causality
ANS does not Granger-cause PINVIQ	4.0e+04	0.0000***	ANS→PINVIQ	

Source: Authors generation

The results of the one-step system GMM are shown in Table 7. The results indicate that the lag values of adjusted net savings and adjusted net savings have a positive association for all three models. This implies that when adjusted net savings fall behind, sustainable development rises. By adjusting net savings, private investment boosted the proxy for sustainable development in Model 7. This illustrates how, if all things else stays the same, more private investment will eventually result in more sustainable development. More specifically, a rise of one unit in private investment will translate into an increase of 0.73 units in sustainable development. This result is consistent with [39] research, which found a long-term positive correlation between economic progress and private investment. He discovered that trade openness, urbanisation of agricultural land, vocational training for labour, investment in science and technology, and private sector financing showed strong correlations with private investment, boosting economic development. Furthermore, this outcome agrees with studies by [24, 40, 41] that show improved sustainable development as a result of foreign direct investment. Remittances considerably increased sustainable development. This shows that remittances are crucial to sustainable development; all other things being equal, a unit increase in remittances will result in a 0.66 unit rise in sustainable development. This is notable at 1%. This finding contradicts the findings of [42, 43], who found that remittance inflows had a detrimental influence on economic growth. However, it is consistent with the findings of [44, 45], who concluded that remittances promote economic growth.

In all the three models, IQ coefficients are consistently positive. This demonstrates how improvements in institutional quality have a beneficial impact on sustainable development; so, improvements in institutional quality promote sustainable development. This shows that a unit increase in institutional quality will translate into a 0.13 unit gain in sustainable development, all other variables being equal. The works of [26, 27] are in line with this finding where institutional quality favourably contributes to increased sustainable development.

Moreover, sustainable development, which is associated with the relationship between institutional quality and private investment, is negatively impacted by all three of the models. To be more exact, sustainable development will drop by 0.09 units for every 10 units increase in the interaction term (PINVIQ). This runs counter to [46] findings, which show that institutional quality and foreign direct investment both support the advancement of sustainable development. To be more precise, the amount of sustainable development captured by adjusted net savings will drop by 0.09 units for every 10 units increase in the interaction term (PINVIQ).

Table 7. *One-Step System GMM estimates (dependent variable adjusted net savings (ANS)).*

VARIABLES	(1)	(2)	(3)
	ANS	ANS	ANS
L.ANS	0.249	0.250	0.259
	(0.194)	(0.193)	(0.199)
PINV	0.729	0.741	0.730
	(0.572)	(0.574)	(0.573)
REM	0.658***	0.647***	0.664***
	(0.223)	(0.229)	(0.218)
CONS	-0.488***	-0.488***	-0.488***
	(0.123)	(0.124)	(0.125)
LFP	0.0228		0.0133
	(0.0626)		(0.0597)
EXP	0.0283	0.0233	
	(0.0659)	(0.0638)	

VARIABLES	(1) ANS	(2) ANS	(3) ANS
IQ	0.133	0.128	0.143
	(0.182)	(0.184)	(0.173)
PINVIQ	-0.00920	-0.00928	-0.00930
	(0.00993)	(0.00992)	(0.0100)
Constant	30.30**	32.10**	31.15**
	(13.88)	(13.55)	(14.67)
Observations	270	270	270
Number of Cid	30	30	30
Time Dummies	Year	Year	Year
Number of instruments	17	16	16
AR(1)	0.023	0.022	0.021
AR(2)	0.542	0.501	0.431
Hansen Test	0.511	0.535	0.509

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The Feasible Generalised Least Squares method has been used for robustness, as shown in Table 8 below. The results match the information in Table 7 above. In all three Models, private investment has a major positive impact on sustainable development. This shows that sustainable development in sub-Saharan African countries increases with an increase in private investment. It is imperative to continue making progress in this area since, assuming all other factors remain constant, a one unit gain in private investment will translate into an approximately 1.12 unit rise in sustainable development. At 1%, this has statistical significance. All of the models' institutional quality coefficients are positive, suggesting that they have a beneficial effect on sustainable development. Since all of the interactive's coefficients are negative for each of the three models, the result further supports the interactive's detrimental effects on sustainable development.

