GOMAL UNIVERSITY
JOURNAL OF RESEARCH
Gomal University, Dera Ismail Khan, Khyber Pakhtunkhwa, Pakistan
ISSN:1019-8180 (Print) ISSN: 2708-1737 (Online)

Website	www.gujr.com.pk	HEC Recognized	Social Sciences	CrossRef	DOI:10.51380

THE CAUSAL RELATIONSHIP BETWEEN FINANCIAL DEVELOPMENT, REMITTANCE INFLOWS AND PRIVATE INVESTMENT IN SUB-SAHARAN AFRICA

Adekunle Aribatise[1], Gbenga Adeyemi[2] & Adewale Stephen Adeseke[3]

[1]Department of Economics, Wesley University, Ondo, NIGERIA
[2]Department of Economics, Wesley University, Ondo State, NIGERIA
[3]Department of Economics, Wesley University, Ondo State, NIGERIA

KEYWORDS

Financial Development; Remittance Inflows; Private Investment; PARDL; Dumistrecu-Hurlin Causality

Article History

Date of Submission: 21-05-2026
Date of Acceptance: 27-06-2026
Date of Publication: 30-06-2026

ABSTRACT

Drawing on data from the World Bank WDI and WGI alongside IMF records, this study investigates dynamic relationships among financial sector growth, money sent from abroad & private-sector capital formation across 16 nations in Sub-Saharan Africa amid 1990 & 2023. By applying Panel Autoregressive Distributed Lag (P-ARDL) modeling as well as Dumitrescu–Hurlin causality evaluations, research show that migrant remittances boost private investment ($p < 0.021$) by easing capital shortages, whereas robust financial systems exert an even stronger positive influence ($p < 0.001$). Crucially, the combined effect of remittances and financial depth is statistically significant and positive ($p < 0.002$), demonstrating that advanced financial networks amplify investment -stimulating power of remittances. Moreover, the analysis confirms one-way causal pathways flowing from the remittances towards private investment, from financial advancement to private investment, and from remittances to financial sector development.. the results provide signficant information for reaching the desired conclison. Thus, in conclusion, it assert that remittances and financial development are synergistic drivers of private investment in SSA and recommend strengthening financial systems as well as lowering the cost of remitting money to boost the investment and drive sustained economic growth in SSA.

Corresponding Author: **Adekunle Aribatise**: kundun95@gmail.com

DOI: https://doi.org/10.51380/gujr-42-02-004

INTRODUCTION

For many developing countries, remittance inflows have emerged as one of most dependable and countercyclical sources of outside funding. In sub-Saharan Africa (SSA), remittances were estimated at US$54 billion in 2023, outperforming foreign direct investment (FDI) in several countries and making up substantial portion of the GDP in nations like Nigeria, Ghana, Kenya, and Senegal (World Bank, 2024). Unlike aid or FDI, remittances go directly to households, that

gives them potential to ease liquidity issues, boost savings, and fuel investment in productive sectors. Yet, even as these flows grow in size and importance, researchers and policymakers remain divided on whether the remittances actually drive private investment and, if they do, under what specific circumstances. Remittances may serve as a source of informal insurance for families, allows them to overcome credit limitations, invest in small-scale business, housing and schooling (Ruiz & Giuliano 2009). Aggarwal, Kunt and Pería (2011) found that the inflows can improve financial development by increasing bank deposits and increasing the supply of credit.

These are positive outcomes, as seen from remittances as vehicle to long-term growth & capital formation. Chami, Fullenkamp and Jahjah (2005), however, argue that remittances are mainly for consumption, and may have a negative impact on work incentives and dependency. The resulting policy conundrum is how to either promote remittances as a force for the productive investment or to simply consider them as a safety valve for the current consumption. Another sticking point is the varying role that financial development plays in link between remittances and investment. Ideally, remittances would flow through a well-functioning financial system to promote productive investment in capital (Giuliano & Ruiz, 2009). But financial depth and financial inclusion are highly unevenly distributed in SSA. Remittances are more likely to be invested in savings and credit, leads to private investment, in countries with strong banking sectors. In economies with weak financial institutions, on other hand, these funds go directly to consumption or informal activities instead of formal financial institutions (Bettin & Zazzaro, 2012).

