

The Effects of Diaspora Remittances and Investment on Sustainable Development in Nigeria

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DOI: <https://doi.org/10.51584/IJRIAS.2026.11080122>

Received: 30 August 2026; Accepted: 04 September 2026; Published: 16 August 2026

ABSTRACT

Despite the growing importance of diaspora remittances and investment in financing development, Nigeria still faces challenges in translating these inflows into sustainable development. This raises concerns about whether remittances and investment contribute to sustainable development beyond their short-run effects. This study examined the effects of diaspora remittances and investment on sustainable development in Nigeria over the period 1990–2025. Adjusted Net Savings (ANS) was used as a proxy for sustainable development, while gross capital formation (GCF) represented investment. Annual data obtained from the Central Bank of Nigeria (CBN), the National Bureau of Statistics (NBS), and the World Bank's World Development Indicators (WDI) were analysed using the Autoregressive Distributed Lag (ARDL) approach. The bounds test yielded an F-statistic of 5.71, exceeding the 5 per cent upper-bound critical value of 4.85 and confirming a significant long-run relationship among the variables. The short-run results showed that remittances had a positive and statistically significant lagged effect on ANS, with a coefficient of 2.247 ($p = 0.019$), although their contemporaneous effect was negative and statistically insignificant. Gross capital formation had a negative and statistically insignificant short-run effect. The error-correction coefficient was negative and statistically significant at the 1 per cent level (-0.535 ; $p = 0.001$), indicating that approximately 53.5 per cent of short-run disequilibrium was corrected within one period. In the long run, remittances (-2.413 ; $p = 0.223$) and GCF (-0.127 ; $p = 0.756$) had negative but statistically insignificant effects on ANS. The study concluded that remittances had short-run developmental potential, but neither remittances nor investment significantly improved sustainable development in the long run. It recommended strengthening financial inclusion, promoting productive remittance investment, improving investment efficiency, enhancing institutional capacity, and adopting an integrated remittance–investment policy framework to promote sustainable wealth creation and environmentally sustainable capital formation in Nigeria.

Keywords: Adjusted Net Savings; Diaspora Remittances; Gross Capital Formation; Investment; Sustainable Development.

BACKGROUND TO THE STUDY

The increasing integration of developing economies into the global financial system has fundamentally reshaped the architecture of development finance by expanding access to diverse sources of external capital capable of supporting long-term economic transformation and sustainable development (Ojeyinka et al., 2024). Beyond conventional sources of external finance, such as foreign direct investment (FDI), official

development assistance (ODA), portfolio investment, and external borrowing, diaspora remittances have emerged as one of the most stable, resilient, and rapidly growing financial inflows to developing economies (Ali et al., 2024; Ifeacho, 2025). Their growing importance stems not only from their increasing volume but also from their relative stability during periods of economic uncertainty. Unlike other forms of international capital that are primarily driven by profit motives and are highly sensitive to global financial fluctuations, diaspora remittances are largely motivated by family obligations, altruism, and enduring social ties. Consequently, they have consistently demonstrated remarkable resilience in the face of economic shocks, geopolitical tensions, inflationary pressures, and financial market instability (Onyina et al., 2025).

Globally, remittance flows have continued to increase despite persistent economic and geopolitical challenges. According to the World Bank (2025), officially recorded remittance inflows to low- and middle-income countries (LMICs) reached approximately US\$685 billion in 2024, up from US\$656 billion in 2023, while total global remittance flows, including transfers to high-income countries, exceeded US\$905 billion (Mutai et al., 2024). These inflows substantially surpass official development assistance and remain among the largest and most reliable sources of external finance for many developing economies. Their resilience and countercyclical nature have further strengthened their role in supporting household livelihoods, enhancing economic stability, and complementing national development financing, particularly during periods of global economic and financial crises.

The developmental significance of diaspora remittances is especially evident in Sub-Saharan Africa, where they have become an increasingly important source of financing for household welfare and broader socioeconomic development. Beyond supporting household consumption, remittances contribute to poverty reduction, consumption smoothing, improved access to education and healthcare, entrepreneurship development, and macroeconomic stability (Barkat et al., 2024). According to the World Bank (2025), remittance inflows to Sub-Saharan Africa increased to approximately US\$61 billion in 2024, reflecting sustained growth despite prevailing global economic uncertainties (Ahmat-Tidjani, 2025). These inflows have become indispensable sources of foreign exchange earnings for many African countries, helping to mitigate the adverse effects of exchange rate volatility, declining commodity prices, inflationary pressures, and fiscal constraints. Consequently, diaspora remittances now constitute a vital component of development finance across the region, complementing domestic resources and other external financial inflows in advancing sustainable development objectives.

Among Sub-Saharan African countries, Nigeria occupies a strategic position as one of the continent's largest economies and one of the leading recipients of diaspora remittances. Over the past three decades, the country has experienced substantial growth in remittance inflows, largely driven by the continuous migration of skilled and unskilled Nigerians in search of better employment opportunities, quality education, and improved living conditions abroad (Isana et al., 2025; Okeke & Nwosu, 2025). According to the United Nations Department of Economic and Social Affairs (UN DESA, 2024), more than 1.7 million Nigerian-born migrants currently reside outside the country, while estimates from the International Organization for Migration (IOM) indicate that the broader Nigerian diaspora is considerably larger when undocumented migrants and second-generation populations are taken into account. Reflecting this growing diaspora population, the World Bank (2025) reports that officially recorded remittance inflows into Nigeria reached approximately US\$19.8 billion in 2024, making the country one of the largest remittance recipients in Africa. Similarly, the Central Bank of Nigeria (CBN, 2024) documented a significant increase in remittance inflows through formal channels following the implementation of exchange rate reforms, improvements in foreign exchange policies, and the expansion of digital money transfer platforms. In several years, remittance inflows have exceeded foreign direct investment (FDI) and official development assistance (ODA), underscoring their growing importance as a reliable and sustainable source of development finance. Beyond supporting household consumption, these inflows finance education, healthcare, housing, agricultural production, entrepreneurship, and the growth of small and medium-sized enterprises (SMEs), thereby contributing both directly and indirectly to sustainable development outcomes (Alhassan et al., 2025).

The growing significance of diaspora remittances is closely aligned with the broader objective of sustainable development, which has become a central priority of national and international development agendas. Unlike traditional measures of development that focus primarily on economic growth, sustainable development embraces a multidimensional perspective encompassing economic prosperity, social inclusion, environmental sustainability, institutional effectiveness, and intergenerational equity (Abdulkareem et al., 2025). Since the adoption of the United Nations Sustainable Development Goals (SDGs) in 2015, governments across the world have intensified efforts to mobilise diverse financial resources capable of promoting inclusive growth, improving human well-being, and reducing multidimensional poverty. Nevertheless, global progress towards achieving the SDGs has remained uneven (De-Jong et al., 2025). According to the United Nations Sustainable Development Goals Report (2024), only about 17% of the SDG targets are currently on track, while nearly half are progressing too slowly and more than one-third have either stagnated or regressed. The situation is particularly challenging in Nigeria, where sustainable development indicators remain relatively weak despite the country's abundant natural and human resources. The United Nations Development Programme (UNDP, 2025) reports that Nigeria's Human Development Index (HDI) stands at approximately 0.548, placing the country within the medium human development category and highlighting the need for more effective strategies to translate financial resources into sustainable development outcomes.