Table 8. *Feasible Generalised Least Squares Result (dependent variable adjusted net savings (ANS)).*

VARIABLES	(1) ANS	(2) ANS	(3) ANS
PINV	1.198***	1.209***	1.219***
	(0.437)	(0.437)	(0.438)
CONS	-0.610***	-0.611***	-0.619***
	(0.0422)	(0.0422)	(0.0415)
REM	0.834***	0.825***	0.851***
	(0.117)	(0.115)	(0.116)
LFP	0.0201		0.00632
	(0.0459)		(0.0442)
EXP	0.0397	0.0353	
	(0.0364)	(0.0350)	
IQ	0.234	0.229	0.251
	(0.170)	(0.170)	(0.170)
PINVIQ	-0.0154*	-0.0155*	-0.0158**
	(0.00805)	(0.00805)	(0.00806)
Constant	33.16***	34.78***	34.92***
	(10.50)	(9.831)	(10.40)
Observations	300	300	300
Number of Cid	30	30	30

Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

5. Conclusion and Policy Recommendations

This research looked at how private investment affected the sustainable development of countries in Sub-Saharan Africa (SSA) and also took institutional quality into account as a moderating factor. The findings suggest that the sustainable development of SSA nations is positively and significantly impacted by both institutional quality and private investment on their own. The interaction term between institutional quality and private investment, however, has a negative effect, indicating that the two factors' combined effects might not always promote sustainable growth as anticipated.

The negative interaction impact may suggest that, although robust institutional frameworks and private investment both contribute to growth, their interactions may not be fully optimised in the current SSA environment. This could be caused by inefficiencies in governance structures that lower the efficacy of private investments, or it could be the result of misalignments between institutional practices and investment aims. The results highlight how crucial it is to take a comprehensive and well-rounded approach to ensuring that institutional frameworks are designed to encourage private investment in ways that promote long-term, sustainable development.

Base the findings of this analysis, the following recommendations are offered. The governments of the SSA nations must prioritise enhancing institutional quality through bettering rule of law, transparency, and governance. As a result, an atmosphere free from the detrimental externalities brought about by ineffective or misaligned institutions would be conducive to the growth of private investment. It is the responsibility of policymakers to make sure that private investments complement regional and national objectives for sustainable development. This entails establishing laws that encourage ethical investment while simultaneously making sure that the regulatory framework supports sustainable business operations. In addition, the governments ought to investigate ways in which public-private partnerships (PPPs) might be utilised to close the gap that exists between private investment and institutional quality. PPPs can provide a more sustainable development framework by assisting in coordinating institutional goals with the expansion of the private sector. Lastly, training and development initiatives must be used to increase institutional capability. This would guarantee that investments support sustainable development and assist local institutions in managing private investment more skillfully.

The availability and calibre of data from Sub-Saharan African (SSA) nations is one of the study's main shortcomings. Accurate, reliable, and current statistics on institutional quality, sustainability indices, and private investment are difficult to obtain and report in many of the region's nations. This could have an impact on the results' generalisability and dependability. Subsequent research endeavours may explore the particular categories of establishments (such as financial, legal, and regulatory) that exert the greatest moderating influence on the outcomes of private investment. This might provide more detailed information about institutional changes.

Abbreviations

SSA	Sub-Sahara Africa
GDP	Gross Domestic Product
ANS	Adjusted ne Saving
PPPs	Public Private Partnership
CSV	Creating Share Valkue
TBL	Triple Bottom Line
FDI	Foreign Direct Investment
UNCTAD	United Nations Conference in Trade and Development
ESG	Environmental, Social and Governance
CONS	Consumption
PINV	Private Investment
LFP	Labour Force Participation
IQ	Institutional Quality
GMM	Generalised Method of Moment
FGLS	Feasible Generalised Least Square
EXP	Export

Conflicts of Interest

The authors declare no conflicts of interest.

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