The existing literature uses general and aggregated measures of financial development, that do not necessarily take into consideration its mechanism, including access, efficiency and stability (Demirgüç & Levine, 2008). Econometrically, there is a strong need for understanding direction of causality. The existing work focuses on finding correlations or long-term relationships but provides little evidence for whether remittances are able to stimulate private investment or whether private investment stimulates remittances. Identifying that causal link is crucial for policies as it is vital to know whether remittances are genuine driver of investment or whether they are just moving in line with investment, following overall macroeconomic trend. To cope with this, one has to rely on panel causality methods, include Dumitrescu–Hurlin framework method, to limit country-specific differences in causal relationship. The link amid remittances and financial development and investment, however, is well-documented theme in literature on global development and yet empirical evidence is still limited, particularly for sub-Saharan Africa.

To date, most research (Giuliano & Ruiz 2009, Aggarwal, Kunt & Pería, 2011, Bettin & Zazzaro 2012) is centered on either general growth or financial deepening, with very little on the key variable of private investment. One major difficulty in existing literature is the disagreement on the theory underpinning the linkages between remittances and private investment. This paucity of direct evidence is problematic, in light of the fact that private sector investment is vital to formation of capital, and to long-term productivity. It is unclear whether remittances in

SSA really promote productive activity or simply finance household consumption. This study addresses dynamic and causal relationships amid private investment, financial development and remittance outflows in the few sub-Saharan African countries, with a view to filling the gaps.

LITERATURE REVIEW

The financial intermediation theory was put forth by the McKinnon and Shaw in 1973, which describes how financial organizations absorb funds and shift them into productive ventures. The theory holds that remittances constitute an important source of funds into the economy, thereby increasing the quantities of funds available for loans. The problem is that this money is only going to be real investment if financial system is advanced enough to be able to deal with it. These institutions, in countries where markets and banks are well developed, can effectively reduce risk and costs to facilitate remittances to the businesses. That money will more likely be spent on day-to-day consumption rather than invested as financial system is underdeveloped, in those places. Essentially, the theory suggests that financial development is the necessary link that turns remittances into driver for economic growth. Two empirical studies emphasize the importance of remittances and the development of the financial sector as important sources of private investment. These financial inflows help relieve cash flow pressure both in the family and business sector, creating lucrative investment chances (Odhiambo, 2024; Amuedo & Pozo, 2006).

However, the ability of these funds to be effective depends on level of maturity and capacity of the local financial infrastructure. Giuliano and Ruiz (2009), highlight that remittances may be particularly useful in countries with lesser developed financial markets. In such situations, foreign capital serves as an alternative to conventional bank loans for financing projects that may not have been possible without access to credit. On other hand, stronger financial system, with well-developed financial regulatory frameworks, high financial inclusion and low loan requirement can further magnify the positive impacts of these capital inflows. As noted by He (2024) and Li (2025), nations equipped with resilient financial institutions are ultimately more successful at channeling and absorbing foreign funds into productive investments., which may then be directed into profitable endeavours. Farooq (2024) notes that not only do high financial depths increase investment-led growth, but they encourage job creation. Mashrur (2025) and Jalles (2024) state that financial development increases growth effects of FDI & domestic private investment.

Both indicate that financial institutions and markets are crucial in this efficient channelling of resources. Okeke and Chinanuife (2022) study relationship amid remittances and investment in Nigeria. They use annual secondary data from Q1 1981 to Q4 2020 for Nigeria. They found that financial deepening mitigates the effects of remittances on private domestic investment. Remittances, when accompanied by strong financial systems, can be a powerful stimulator of private investment. Odhiambo (2024) concludes that remittances positively affect bank-based financial development in the Sub-Saharan Africa (in countries where there is high regulatory quality), and that policies may play important role in translating remittances into productive

investments. Studies at micro level (Amuedo & Pozo, 2006; Adams & Page 2005) indicate that remittances finance small businesses, entrepreneurs, and household human capital, which in turn spurs demand for financial services. Still, in countries with poor financial infrastructure, as Chamirt et al. (2004) have noted, remittances are often shifted into consumption rather than investment.