Beyond remittance inflows, investment constitutes another fundamental pillar of sustainable economic transformation. Both public and private investment promote capital accumulation, technological innovation, infrastructure development, industrial expansion, productivity enhancement, employment creation, and structural transformation. Gross capital formation, which measures additions to a nation's productive assets, is widely recognised as a key indicator of investment performance and long-term economic competitiveness (Zakari et al., 2025). However, according to the World Development Indicators (2025), Nigeria's gross capital formation has remained relatively modest, averaging between 24% and 26% of GDP in recent years. This relatively low investment performance reflects persistent structural constraints, including inadequate infrastructure, limited access to long-term finance, policy uncertainty, insecurity, and macroeconomic instability. Efficient investment allocation generates significant multiplier effects capable of raising productivity, improving living standards, reducing poverty, and fostering sustainable development (Zakari et al., 2025).

The interaction between diaspora remittances and investment has therefore emerged as an important mechanism through which sustainable development can be promoted and has consequently attracted growing attention within contemporary empirical literature (Alhassan et al., 2024). Although remittances directly improve household welfare by increasing disposable income and facilitating consumption smoothing, they also possess substantial potential to finance productive investment when channelled into economically viable activities. Remittance-financed investments in agriculture, manufacturing, housing, education, healthcare, financial assets, and small and medium-sized enterprises stimulate domestic production, employment generation, income diversification, technological innovation, and local economic development (Ojeyinka, 2024; Jallow & Jiang, 2025). Consequently, the developmental impact of remittances depends not only on the magnitude of financial inflows but also on the extent to which these resources are transformed from consumption-oriented transfers into productive investments capable of generating sustained socioeconomic benefits.

Despite sustained growth in remittance inflows and continued investment efforts, Nigeria continues to face significant sustainable development challenges. Poverty remains pervasive, unemployment and underemployment persist at high levels, income inequality continues to widen, infrastructure deficits remain substantial, environmental degradation has intensified, and access to quality healthcare, education, clean water, and social protection remains inadequate for a considerable proportion of the population (Ahmat-Tidjani, 2025). According to the National Bureau of Statistics (NBS, 2022), approximately 133 million Nigerians, representing 63% of the population, are classified as multidimensionally poor. Furthermore, the World Bank (2025) estimates that nearly 47% of Nigerians live below the international poverty line, while inflation exceeded 33% in 2024, significantly eroding household purchasing power and exacerbating food

insecurity. Although Nigeria has experienced periods of positive economic growth, these gains have not consistently translated into broad-based improvements in human development and social welfare (Adewuyi & Olofin, 2024). Consequently, progress towards achieving several Sustainable Development Goals has remained relatively slow, raising important concerns about the effectiveness of existing financial inflows and investment in promoting inclusive and sustainable development.

This apparent disconnect between rising external financial inflows and limited sustainable development outcomes can be attributed to several structural and institutional constraints. A substantial proportion of diaspora remittances continues to finance immediate household consumption rather than productive investment, thereby limiting their long-term developmental impact. Moreover, weak financial institutions, inadequate investment opportunities, poor infrastructure, governance deficiencies, policy inconsistencies, insecurity, exchange rate volatility, inflationary pressures, and limited financial inclusion constrain the effective mobilisation and productive utilisation of remittance inflows (Asongu & Odhiambo, 2024; Nyamongo & Misati, 2024). Domestic investment has likewise been constrained by macroeconomic instability, rising production costs, foreign exchange shortages, high borrowing costs, and institutional weaknesses, thereby reducing its capacity to stimulate sustainable development. These challenges underscore the importance of strengthening the institutional and policy environment to ensure that diaspora remittances and investment are effectively harnessed as complementary instruments for advancing sustainable development in Nigeria.

The relationship between diaspora remittances, investment, and sustainable development is well grounded in several complementary theoretical perspectives that explain the channels through which financial inflows contribute to long-term development outcomes. The New Economics of Labour Migration (NELM) Theory posits that migration and remittance decisions constitute household strategies aimed at overcoming imperfections in credit and insurance markets, relaxing liquidity constraints, diversifying income sources, and financing productive investments that enhance household welfare and economic resilience (Ajide & Raheem, 2024). In a similar vein, Endogenous Growth Theory emphasises that sustained economic growth is primarily driven by investment in physical capital, human capital, technological innovation, and knowledge accumulation, all of which enhance productivity and promote long-term economic development (Adeleye & Eboagu, 2024). Likewise, Sustainable Development Theory underscores the importance of allocating financial resources efficiently to activities that simultaneously foster economic prosperity, social inclusion, environmental sustainability, and institutional resilience. Collectively, these theoretical perspectives provide a robust conceptual foundation for understanding how diaspora remittances, when effectively mobilised and channelled into productive investment, can complement domestic investment in promoting sustainable development.

Despite the growing body of empirical literature on diaspora remittances in Nigeria, existing studies have largely focused on their effects on economic growth, household welfare, poverty reduction, financial development, and consumption behaviour. Comparatively little attention has been devoted to examining the complementary roles of diaspora remittances and investment in advancing sustainable development. Moreover, many previous studies rely on datasets that do not adequately capture recent structural and macroeconomic developments, including the post-COVID-19 economic recovery, exchange rate liberalisation, digital remittance innovations, financial sector reforms, and evolving investment dynamics. Consequently, important empirical gaps remain regarding the extent to which diaspora remittances and investment interact to influence sustainable development under Nigeria's changing economic environment. Given the country's renewed commitment to achieving the Sustainable Development Goals (SDGs), strengthening financial sector reforms, expanding digital payment infrastructure, and enhancing diaspora engagement initiatives, there is a pressing need for updated empirical evidence capable of informing policies that promote the productive utilisation of remittance inflows and improve sustainable development outcomes.

Against this backdrop, the present study investigates the effects of diaspora remittances and investment on sustainable development in Nigeria. Specifically, it examines the extent to which diaspora remittances and investment, both individually and jointly, contribute to improving sustainable development outcomes. In doing

so, the study provides robust empirical evidence to support the formulation of policies aimed at enhancing the developmental impact of remittance inflows through productive investment and efficient financial intermediation. The findings are expected to make a significant contribution to the growing literature on migration, investment, and sustainable development while offering practical policy recommendations for strengthening institutional quality, promoting productive investment, improving financial inclusion, and accelerating Nigeria's progress towards achieving the Sustainable Development Goals.

Statement of the Research Problem

Despite the growing importance of diaspora remittances as a source of external development finance and sustained efforts to stimulate investment in Nigeria, there remains limited empirical evidence on whether these financial resources have translated into measurable improvements in sustainable development, (Ogege & Agbesuyi, 2025). Although remittance inflows have increased substantially over the years and investment has remained a central focus of successive national development strategies, the extent to which these two sources of finance jointly contribute to sustainable development remains insufficiently understood, (Magwedere & Marozva, 2024; Mba & Chijioke, 2024). Consequently, policymakers continue to face considerable uncertainty regarding the effectiveness of existing strategies designed to leverage diaspora resources and investment to achieve long-term, inclusive, and sustainable national development.

A major concern is that Nigeria's policy framework has largely emphasised increasing the volume of diaspora remittances and investment without adequately evaluating their developmental effectiveness. Existing initiatives, including diaspora engagement programmes, investment promotion policies, financial inclusion strategies, and foreign exchange reforms, have focused primarily on attracting financial inflows rather than assessing whether these resources are effectively transformed into improvements in human development, social welfare, environmental sustainability, and inclusive economic progress. As a result, a significant policy gap persists because increasing financial inflows alone cannot guarantee sustainable development unless such resources are effectively mobilised, efficiently intermediated, and productively utilised.

Another important concern relates to the interaction between diaspora remittances and domestic investment. Although both are widely recognised as important sources of development finance, existing studies have largely examined their independent effects, with limited attention devoted to their complementary or interactive contributions to sustainable development. Consequently, the potential synergies through which remittance inflows may stimulate productive investment and jointly promote sustainable development remain insufficiently explored. This fragmented approach provides only a partial understanding of the mechanisms through which these financial resources influence development outcomes and constrains the formulation of integrated policy interventions capable of maximising their developmental impact.

The existing empirical literature also exhibits notable conceptual, methodological, and measurement limitations. Most previous studies on Nigeria have examined diaspora remittances in relation to economic growth, poverty reduction, household consumption, financial inclusion, or welfare, whereas investment-related studies have focused primarily on economic growth, productivity, or capital accumulation. Comparatively few studies have adopted sustainable development as the principal outcome variable by simultaneously capturing its economic, social, and environmental dimensions. Moreover, many earlier studies relied on relatively short sample periods, excluded recent structural developments—including the post-COVID-19 economic recovery, exchange rate liberalisation, the rapid expansion of digital remittance channels, and ongoing financial sector reforms—or employed estimation techniques that may not adequately capture the long-run dynamics among the variables. Consequently, the relevance of much of the existing evidence for informing contemporary policy decisions remains limited.

Furthermore, empirical evidence on the developmental effects of diaspora remittances and investment remains mixed and inconclusive. While numerous studies (Ojeyinka & Ibukun, 2024; Garcia-Fuentes, et al., 2025; Alhassan et al., 2025; Mia et al., 2025; Mba & Onwunyi, 2025) report that remittances significantly reduce poverty, promote financial inclusion, enhance human capital development, stimulate entrepreneurship,

strengthen household resilience, and foster economic growth, other studies (Anwar, 2024; Carare et al., 2024; Ibrahim et al., 2024; Jijin, 2026) contend that excessive reliance on remittance inflows may encourage consumption-oriented expenditure, discourage labour force participation, generate inflationary pressures, widen regional inequalities, and create long-term dependency among recipient households. Similarly, although investment is widely recognised as a key driver of economic growth and development, its contribution to sustainable development depends critically on institutional quality, governance effectiveness, macroeconomic stability, financial sector development, and the efficiency with which financial resources are allocated and utilised. These contrasting findings indicate that the developmental effects of diaspora remittances and investment are highly context-specific, varying across countries according to differences in institutional quality, macroeconomic conditions, and policy environments. Collectively, these inconsistencies underscore the need for country-specific empirical investigations capable of generating more robust and policy-relevant evidence for Nigeria.

Against this background, the absence of comprehensive empirical evidence on the combined effects of diaspora remittances and investment on sustainable development represents a significant knowledge gap, particularly at a time when Nigeria is pursuing the Sustainable Development Goals (SDGs), implementing wide-ranging economic reforms, strengthening diaspora engagement, and seeking alternative sources of development finance amid declining fiscal space and increasing global economic uncertainty. Without a clear understanding of how these financial resources interact to influence sustainable development, policy interventions aimed at harnessing diaspora remittances and promoting investment are likely to remain fragmented, suboptimal, and less effective in delivering broad-based and sustainable development outcomes. It is against these conceptual, empirical, methodological, and policy gaps that this study investigates the effects of diaspora remittances and investment on sustainable development in Nigeria. By jointly examining these variables using recent data and an appropriate analytical framework, the study seeks to generate updated empirical evidence that enriches the existing literature, provides policymakers with a stronger basis for designing strategies that enhance the productive utilisation of diaspora remittances and stimulate investment, and ultimately accelerates sustainable, inclusive, and resilient development in Nigeria.

Research Objectives

To examine the effects of diaspora remittances and investment on sustainable development in Nigeria.

LITERATURE REVIEW

Theoretical Review

The New Economics of Labour Migration (NELM) Theory

The New Economics of Labour Migration (NELM) Theory, developed by Stark and Bloom (1985), extends neoclassical migration theory by arguing that migration decisions are made collectively by households rather than by individuals acting independently. The theory posits that households use migration as a strategic response to imperfections in credit, insurance, and labour markets to diversify income sources, reduce economic risks, and ease liquidity constraints. Within this framework, diaspora remittances serve as an important financial mechanism through which migrants support their households, not only by financing current consumption but also by funding education, healthcare, housing, entrepreneurship, and other productive investments, (Shair et al. 2026). When remittances are channelled into productive activities, they can stimulate capital accumulation, create employment, improve household welfare, and promote long-term socioeconomic development. Thus, the developmental effect of remittances depends not only on their volume but also on the extent to which they are converted into productive investments that generate sustainable economic and social benefits, (Blouchoutzi et al. 2026). This proposition is particularly relevant to Nigeria, where diaspora remittances constitute one of the country's largest and most stable sources of external financial inflows, while access to investment finance remains constrained by structural and institutional challenges. The theory therefore explains how remittances can complement domestic investment in promoting sustainable

development through productive activities, human capital development, household resilience, and inclusive economic progress. Accordingly, the NELM Theory provides an appropriate theoretical foundation for this study because it directly explains the relationship between diaspora remittances, investment, and sustainable development, which lies at the core of the research.

Empirical Literature

The empirical literature on diaspora remittances and development has expanded considerably, particularly because remittances have become an important source of external finance and household income in developing economies. However, findings remain mixed, suggesting that their developmental effects depend not only on the volume of inflows but also on their utilisation and the prevailing institutional, financial, and macroeconomic conditions.

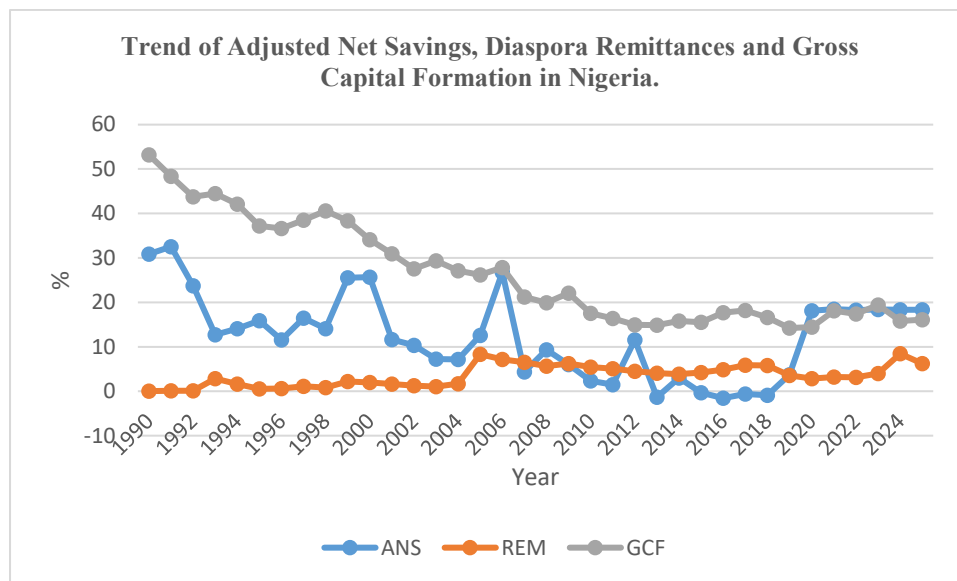
Adewale et al. (2021) examined the effect of diaspora remittances on economic growth in Nigeria using the ARDL model and annual data for 1986–2019. The study found that remittances had positive and statistically significant effects on economic growth in both the short and long run, although the magnitude was relatively small. It therefore recommended policies that promote the productive use of remittances through investment, job creation, financial development, and industrial diversification. In contrast, Anetor (2019), using ARDL and data for 1981–2017, found that remittances and financial sector development had significant negative effects on economic growth in both the short and long run. These contrasting findings indicate that the impact of remittances may depend on financial-system efficiency and the extent to which funds are channelled into productive activities. Osayi and Akemiyefa (2023) examined the capacity of Nigeria's financial system to mobilise and utilise diaspora remittances for sustainable economic development using data for 1987–2020. The study highlighted the substantial volume of remittance inflows and recommended stronger formal financial channels and policies that encourage their use in employment-generating activities. Similarly, Akanle et al. (2022) examined the contribution of remittances to the Sustainable Development Goals in Africa and argued that remittances can support poverty reduction, health, education, employment, inequality reduction, and other dimensions of sustainable development. Owotemu et al. (2024) further showed that remittances directed towards infrastructure, education, healthcare, housing, and other productive activities can stimulate investment and household income, particularly where supportive financial and institutional environments exist.