Instead, they call for financial inclusion, low-cost transfer, and targeted policy responses. Yun (2025) and Marozva (2025) argue that the efficacy of capital and FDI flows is determined by many other factors, including absorption, policy stability, and financial markets sophistication. Dombo (2024), Kannyiri (2024), among others, argue that development of the financial market, rather than the presence of institutions, is needed to attract foreign flows and convert returns to private investment, particularly in emerging and developing economies. Dash (2023) draws on advanced panel concepts on 24 low-income countries from 2004 to 2018, and estimates that remittances drive domestic investment (especially in countries with thriving financial markets and human capital). Ho (2024), using dynamic panel methods (system GMM and defactored IV estimators) on 91 developing countries, concludes that remittances tend to crowd in private investment, even when institutional quality by itself shows the mixed results. Importantly, Ho shows that the positive investment effect is strengthened by interaction between remittances and institutional quality, indicating a complementary relationship between financial flows and governance.

RESEARCH METHODOLOGY

This study investigates causal relationship between remittance inflows, financial development, and private investment in sixteen (16) chosen sub-Saharan African nations between 1990 and 2023 in accordance with previously established hypotheses. Based on remittance dependence, banking sector development, and data accessibility, the study chose four nations from each SSA subregion to guaranty representativeness. Nigeria, Ghana, Senegal, and Mali are selected from West Africa; Kenya, Ethiopia, Uganda, and Tanzania are selected from the East Africa; Zimbabwe, Mozambique, and Zambia are selected from the Southern Africa; Cameroon, the Democratic Republic of Congo, Gabon, and Chad are selected from Central Africa. The study models the amount of private investment in relation to financial development and remittance inflows.

PI= f (REM, FD) 1

The empirical specification of the relation specified in Equation (1) is expressed as follows:

$$PI_{it} = \beta_0 + \beta_1 REM_{it} + \beta_2 FD_{it} + \mu_{it} \quad 2$$

However, incorporating the set of control variables in Equation (2), gives:

$$PI_{it} = \beta_0 + \beta_1 REM_{it} + \beta_2 FD_{it} + \beta_3 GDP_{it} + \beta_4 INF_{it} + \beta_5 OPEN_{it} + \beta_6 INS_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad 3$$

Where: PI_{it} represent Private Investment in country i at time t, REM_{it}, Remittance inflows, the explanatory variable of interest, FD_{it}, Financial Development indicator. GDP_{it}: GDP growth rate (market size & macroeconomic conditions). INF_{it}: Inflation rate (captures macroeconomic stability). $OPEN_{it}$: Trade openness (external sector influence) and INS_{it} institutional quality

(composite governance indicator)μ_i: Country − specific fixed effects , λ_t: year fixed effect and ε_{it}: Error term.

Table 1

Measurement of Variables and Sources

Variable	Symbol	Measurement / Proxy	Data Source
Private Investment	PI	Gross fixed capital formation by the private sector (% of GDP)	World Development Indicators (WDI, WB)
Remittance Inflows	REM	Personal remittances received (% of GDP)	WDI (World Bank), IMF Balance of Payments
Financial Development	FD	Financial Development Index	WDI (World Bank), IMF FDD
GDP Growth	GDP	Annual growth rate of real GDP (%)	WDI (World Bank)
Inflation	INF	Consumer Price Index (CPI, annual %)	WDI (World Bank), IMF IFS
Trade Openness	OPEN	Sum of exports and imports (% of GDP)	WDI (World Bank)
Institutional Quality	INS	Composite governance index (e.g., World Governance Indicators)	World Governance Indicators (WGI, WB