More recent Nigerian evidence by Ogege and Agbesuyi (2025) found that remittances had significant positive effects on GDP growth, per capita income, and human capital development using ARDL and data for 1985–2023. The study recommended promoting remittance utilisation in education, healthcare, and small and medium-sized enterprises. Ibrahim (2026) similarly found that remittances generally reduce poverty and improve financial inclusion, although their effects on economic growth and environmental outcomes vary with financial development, human capital, and institutional quality. Al-Kazraji (2026), using panel data, further established that remittances were more strongly associated with sustainable growth in high-remittance countries, while their effects were weaker or negative where institutions and investment opportunities were limited. Importantly, productive utilisation generated stronger long-term development effects than consumption-oriented use. Evidence from India also reinforces the importance of investment as a transmission mechanism. Narang (2020), using the Two-Stage Least Squares approach and data for 1975–2017, found that although remittances had no direct effect on GDP, they increased household consumption and additions to capital stock, which subsequently contributed to economic output. This suggests that the developmental contribution of remittances may operate indirectly through investment and capital accumulation. Overall, the empirical evidence indicates that diaspora remittances can support economic growth, poverty reduction, human capital development, financial inclusion, investment, and sustainable development. Nevertheless, the mixed and conditional findings suggest that their effects depend substantially on institutional quality, financial development, macroeconomic stability, and productive utilisation. The literature therefore points to investment as an important channel through which remittances can generate durable development outcomes. Despite the growing literature, an important gap remains in Nigeria. Most previous studies have examined remittances separately or focused on conventional development indicators such as economic growth, GDP per

capita, poverty, consumption, and human capital, with limited attention to the joint effects of diaspora remittances and investment on sustainable development. The divergent findings of Adewale et al. (2021), Anetor (2019), Ogege and Agbesuyi (2025), Ibrahim (2026), and Al-Kazraji (2026) further demonstrate the need for additional empirical investigation.

Against this background, this study jointly examines diaspora remittances and investment as determinants of sustainable development in Nigeria using recent national data and a time-series econometric framework that captures both short-run and long-run effects. By moving beyond conventional economic indicators to sustainable development, the study provides broader evidence on how remittances and investment can be mobilised and utilised to promote inclusive, resilient, and sustainable development in Nigeria.

Figure 1: Trend of Adjusted Net Savings, Diaspora Remittances and Gross Capital Formation in Nigeria.



Source: Author's computation, 2026

The trends presented in Figure 1 reveal important changes in Adjusted Net Savings (ANS), diaspora remittances (REM), and gross capital formation (GCF) in Nigeria between 1990 and 2025. ANS was highly volatile, declining from relatively high levels in the early 1990s and becoming negative between 2013 and 2018 before recovering strongly from 2019 and stabilising at about 18% in the later years. This pattern indicates alternating periods of improvement and deterioration in Nigeria's capacity to preserve and accumulate national wealth, with the later recovery suggesting improved sustainable-development performance. In contrast, REM generally increased over the period, despite some fluctuations. Remittances were negligible in the early 1990s but rose substantially from the mid-2000s, reaching 8.31% of GDP in 2005 and peaking at 8.44% in 2024 before declining to 6.23% in 2025. However, the coexistence of high remittance inflows with periods of declining or negative ANS suggests that increased remittances do not automatically translate into sustainable wealth accumulation. This may partly depend on whether remittances are directed towards consumption or productive and wealth-enhancing activities.

Similarly, GCF followed a declining long-term trend, falling from 53.19% of GDP in 1990 to 16.11% in 2025, despite intermittent recoveries, particularly between 2021 and 2023. This decline may constrain productive capacity, infrastructure development, employment creation, and long-term economic transformation. Overall, the divergent movements of ANS, REM, and GCF suggest that increases in remittances and changes in investment have not consistently translated into corresponding improvements in sustainable development. Although the trends do not establish causality, they provide a useful basis for examining the short- and long-run effects of remittances and investment on sustainable development in Nigeria. Consequently, the observed patterns highlight the need to promote the productive utilisation of remittances while improving the volume,

efficiency, and sustainability of investment. Such measures can strengthen productive capacity, support national wealth accumulation, and enhance Nigeria's prospects for sustainable development.

THEORETICAL FRAMEWORK AND MODEL SPECIFICATION

Based on the theoretical review and empirical consideration, the following model was used in this work: The functional relationship is expressed as:

$$SD_t = f(REM_t, INV_t) \text{-----} (1)$$

The corresponding econometric model is:

$$SD_t = \beta_0 + \beta_1 REM_t + \beta_2 INV_t + \eta_t \text{-----} (2)$$

Where:

SD_t = Sustainable Development in Nigeria at time t

REM_t = Diaspora Remittances at time t

INV_t = Investment at time t

β_0 = Constant/intercept

β_1, β_2 = Parameters to be estimated

η_t = Stochastic error term.

Thus, the empirical model becomes:

$$ANS_t = \beta_0 + \beta_1 REM_t + \beta_2 GCF_t + \eta_t \text{-----} (3)$$

Where:

ANS = Adjusted Net Savings, proxy for sustainable development;

REM = Personal remittances received (% of GDP);

GCF = Gross capital formation (% of GDP), proxy for investment.

The unrestricted ARDL (p, q₁, ---- q₂) model is specified as:

$$\Delta ANS_t = \alpha_0 + \sum_{i=1}^p \alpha_i \Delta ANS_{t-i} + \sum_{j=0}^{q_1} \beta_j \Delta REM_{t-j} + \sum_{k=0}^{q_2} \gamma_k \Delta GCF_{t-k} + \lambda_1 ANS_{t-1} + \lambda_2 REM_{t-1} + \lambda_3 GCF_{t-1} + \eta_t \text{---} (4)$$

The long-run relationship is:

$$ANS_t = \theta_0 + \theta_1 REM_t + \theta_2 GCF_t + \eta_t \text{-----} (5)$$

While the short-run error-correction representation is:

$$\Delta ANS_t = \alpha_0 + \sum \alpha_i \Delta ANS_{t-i} + \sum \beta_j \Delta REM_{t-j} + \sum \gamma_k \Delta GCF_{t-k} + \phi ECT_{t-1} + \eta_t \text{-----} (6)$$

Where ECT_{t-1} is the error-correction term and should be negative and statistically significant if a stable long-run relationship exists.

Structural Break Consideration

Given the relatively long study period of 1990–2025, during which Nigeria experienced substantial economic, financial, institutional, and policy changes, the possibility of structural breaks is an important consideration in the empirical analysis. Major developments over the study period, including the Structural Adjustment Programme and associated reforms of the 1990s, the transition to democratic governance in 1999, financial-sector reforms and banking consolidation in the 2000s, the 2008–2009 global financial crisis, the 2014–2016 oil-price shock and recession, the COVID-19 pandemic and associated 2020 recession, as well as subsequent fiscal, exchange-rate, and petroleum-sector reforms, may have influenced the behaviour of sustainable development, diaspora remittances, investment, and their underlying relationships. Ignoring such changes could potentially affect the stability of the estimated parameters and, consequently, the reliability of the empirical inferences drawn from the model. Accordingly, the study recognises the possibility that major economic and policy developments may have generated changes in the data-generating process over the sample period and therefore considers structural stability as an important aspect of the empirical analysis. This consideration complements the ARDL framework by ensuring that the estimated short-run and long-run relationships are interpreted with due regard to the major economic and policy transformations that occurred in Nigeria between 1990 and 2025.

Justification for the ARDL Specification and Small-Sample Consideration

The Autoregressive Distributed Lag (ARDL) approach is employed because the variables exhibit mixed orders of integration, with Adjusted Net Savings (ANS) being integrated of order zero, $I(0)$, while diaspora remittances (REM) and gross capital formation (GCF) are integrated of order one, $I(1)$; importantly, none of the variables is integrated of order two, $I(2)$. Given these integration properties, the ARDL framework is particularly appropriate because it permits the simultaneous examination of long-run relationships and short-run dynamics within a single modelling framework and is well suited to relatively small samples. Moreover, given the 36 annual observations covering the period 1990–2025, the selected ARDL(1,2,0) specification provides a parsimonious representation of the dynamic relationships among sustainable development, diaspora remittances, and investment without imposing an excessive parameter burden on the limited sample. The inclusion of only two explanatory variables, together with the relatively low lag orders, further helps to conserve degrees of freedom and mitigate the risk of over-parameterisation, thereby enhancing the efficiency and stability of the estimated model.

Furthermore, recognising that the conventional ARDL bounds-test critical values of Pesaran, Shin and Smith (2001) are based on asymptotic distributions and may not fully account for the limitations associated with small samples, the study supplements the conventional bounds-test assessment with the finite-sample critical values proposed by Narayan (2005). Specifically, given the 36 observations available for the study and the two explanatory variables ($k = 2$), the nearest available finite-sample critical values corresponding to 35 observations are employed as a robustness check. This finite-sample assessment provides a more conservative basis for determining the existence of a long-run relationship and strengthens the robustness of the study's cointegration inference. Accordingly, the ARDL bounds-testing procedure serves as the principal and sole cointegration approach adopted in the study, while the resulting long-run coefficients and short-run error-correction dynamics provide the empirical basis for assessing the effects of diaspora remittances and investment on sustainable development in Nigeria.

Source of Data

The study employed annual time-series data for Nigeria covering 1990–2025, sourced from the World Bank's World Development Indicators (WDI), the Central Bank of Nigeria (CBN) Statistical Bulletin, and the National Bureau of Statistics (NBS), selected for their reliability, consistency, and broad coverage. Sustainable

development was measured by Adjusted Net Savings (ANS) as a percentage of GNI, while diaspora remittances were measured by personal remittances received as a percentage of GDP and investment was proxied by gross capital formation (GCF) as a percentage of GDP. The data were carefully compiled, harmonised, and cross-checked where necessary to ensure consistency and comparability throughout the study period. The resulting annual observations were subjected to descriptive and econometric analyses, including unit-root, cointegration, and ARDL bounds testing, to examine the short- and long-run effects of diaspora remittances and investment on sustainable development in Nigeria.

Table 1: Measurement of Variables, Expected Signs and Theoretical Justification

Variable	Symbol	Measurement	Expected Sign	Theoretical Justification
Sustainable Development	SD (ANS)	Adjusted Net Savings (% of GNI)	—	Proxy for sustainable development, reflecting changes in national wealth after accounting for produced-capital depreciation, natural-resource depletion, and human-capital investment.
Diaspora Remittances	REM	Personal Remittances Received (% of GDP)	$\beta_1 > 0$	Expected to promote sustainable development through household welfare, human-capital development, entrepreneurship, savings, and productive activities.
Investment	INV (GCF)	Gross Capital Formation (% of GDP)	$\beta_2 > 0$	Expected to enhance sustainable development through capital accumulation, infrastructure development, technological advancement, employment creation, productivity improvement, and expanded productive capacity.

Source: Author's computation, 2026

Accordingly, the expected relationship can be expressed as:

$$SD_t = \beta_0 + \beta_1 REM_t + \beta_2 INV_t + \eta_t \text{-----} (7)$$

Where $\beta_1 > 0$ and $\beta_2 > 0$ are the expected coefficients of diaspora remittances and investment, respectively.

Data Analyses and Discussion of Findings

Descriptive Statistics

Table 2: Descriptive Statistics

	ANS	GCF	REM
Mean	12.379	26.461	3.514
Median	12.075	21.645	3.380

Maximum	32.540	53.190	8.440
Minimum	-1.560	14.210	0.020
Std. Dev.	9.455	11.455	2.406
Skewness	0.282	0.694	0.285
Kurtosis	2.263	2.204	2.061
Jarque-Bera	1.292	3.845	1.807
Prob	0.524	0.146	0.405
Sum	445.667	952.610	126.515
Sum Sq. Dev.	3128.930	4592.539	202.682
Obs	36	36	36

Source: Researcher's Compilation, 2026 from E-view-9.

The descriptive statistics in Table 2 show considerable variation in ANS, GCF, and REM over the study period. ANS has a mean of 12.379 and ranges from -1.560 to 32.540 , while GCF records the highest mean of 26.461 , ranging from 14.210 to 53.190 . REM has a mean of 3.514 and varies between 0.020 and 8.440 , indicating notable fluctuations in remittance inflows. The positive skewness values for ANS (0.282), GCF (0.694), and REM (0.285) indicate mild right-skewness, with GCF showing the greatest asymmetry. Moreover, kurtosis values below 3 indicate platykurtic distributions with relatively lighter tails than the normal distribution. Overall, the variables exhibit substantial variation without severe departures from normality, supporting their suitability for subsequent econometric analysis.

Correlation Analysis

Table 3: Results of correlation Test

	ANS	GCF	REM
ANS	1		
GCF	0.619	1	
REM	-0.373	-0.692	1

Source: Researcher's Compilation, 2026 from E-view-9.

The correlation results in Table 3 show varying degrees of association among ANS, GCF, and REM. Specifically, ANS is positively correlated with GCF (0.619) but negatively correlated with REM (-0.373), indicating moderate positive and inverse associations, respectively. Furthermore, GCF and REM exhibit a relatively strong negative correlation (-0.692), thereby representing the strongest relationship among the variables. Taken together, the results reveal meaningful associations among the variables; however, since correlation does not imply causality, the findings should be interpreted cautiously. Moreover, although the

correlation coefficients do not indicate severe multicollinearity, the relatively high correlation between GCF and REM warrants further diagnostic testing.

Table 4: Results of Unit Root Test

Table 4. Results of Unit Root Test at level and 1st deference

Variable	Test Statistic	5% critical Value	Remark	Test Statistic	5% critical Value	Remark
ANS	-2.954	-2.948	I(0)	-7.291	-2.951	-----
REM	-2.238	-2.948	-----	-6.139	-2.951	I(1)
GCF	-2.706	-2.948	-----	-5.768	-2.951	I(1)

Source: Researcher's Compilation (2026) from E-views-9

The unit root results in Table 4 show mixed orders of integration. ANS is stationary at level, I(0), with a test statistic of -2.954 , exceeding the 5% critical value of -2.948 in absolute terms. In contrast, REM and GCF are non-stationary at level but become stationary after first differencing, with test statistics of -6.139 and -5.768 , respectively, confirming that both are I(1). Since the variables are a mixture of I(0) and I(1), with none exceeding I(1), the ARDL approach is appropriate for examining their short- and long-run relationships.