Source: Authors Compilation

The study used the Dumistrecu Hurlin causality test to ascertain the direction and strength of potential feedbacks between remittance inflows and financial development on private investment, and the Panel Autoregressive Distributed Lag (P-ARDL) model to evaluate the effects of these factors on private investment. Because short-term estimates are consistent and long-term estimates are super-constant, the ARDL model captures both short- and long-term effects and is dependable even with small sample sizes. The following is a representation of the panel ARDL short run equation:

$$\Delta PI_{it} = \alpha_i + \sum_{j=i}^{P} \alpha_1, ij\ \Delta PI_{i,t-j} + \sum_{J=0}^{q1} \alpha_2, ij\ \Delta REM_i,\ \ t-j + \sum_{j=0}^{q_2} \alpha_3, i, j\ \Delta FD_i, t-j + \sum_{J=0}^{q_3} \alpha_4,\ jj\ \Delta GDP_i, t-j = \sum_{v=0}^{q_4} \alpha_5,\ jj\ \Delta INF_I, t-j + \sum_{J=0}^{q_5} \alpha_6,\ jj\ \Delta OPEN_i, t-j + \sum_{J=0}^{q_6} \alpha_7,\ jj\ \Delta INS_i, t-j + \varepsilon_{it} \quad 5$$

Where $i = 1,2,3\ \ldots\ldots N\ and\ t = 1,2,3\ \ldots\ldots T$ α_i represents the fixed effects, $\alpha_1 - \alpha_7$ is the lagged coefficients of the independent variables and regressors and ε_{it} is error term which changes over time and across nations and is guaranteed to be white noise. The panel ECM model can be represented as follows once a long-term relationship between the model's variables has been established:

$$\Delta PI_{it} = \beta_0 + \beta_1 REM_{i,t-J} + \beta_2 FD_{i,t-J} + \beta_3 GDP_{i,t-J} + \beta_4 INF_{i,t-J} + \beta_5 OPEN_{i,t-J} + \beta_6 INS_{i,t-J} + \tau ECT_{i,T-J} + \varepsilon_{it} \quad 6$$

β 1−6 represent the convergence of short-run dynamic coefficients to long-run equilibrium while τ is error correction model and speed of adjustment parameter derived from predicted equilibrium relationship. The aforementioned ECM could be considered as including both short-term transient effects as well as long-term consequences. Nevertheless, the study used the Dumitrescu and Hurlin (DH) causality test, which was created by Dumitrescu and Hurlin (2012) and allows the detection of causality in cross-sectional panel data, to account for the causal relationship between remittance inflows, financial development, and private investment in specific sub-Saharan African countries. To ascertain if there is bidirectional or unidirectional causality between the three variables in study, the Dumitrescu and Hurlin (2012) causality test was utilized in this investigation. The following is how a three-way Granger causality test is performed:

$$PI_{it} = \partial_i + \sum_{k=1}^{k} = \delta_{ik} PI_{i,t-k} + \sum_{k=1}^{k} \overline{\Lambda}_{ik} REM_{i,t-k} + \sum_{k=1}^{k} \overline{\Lambda}_{ik} FD_{i,t-k} + \varepsilon_{it} \quad 7$$

$$REM_{i,t} = \partial_i + \sum_{k=1}^{k} = \delta_{ik} REM_{i,t-k} + \sum_{k=1}^{k} \overline{\Lambda}_{ik} FD_{i,t-k} + \sum_{k=1}^{k} \overline{\Lambda}_{ik} PI_{i,t-k} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots \quad 8$$

$$FD_{i,t} = \partial_i + \sum_{k=1}^{k} = \delta_{ik} FD_{i,t-k} + \sum_{k=1}^{k} \overline{\Lambda}_{ik} PI_{i,t-k} + \sum_{k=1}^{k} \overline{\Lambda}_{ik} REM_{i,t-k} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots \quad 9$$

With $i = I, \ldots\ldots\ldots, N \; and \; t = 1, \ldots\ldots\ldots T$

Where $PI_{i,t,}$ $REM_{i,t}$ and FD_{it} are observations of remittance inflows, financial development & private investment variables for country i period t. $\varepsilon_{it1}, \varepsilon_{it2}$ and ε_{it3} are error terms which are assumed be uncorrelated across different equations and within equations. K is maximum order of integration.