Table 5: ARDL Bound Test Result

Test Statistic	Value	K: 2
F-statistic	5.71	
% critical levels	Critical value for Bound test	
Significance	I(0) Bound	I(1) Bound
10%	3.17	4.14
5%	3.79	4.85
2.5%	4.41	5.52
1%	5.15	6.36
Notes: ** denote significant at 5% levels. Critical values		

Source: Research's Compilation, 2026 from E-view-9

Table 5 presents the ARDL bounds test for a long-run relationship among the variables with two explanatory variables ($K = 2$). At the 5% significance level, the calculated F-statistic of 5.71 exceeds the upper-bound critical value of 4.85. Therefore, the null hypothesis of no long-run relationship is rejected, confirming a

significant long-run equilibrium relationship among the variables. This implies that short-run deviations are temporary and tend to adjust towards a stable long-run path.

Table 6: Short-Run Result of ARDL (Dependent Variable: ANS)

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.**
D(REM)	-0.176	0.748	-0.236	0.815
D(REM(-1))	2.247	0.909	2.471	0.019**
D(GCF)	-0.068	0.209	-0.325	0.747
CointEq(-1)	-0.535	0.145	-3.679	0.001**
Cointeq = ANS - (-2.413*REM -0.127*GCF + 21.624)				

Source: Research's Compilation, 2026 from E-view-9

The short-run ARDL estimates presented in Table 6 indicate that diaspora remittances (REM) exhibit a mixed but predominantly positive and lag-dependent association with Adjusted Net Savings (ANS), whereas gross capital formation (GCF) shows no statistically significant short-run association with ANS. In interpreting these results, it is important to emphasise that ANS is employed in this study as a proxy for sustainable development because it provides a broader measure of changes in a country's underlying wealth than conventional income-based indicators. By adjusting national savings for selected investments in human capital, depletion of natural resources, and environmental damage, ANS captures important economic, human-capital, and environmental dimensions of sustainable wealth accumulation. Nevertheless, ANS does not encompass all dimensions of sustainable development, particularly social inclusion, income distribution, institutional quality, gender equality, health outcomes, biodiversity, and other non-market dimensions of well-being. Accordingly, the estimated relationships should be interpreted as evidence concerning the association of diaspora remittances and investment with adjusted national wealth accumulation, rather than as definitive evidence that these variables causally determine sustainable development in its broader multidimensional sense.

Specifically, the contemporaneous change in remittances, D(REM), has a negative but statistically insignificant coefficient of -0.176 ($p = 0.815$), indicating that an immediate change in diaspora remittance inflows is not statistically associated with changes in adjusted net savings in the short run. In contrast, the first lag of remittances, D(REM(-1)), has a positive and statistically significant coefficient of 2.247 ($p = 0.019$), implying that a one-unit increase in remittance inflows in the preceding period is associated with an approximately 2.247-unit increase in ANS in the current period, ceteris paribus. Taken together, the contrasting contemporaneous and lagged coefficients suggest that the association between remittance inflows and adjusted national wealth accumulation may not materialise immediately but may emerge with a time lag. One possible explanation is that remittance resources may initially be directed towards immediate household consumption and other short-term needs before a portion is subsequently allocated to savings, investment, education, and other productive activities. This interpretation is consistent with Pal (2024), Nasrin et al. (2024), Joseph (2025), and Lamsal and Soneja (2025), who generally report positive relationships between remittance inflows and domestic or financial savings, although the magnitude and timing of these relationships vary across countries and institutional settings. More specifically, Joseph (2025) reports a positive short-run relationship between remittances and domestic savings in Tanzania, while Lamsal and Soneja (2025) find a positive and statistically significant association between remittances and financial savings in Nepal. These

findings are therefore broadly consistent with the present evidence that the savings-related association of remittances may emerge gradually through financial intermediation and the subsequent allocation of remittance resources. However, given the observational nature of the present time-series analysis, these findings should be interpreted as statistical associations rather than definitive evidence of a causal effect of remittances on sustainable development or adjusted net savings.

Similarly, gross capital formation (GCF) has a negative coefficient of -0.068 but is statistically insignificant ($p = 0.747$), indicating that changes in capital formation are not statistically associated with changes in adjusted net savings in the short run. Although the negative coefficient suggests a marginal inverse association between GCF and ANS, the high probability value indicates that this relationship is not statistically distinguishable from zero. One possible explanation is that investments in physical capital, infrastructure, machinery, and other productive assets may require time before their productivity and wealth-enhancing effects become observable. Moreover, the initial process of capital accumulation may involve substantial resource utilisation, depreciation, and environmental costs, which could offset some of its potential contribution to adjusted net savings in the short run. This finding is broadly consistent with Eze and Ugwuoke (2024), Amoah et al. (2024), Ozili (2025), and Eniekezimene et al. (2024), who report that capital formation does not necessarily generate immediate and statistically significant improvements in economic or environmental outcomes, particularly where investment is constrained by inefficiencies, weak productivity, or an unfavourable composition of capital expenditure. Accordingly, the absence of a statistically significant short-run association between GCF and ANS suggests that the relationship between capital accumulation and sustainable wealth accumulation may depend not merely on the volume of investment but also on its productivity, efficiency, sectoral composition, and capacity to generate durable economic and environmental benefits.

Beyond these variable-specific relationships, the error-correction term, $CointEq(-1)$, is negative and statistically significant at the 1% level, with a coefficient of -0.535 ($p = 0.001$). This result provides evidence of a systematic adjustment mechanism towards the estimated long-run equilibrium relationship among ANS, REM, and GCF. The coefficient indicates that approximately 53.5% of the disequilibrium arising from short-run disturbances is corrected within one period, implying a relatively rapid speed of adjustment towards the estimated long-run equilibrium path. In practical terms, when adjusted net savings deviates from its long-run equilibrium level following a short-run disturbance, more than half of the resulting disequilibrium is eliminated in the subsequent period. Thus, the negative and statistically significant error-correction coefficient indicates that deviations from the estimated long-run equilibrium are systematically corrected over time, suggesting that the model exhibits a strong tendency to converge towards its long-run equilibrium following short-run disturbances. The relatively high speed of adjustment therefore underscores the relevance of the estimated long-run equilibrium relationship to the short-run dynamics among adjusted net savings, diaspora remittances, and gross capital formation.

Notwithstanding these findings, the results differ from some recent empirical evidence. In the case of diaspora remittances, Nguyen et al. (2026) report that remittance inflows can be negatively associated with domestic savings in developing countries, suggesting that remittances may be directed predominantly towards consumption or informal economic activities rather than formal savings. This evidence contrasts with the positive and statistically significant lagged association between REM and ANS observed in the present study and indicates that the relationship between remittance inflows and savings may be conditioned by factors such as financial inclusion, institutional quality, household preferences, and the prevailing economic environment. Likewise, with respect to gross capital formation, Wang et al. (2025) and Olaoye et al. (2025) provide contrasting evidence by reporting that domestic capital formation can be significantly associated with improved sustainable-development outcomes, particularly when investment is channelled towards productive and sustainability-enhancing activities. Their findings therefore differ from the statistically insignificant short-run association between GCF and ANS obtained in the present study, suggesting that the relationship between capital accumulation and adjusted wealth may depend critically on the quality, productivity, composition, and efficiency of investment.