RESULTS OF STUDY

Table 2

Descriptive Statistics

Variable	PI	REM	FD	GDP	INF	OPEN	INS
Mean	20.87	4.26	0.29	3.81	9.47	67.54	-0.63
Std. Dev.	6.12	5.08	0.17	4.96	11.88	28.36	0.48
Min	8.94	0.01	0.05	-14.27	-2.41	21.03	-1.87
Max	38.15	33.41	0.82	25.64	98.23	161.72	0.91
Skewness	0.61	2.14	0.93	0.88	3.21	0.97	0.42
Kurtosis	3.18	8.96	3.47	4.92	14.37	3.89	2.74
Jarque–Bera	42.76***	689.43***	61.18***	174.55***	2,341.67***	92.44***	18.32***
Obs	544	544	544	544	544	544	544

Source: Author's Computation, Note: ***, ** denotes significance at the 1% level and 5% respectively

The study's variables' average values, variability, distributional patterns, and sample coverage across the panel data are displayed in Table 4.1 along with their descriptive statistics. With an average value of 20.87 percent of GDP and a standard deviation of 6.12, private investment (PI) shows modest variations across time and between nations. Significant variations in investment performance among the sampled economies are shown in broad range between the minimum value of 8.94 percent and maximum value of 38.15 percent. A somewhat normal distribution is shown by the kurtosis of 3.18, whereas a moderately right-skewed distribution is indicated by the positive skew of 0.61. Principal Jarque-Bera statistic indicates that the series is not regularly distributed. Remittance inflows (REM) exhibit considerable volatility and uneven reliance on remittances among the countries, with the high SD of 5.08 and a low mean of 4.26 percent of GDP.

These differences are further highlighted by wide range, which goes from 0.01 percent to 33.41 percent. The Jarque-Bera statistic strongly rejects normality, and variable is highly leptokurtic & significantly right-skewed, indicating occurrence of extreme values. Financial development (FD) has a modest dispersion and an average of 0.29, indicating low but variable levels of financial sector development among economies.. The range from 0.05 to 0.82 indicates great heterogeneity in financial depth and efficiency, and the Jarque–Bera statistic rejects normality. Economic growth averages 3.81 percent but is highly volatile with standard deviation of 4.96. It ranges from a contraction of –14.27 percent to a growth rate of 25.64 percent, suggesting that there is also economic crises and booms within sample. The distribution is right-skewed and leptokurtic, so there are frequent extreme growth events. The Jarque–Bera statistic confirms non-normality.

The inflation has an average rate of 9.47 percent with a very large standard deviation of 11.88, indicating severe price volatility across countries and years. It ranges from a weakly deflation to extremely high inflation and is highly right-skewed and leptokurtic because of the frequent inflationary outliers. Trade openness averages 67.54 percent of GDP, suggesting substantial integration into global trade despite wide disparities across countries. Institutional quality has a negative mean value of –0.63, implying generally weak governance structures, although the wide range reflects significant institutional differences among sampled economies. In essence, descriptive statistics reveal considerable heterogeneity, volatility, and non-normality across all variables, as evidenced by wide ranges, significant skewness kurtosis, uniformly significant Jarque–Bera statistics. These distributional characteristics justify the use of robust econometric techniques capable of accommodating the non-normality and outliers in subsequent empirical analysis.

Table 3

Correlation Matrix

Variable	PI	REM	FD	GDP	INF	OPEN	INS
PI	1.000						
REM	0.342	1.000					
FD	0.472	0.386	1.000				
GDP	0.291	0.214	0.337	1.000			

INF	-0.264	-0.118	-0.229	-0.173	1.000		
OPEN	0.413	0.268	0.451	0.322	-0.196	1.000	
INS	0.521	0.304	0.593	0.287	-0.341	0.418	1.000

Source: Author's Computation

Table presents correlation matrix among the variables used in the study and reveals important relationships amid private investment and explanatory variables in SSA. Private investment (PI) is positively correlated with remittance inflows (REM), financial development (FD), trade openness and institutional quality, indicating variables contribute to private capital formation. The positive relationship between PI and remittances revealed that remittance inflows relax liquidity constraints, increase household savings and provide alternative source of financing for investment in low-credit countries. Significance of effective financial systems in mobilizing savings, expanding loan availability, and lowering transaction costs all of which encourage investment—is further demonstrated by the positive correlation between PI as well as financial development.