Overall, the short-run evidence indicates that diaspora remittances are positively associated with adjusted net savings with a one-period lag, whereas their contemporaneous association with ANS is statistically insignificant. Conversely, gross capital formation does not exhibit a statistically significant short-run association with ANS. The findings therefore suggest that the relationship between external household financial inflows, capital accumulation, and adjusted national wealth may be time-dependent rather than instantaneous. At the same time, the negative and statistically significant error-correction coefficient indicates that approximately 53.5% of short-run disequilibrium is corrected within one period, demonstrating relatively rapid convergence towards the estimated long-run equilibrium. From a policy perspective, the results suggest that strengthening financial inclusion, savings mobilisation, and productive investment channels could enhance the extent to which remittance inflows are associated with national wealth accumulation, while improving the efficiency, productivity, sustainability, and sectoral composition of investment could strengthen the relationship between capital formation and adjusted wealth. Nevertheless, these policy implications should be interpreted cautiously because the estimated ARDL relationships establish statistical associations and dynamic adjustment patterns rather than definitive causal effects. Ultimately, the findings provide evidence that diaspora remittances and investment are relevant components of Nigeria's sustainable wealth dynamics, while recognising that sustainable development is a multidimensional concept that cannot be fully represented by ANS alone.

Table 7: Long-run Estimates (Dependent Variable: ANS)

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.**
REM	-2.413	1.938	-1.245	0.223
GCF	-0.127	0.407	-0.313	0.756
C	21.624	16.197	1.335	0.193

Source: Research's Compilation, 2026 from E-view-9

The long-run ARDL estimates presented in Table 7 indicate that both diaspora remittances (REM) and gross capital formation (GCF) exhibit negative but statistically insignificant associations with Adjusted Net Savings (ANS) in the long run. Specifically, diaspora remittances (REM) have a coefficient of -2.413 and a probability value of 0.223, indicating that remittance inflows are negatively associated with adjusted net savings over the long run, although the estimated relationship is not statistically significant at conventional levels. Thus, a one-unit increase in remittance inflows is associated with an approximately 2.413-unit decline in ANS, *ceteris paribus*; however, given the probability value of 0.223, this estimated association cannot be regarded as statistically different from zero. Importantly, this finding should not be interpreted as evidence that remittances causally reduce sustainable development or adjusted net savings. Rather, it indicates that, conditional on the variables and specification employed, the data do not provide statistically significant evidence of a positive long-run association between remittance inflows and adjusted national wealth accumulation. Nevertheless, the negative coefficient may suggest that remittance inflows are not necessarily transformed into sustained wealth accumulation over time, but may instead be absorbed by household consumption and other immediate welfare needs. This interpretation is broadly consistent with Joseph (2025), who finds that remittances have a negative and statistically significant long-run association with domestic savings in Tanzania, although the study reports a positive short-run association. The finding also contrasts with Pal (2024), who reports a positive association between remittances and domestic savings and investment across the developing regions examined. These contrasting findings suggest that the relationship between remittance inflows and savings is not uniform across countries and may depend on the manner in which remittance resources are allocated within recipient economies.

Furthermore, the long-run negative and statistically insignificant association between REM and ANS contrasts with the positive and statistically significant lagged association observed in the short-run estimates. This divergence between the short- and long-run results suggests that the positive short-run association between remittance inflows and adjusted net savings may not persist over time. In other words, remittance inflows may initially be associated with higher adjusted net savings after a one-period lag, but this association may dissipate as recipients subsequently allocate remittance resources towards consumption, housing, education, healthcare, debt servicing, and other expenditure commitments. Consequently, the long-run finding highlights the importance of financial intermediation, savings incentives, investment opportunities, and institutional mechanisms capable of transforming remittance inflows into durable forms of national wealth. This interpretation is particularly relevant to Nigeria, where remittances constitute an important source of external financial resources, although their contribution to sustainable wealth accumulation ultimately depends on the extent to which such resources are mobilised into formal savings and productive activities.

Nevertheless, contrasting empirical evidence indicates that remittances can strengthen savings under favourable financial and institutional conditions. For instance, Lamsal and Soneja (2025) report a positive and statistically significant relationship between remittances and financial savings in Nepal, while Joseph (2025) identifies a positive and statistically significant short-run association between remittances and domestic savings in Tanzania. Similarly, Pal (2024) reports that remittances positively influence domestic savings and investment across the developing regions examined. These findings contrast with the negative long-run coefficient obtained for REM in the present study, although the evidence from Joseph (2025) is particularly instructive because it demonstrates that the relationship between remittances and savings can vary across time horizons. Accordingly, the contrasting evidence suggests that the relationship between remittances and savings is context-dependent and may be conditioned by financial inclusion, institutional quality, household preferences, investment opportunities, and the structure of the receiving economy.

Turning to gross capital formation (GCF), the variable exhibits a coefficient of -0.127 and a probability value of 0.756 , indicating a negative but statistically insignificant long-run association with adjusted net savings. Although the coefficient suggests that a one-unit increase in GCF is associated with an approximately 0.127 -unit decline in ANS, *ceteris paribus*, the high probability value indicates that this relationship is not statistically distinguishable from zero. Accordingly, the finding should not be interpreted as evidence that capital formation significantly reduces adjusted net savings. Rather, it indicates that the available evidence does not establish a statistically meaningful long-run association between GCF and ANS. This outcome may reflect the fact that the contribution of capital accumulation to sustainable wealth creation depends considerably on the quality, productivity, technological content, sectoral composition, efficiency, and environmental consequences of investment. In particular, capital formation concentrated in low-productivity, resource-intensive, or environmentally damaging activities may fail to generate corresponding improvements in sustainable wealth, even when the volume of investment increases. This interpretation is consistent with the broader sustainability literature, which emphasises that the contribution of capital accumulation to development depends not only on the quantity of investment but also on its efficiency and allocation across productive and sustainability-enhancing activities.

Empirical evidence provides support for the possibility that the sustainability implications of capital formation may vary across economic contexts. For example, Zakari et al. (2024) report a negative and statistically significant association between gross capital formation per capita and sustainable economic development in OECD countries, suggesting that increases in capital accumulation do not automatically translate into improvements in sustainability when environmental considerations are not adequately incorporated into investment decisions. Conversely, Farabi et al. (2024) find evidence that gross capital formation contributes positively to economic development in Indonesia, illustrating that capital accumulation can generate favourable development outcomes under particular economic and institutional conditions. These contrasting findings reinforce the view that the relationship between capital formation and sustainable wealth accumulation is not uniform and may depend substantially on the productivity, composition, efficiency, and environmental consequences of investment.

Moreover, the long-run insignificance of GCF is consistent with its short-run behaviour reported in Table 4, where GCF also exhibits a negative and statistically insignificant coefficient of -0.068 ($p = 0.747$). Taken together, the short- and long-run results indicate that gross capital formation does not exhibit a statistically significant association with adjusted net savings within the period examined. This persistent insignificance may indicate that the prevailing pattern of capital accumulation in Nigeria has not been sufficiently productive, efficient, or sustainability-oriented to generate measurable improvements in ANS. Consequently, increasing the volume of investment alone may be insufficient to enhance sustainable wealth accumulation unless capital expenditure is accompanied by improvements in project selection, institutional quality, technological efficiency, infrastructure management, and environmental safeguards.

Given the relatively long study period of 1990–2025, the interpretation of the estimated long-run relationships should also recognise the possibility of structural changes arising from major economic and policy developments in Nigeria. The study period encompasses several important episodes, including the Structural Adjustment Programme and associated economic reforms of the 1990s, the transition to democratic governance in 1999, financial-sector reforms and banking consolidation in the 2000s, the 2008–2009 global financial crisis, the 2014–2016 oil-price shock and economic recession, the COVID-19 pandemic and the 2020 recession, as well as subsequent exchange-rate, fiscal, and petroleum-sector reforms. These developments may have altered the economic environment and potentially affected the behaviour of remittances, investment, and adjusted net savings over time. Accordingly, the estimated coefficients should be interpreted as average long-run relationships over the sample period and should not necessarily be understood as evidence that the magnitude or direction of these relationships remained constant throughout 1990–2025. This consideration is particularly relevant when interpreting statistically insignificant long-run coefficients, because changes in the underlying economic and policy environment may affect the stability of the relationships being estimated.