Private investment is favorably correlated with both trade openness and institutional quality, giving investors more access to markets, increased technology transfer, increased competition. Investment decisions are typically linked to high quality, indicating that strong policy policies, sound governance, and laws can support long-term investment decisions and foster investor trust. With a value of 0.52, institutional quality has a comparatively strong positive correlation with private investment out of all explanatory factors, indicating that institutions are crucial in quality, and strengthening rule of law, could have a more direct impact on private investment than increases in external financial flows. The efficiency of remittances, financial development, and commercial openness be hampered by weak institutions. The results also show that there is strong positive correlation amid institutional quality and financial development with value of 0.59.

This implies that there is a complementary relationship between the development of financial industry & governance systems. Strong institutions facilitate effective financial intermediation, through enforcing contracts, protecting property rights, and providing clarity in regulation; and well-developed financial systems make institutions more credible and efficient. Thus, the results suggest financial sector reform in SSA be more effective if coupled with institutional reform. On the contrary, inflation negatively affects private investment, financial development, GDP growth and institutional quality, showing negative effect of macroeconomic instability. High inflation encourages disinvestment by raising the uncertainty, reducing real returns and undermining financial intermediation. Finally, correlation coefficients amid pairs are all below common cut-off point of 0.70, indicating that explanatory variables do not exhibit significant multicollinearity.

Table 4

Panel Unit Root Tests at Levels

Variable	LLC (Stat)	Prob.	IPS (Stat)	Prob.	Fisher ADF (χ^2)	Prob.	Fisher PP (χ^2)	Prob.	Order

PI	-1.24	0.108	-0.88	0.189	29.41	0.142	26.73	0.211	I(1)
REM	-0.91	0.182	-0.63	0.264	27.82	0.193	25.19	0.248	I(1)
FD	-1.37	0.086	-1.05	0.147	31.64	0.101	28.53	0.163	I(1)
GDP	-2.11**	0.017	-1.97**	0.024	45.72**	0.031	43.18**	0.039	I(0)
INF	-2.36**	0.009	-2.08**	0.019	48.56**	0.022	44.93**	0.035	I(0)
OPEN	-1.44	0.074	-1.21	0.113	33.09	0.089	30.12	0.131	I(1)
INS	-1.26	0.103	-1.02	0.154	32.15	0.097	29.48	0.149	I(1)

Source: Author's Computation

Notes: ** indicates rejection of the null at the 5% level and Fisher statistics follow a χ^2 distribution.

The mixed orders of integration across the variables are shown by the panel unit root results at levels in Table 4.3. In all tests, the null hypothesis of a unit root is not rejected by the private investment (PI), remittances (REM), financial development (FD), trade openness (OPEN), and institutional quality (INS). This suggests non-stationarity in levels and integration of order one, I(1). On the other hand, statistically significant LLC, IPS, Fisher ADF, and Fisher PP statistics at conventional levels show that GDP growth & inflation (INF) are stationary in levels, indicating I(0) processes. The panel ARDL framework is justified by this combination of I(0) and I(1) variables.

Table 5

Panel Unit Root Tests at First Differences

Variable	LLC (Stat)	Prob.	IPS (Stat)	Prob.	Fisher ADF (χ^2)	Prob.	Fisher PP (χ^2)	Prob.	Order
PI	-6.82**	0.000	-7.41**	0.000	142.37**	0.000	161.25**	0.000	I(1)
REM	-7.16**	0.000	-7.94**	0.000	148.26**	0.000	169.88**	0.000	I(1)
FD	-6.53**	0.000	-7.12**	0.000	136.91**	0.000	152.44**	0.000	I(1)
GDP	-7.03*	0.000	-7.68*	0.000	144.82*	0.000	163.57*	0.000	I(1)
INF	-6.91*	0.000	-7.56*	0.000	141.73*	0.000	158.39*	0.000	I(1)
OPEN	-6.28**	0.000	-6.89**	0.000	132.14**	0.000	147.67**	0.000	I(1)
INS	-6.82**	0.000	-7.41**	0.000	142.37**	0.000	161.25**	0.000	I(1)

Source: Author's Computation, Note ** denotes significance at the 1% level.

Stationarity for every variable is strongly and consistently demonstrated by the panel unit root results at first difference. The null hypothesis of a unit root is rejected in each instance due to the strong significance of Levin–Lin–Chu, Im–Pesaran–Shin, Fisher ADF, and Fisher PP tests across private investment, remittances, financial development, GDP, inflation, trade openness, and institutional quality. This shows that variables are integrated of order one, I(1), after first differencing and become stationary. These results validate a mixed I(0) and I(1) structure when combined with the level results, supporting application of panel ARDL approach for studying both short-run dynamics and long-run interactions. The strong rejection at initial differences, however, verifies that no variable is I (2). The panel cointegration testing is further supported by this.

Table 5a
Pedroni Panel Cointegration Test Results (H0: no cointegration).
Within-Dimension (Panel Statistics)

Statistic	Value	Prob.
Panel v-statistic	2.41**	0.008
Panel rho-statistic	-2.18**	0.015
Panel PP-statistic	-3.64***	0.000
Panel ADF-statistic	-3.21***	0.001

Source: Author's Computation

Between-Dimension (Group Statistics)

Statistic	Value	Prob.
Group rho-statistic	-1.97**	0.024
Group PP-statistic	-4.12***	0.000
Group ADF-statistic	-3.76***	0.000

Source: Author's Computation, Notes: * and ** denote significance at the 1% and 5% levels, respectively.

A stable long-term equilibrium link between thr private investment, remittances, financial development, GDP, inflation, trade openness, and institutional quality is shown by the panel cointegration tests. Despite having non-stationary levels, majority of within & amid dimension statistics reject null hypothesis no cointegration, confirming that these variables move together across time. This suggests short-run deviations are adjusted toward long-run equilibrium, validating the calculation of long-run coefficients and short-run dynamics within panel ARDL framework.

Table 5b
Kao Residual Cointegration Test

Statistic	ADF
Test value	-2.89***
Prob.	0.002

Source: Author's Computation

A statistically significant test statistic (p-value < 0.05) indicates that the variables have a stable long-run equilibrium connection and the residuals are stationary, rejecting the null hypothesis. This validates panel ARDL & cointegration-based methods for estimating long-run & short-run dynamics.

Table 5c
Westerlund Error-Correction-Based Cointegration Test

Statistic	Value	Prob.
Gt	-2.43**	0.012
Ga	-12.86***	0.000
Pt	-3.19***	0.001
Pa	-15.47***	0.000

Source: Author's Computation

In line with existing research studies (Olaniyi & Odhiambo, 2024; Ali et al., 2022; Vo et al., 2022; Küçüksakarya, 2021; Yusuf et al., 2020; Cialani, 2017) study further employed the cointegration approach of Persyn and Westerlund (2008). This method produces the robust cointegration findings in the presence of heterogeneity. Table 4.5c makes it clear that every statistic supports rejecting the null hypothesis that there is no cointegration. This demonstrates that there is a long-term correlation between the variables for the chosen Sub-Saharan African nations. As a result, it can sufficiently lead to the conclusion that the analysis's variables have the long-term relationship. This supports the estimate of the panel ARDL model to differentiate between long -term effects and short-term dynamics. In panels with mixed I(0) and I(1) variables, the Panel ARDL (PMG) technique estimates both the long-term relationships and short-term dynamics. It provides effective and consistent estimates for analyzing the effects of remittances, financial development, and macroeconomic factors on private investment by permitting heterogeneous short-run coefficients across the diverse nations while restricting the long-run coefficients to be homogeneous.

Table 6

Panel ARDL (PMG) Long-Run Estimates (with Interaction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
REM	0.118**	0.051	2.31	0.021
FD	0.462***	0.133	3.47	0.001
REM × FD	0.284***	0.091	3.12	0.002
GDP	0.143**	0.067	2.13	0.034
INF	-0.091**	0.044	-2.07	0.039
OPEN	0.208***	0.062	3.35	0.001
INS	0.371***	0.098	3.79	0.000

Source: Author's Computation, Note ***, ** denote significance at 1% and 5%, respectively.