The use of Adjusted Net Savings (ANS) as a proxy for sustainable development also requires careful interpretation. ANS provides a broader measure of sustainable wealth accumulation than conventional income or output indicators because it adjusts national savings for selected investments in human capital, depletion of natural resources, and environmental damage associated with pollution. Consequently, ANS captures important economic, human-capital, and environmental dimensions of sustainability and provides an indication of whether an economy is accumulating or depleting selected components of its underlying wealth. The theoretical foundation of this approach is rooted in the concept of genuine savings, which interprets changes in a nation's comprehensive capital stock as an indicator of weak sustainability and future well-being (Ferreira & Vincent, 2005; Hanley et al., 2015). Nevertheless, the literature also recognises important limitations of ANS, including measurement difficulties, assumptions concerning substitutability among different forms of capital, and the omission or incomplete valuation of some human, natural, social, and knowledge-capital components (Pillarissetti, 2005; Pezzey, 2024). Thus, ANS does not comprehensively represent all dimensions of sustainable development. In particular, it does not fully capture social inclusion, income distribution, gender equality, institutional quality, health outcomes, biodiversity, political and governance conditions, or other non-market dimensions of human well-being. Therefore, ANS should be regarded in this study as a measurable macroeconomic proxy for sustainable wealth accumulation rather than a complete representation of sustainable development in its broader multidimensional sense. The estimated relationships between REM, GCF, and ANS should consequently be interpreted as evidence concerning adjusted national wealth accumulation and not as definitive evidence concerning every dimension of sustainable development.

Finally, the findings should be distinguished carefully from causal claims. Although the ARDL framework is appropriate for examining dynamic short-run relationships and long-run equilibrium associations among variables with mixed orders of integration, the estimated coefficients do not, by themselves, establish that remittances or gross capital formation causally produce changes in sustainable development. In the absence of a stronger causal identification strategy, the results are appropriately interpreted as conditional statistical associations within the specified model. Accordingly, the negative and statistically insignificant coefficients for REM and GCF should not be interpreted as proof that remittances or investment directly undermine

sustainable development. Rather, they indicate that, over the study period and conditional on the model specification, the data do not provide statistically significant evidence of a positive long-run association between these variables and adjusted net savings. This interpretation is consistent with the observational nature of the study and avoids attributing causal effects to diaspora remittances or investment that cannot be conclusively established by the ARDL estimates alone.

Overall, the long-run estimates reveal that neither diaspora remittances nor gross capital formation exhibits a statistically significant long-run association with adjusted net savings in Nigeria, although both variables have negative coefficients. For remittances, the finding indicates that the positive short-run association observed after one period does not persist into the long run, suggesting that the savings-related association of remittance inflows may be temporary rather than sustained. Similarly, the negative and statistically insignificant coefficients for GCF in both the short and long run indicate that capital formation, in its observed form, has not generated a statistically measurable improvement in adjusted net savings during the study period. Taken together, these findings demonstrate that the relationship between external financial inflows, capital accumulation, and sustainable wealth accumulation is more complex than a simple increase in remittance inflows or investment expenditure. Therefore, policy attention should extend beyond increasing the volume of remittances and capital investment towards strengthening the mechanisms through which these resources can be channelled into formal savings, productive investment, human-capital development, technological advancement, and environmentally sustainable activities. In particular, strengthening financial inclusion, expanding access to formal savings instruments, encouraging productive remittance investment, improving the efficiency of public and private investment, and directing capital towards productive and environmentally sustainable sectors could strengthen the contribution of these resources to long-term wealth accumulation. Nevertheless, these policy implications should be interpreted cautiously because the ARDL estimates establish statistical associations and dynamic adjustment patterns rather than definitive causal effects. Ultimately, the findings provide evidence concerning the role of diaspora remittances and investment in Nigeria's sustainable wealth dynamics while recognising both the multidimensional nature of sustainable development and the limitations of ANS as its empirical proxy.

Table 8: Summary of Post-Estimation Diagnostic Tests

Diagnostic Test	Test Statistic	Prob Value	Decision	Conclusion
Jarque–Bera Normality Test	1.859	0.395	Fail to reject H_0	Residuals are normally distributed
Breusch–Godfrey LM Test	F-statistic =0.445	0.646	Fail to reject H_0	No serial correlation
Breusch–Pagan–Godfrey Test	F-statistic =0.514	0.763	Fail to reject H_0	No heteroskedasticity
Ramsey RESET Test	F-statistic =1.026	0.320	Fail to reject H_0	Model is correctly specified

Source: Research’s Compilation, 2026 from E-view-9

Note: H_0 denotes the null hypothesis of normally distributed residuals, no serial correlation, no heteroskedasticity, and correct model specification, respectively.

SUMMARY, CONCLUSION AND POLICY IMPLICATION

This study examined the effects of diaspora remittances and investment on sustainable development in Nigeria over 1990–2025, using Adjusted Net Savings (ANS) as a measure of sustainable wealth accumulation and gross capital formation (GCF) as a proxy for investment. Using data from the Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS), and World Bank's World Development Indicators, the Autoregressive Distributed Lag (ARDL) approach was employed to examine short- and long-run relationships. The bounds test produced an F-statistic of 5.71, exceeding the 5% upper-bound critical value of 4.85 and confirming a significant long-run relationship. The short-run results show that remittances have a delayed but positive effect on sustainable development. While the contemporaneous effect is negative and insignificant, the first lag is positive and significant (2.247; $p = 0.019$), suggesting that remittance benefits may materialise gradually through savings and productive activities. GCF has a negative and insignificant short-run effect, indicating that investment may require time to generate sustainability benefits. The error-correction coefficient is negative and significant at 1% (-0.535 ; $p = 0.001$), showing that approximately 53.5% of short-run disequilibrium is corrected within one period. In the long run, both remittances and GCF have negative but statistically insignificant effects on ANS, with coefficients of -2.413 ($p = 0.223$) and -0.127 ($p = 0.756$), respectively. This suggests that the short-run benefits of remittances do not persist, possibly because inflows are directed largely towards consumption rather than savings and productive investment. Similarly, the insignificant effect of GCF indicates that investment volume alone may not improve sustainable wealth accumulation where investment quality, productivity, efficiency, composition, and environmental sustainability remain weak. Overall, the study concludes that while remittances have short-run developmental potential, neither remittances nor investment significantly improves sustainable development in the long run. The key policy challenge is therefore to improve the mobilisation, allocation, productivity, and sustainability of these resources. Nigeria should strengthen financial inclusion and formal savings mechanisms, promote productive remittance investment, improve investment efficiency, and strengthen institutional frameworks. Greater attention should also be given to productive infrastructure, technology, renewable energy, human capital, transparency, accountability, and effective project management to transform financial inflows and capital accumulation into durable and inclusive sustainable wealth.

RECOMMENDATIONS

Based on the empirical findings, the study recommends strengthening financial inclusion and developing attractive savings and investment instruments to promote the productive utilisation of diaspora remittances and enhance their contribution to sustainable wealth accumulation. Investment policies should prioritise productive, efficient, and environmentally sustainable sectors, supported by effective project appraisal, monitoring, transparency, and accountability to improve the developmental impact of capital formation. In addition, institutional capacity and the business environment should be strengthened through improved governance, regulatory effectiveness, investor protection, and appropriate incentives to encourage diaspora and private-sector investment in productive domestic activities. Finally, the government should adopt an integrated remittance–investment policy framework, supported by sound macroeconomic management, to ensure that remittances and capital formation are effectively mobilised, efficiently allocated, and transformed into durable sources of inclusive and sustainable development in Nigeria.

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