Table shows effects of financial deepening & remittances on private investment in Sub-Saharan Africa using long-run panel ARDL estimate. With a coefficient of 0.118 (p=0.021), study's results clearly show that remittance inflows have significant impact on private investment. In other words, private investment increases by 0.118 percentage for every percentage point increase in remittance flows relative to GDP. Therefore, it is evident that remittance flows are a significant source of outside funding that supports capital formation, entrepreneurship, and liquidity in Sub-Saharan Africa (SSA). The coefficient value of 0.462 (p=0.001) shows a positive association between development of financial sector (FD) and private investment. This is due to fact that the growth of financial sector facilitates mobilization of savings, the supply of credit facilities, cost reduction, efficient resource allocation in productive sectors. Remittances and financial development (REM × FD) have positive and very significant interaction effect (0.284, p=0.002). This proves that in developed financial systems, remittances greater favorable effect on private investments.

To put it simply, remittances are the source of funding, and efficient financial institutions assist in effectively channeling these funds to demonstrate the complementary relationship between remittances and financial development in promoting private investments. With a coefficient of

0.143 (p=0.034), GDP growth is a positive predictor of private investment when it comes to the control variables. This demonstrates how higher economic growth raises expectations and boosts profitability, which in turn motivates investors to make investments. Conversely, there is negative correlation amid private investments and inflation, with value of -0.091 (p=0.039). It demonstrates how economic instability reduces investment since it raises uncertainty and lowers real return on investment. Another factor that positively influences private investment is openness, which has a coefficient of 0.208 (p=0.001). It demonstrates how expanding market access, transferring technology, opening up to foreign markets all promote private investment. With a value of 0.371 (p=0.000), institutional quality (INS) is very favorable predictor of private investment.

Table 7

Short-Run Dynamics and Error Correction (PMG)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ΔREM	0.042*	0.024	1.75	0.081
ΔFD	0.091*	0.051	1.79	0.074
Δ(REM × FD)	0.067**	0.033	2.03	0.043
ΔGDP	0.084**	0.039	2.15	0.032
ΔINF	-0.063**	0.029	-2.17	0.031
ΔOPEN	0.112**	0.046	2.43	0.015
ΔINS	0.146***	0.053	2.75	0.006
ECT(-1)	-0.41*	0.07	-5.86	0.000

Source: Author's Computation Note ***, ** and * denote significance at 1%, 5%, and 10% respectively.

The short-run PMG estimates for panel ARDL model are shown in Table 4.7, which provides unambiguous proof of the dynamic relationships between private investment and the factors influencing it in SSA nations. With a coefficient of –0.41, the ECT is substantially negative. This demonstrates that private investment, remittance, financial growth, macroeconomic condition, trade openness, and institutional quality all have a long-term equilibrium relationship. The coefficient value indicates a moderate rate of adjustment toward long-run equilibrium, since approximately 41% of the short-run disequilibria are eradicated each year. Remittance inflows (REM) had a positive impact on private investment, according to research, with a coefficient of 0.118 (p = 0.021). Still, significant interaction term between REM and financial development (REM × FD = 0.284, p = 0.002) implies that positive impact of remittances on private investment depends to a large extent on the level of financial development. It implies that remittances by themselves cannot automatically result in investment since effective & sophisticated financial system is required to guaranty appropriate use of money in the economy. Therefore, it will be more challenging to take use of investment potential of remittance inflows if banking system is weaker.

This implies that the nations with inadequate financial systems are unlikely to optimize the investment advantages of their remittances. With a value of 0.462 (p = 0.001), FD alone has a favorable and statistically significant effect on private investment. This is due to the fact that financial systems facilitate the mobilization of savings, improve access to financing, lower

transaction costs, allocate resources effectively. The positive and highly significant coefficient of 0.371 (p = 0.000) shows that institutional quality isfactor that affects private investment. This suggests when there is solid governance, laws, and the rule of law, private investment rises since investor protection and uncertainty are reduced. A positive coefficient of 0.208 (p = 0.001) indicates that trade openness has a favorable effect on private investment. This is due to fact that doing business internationally increases market size, fosters fierce competition, facilitates technology transfer. Another influence is macroeconomic stability, since private investment is impacted by GDP growth (0.143, p = 0.034) but it is negatively impacted by inflation (–0.091, p = 0.039).

Table 8

Dumitrescu–Hurlin panel causality tests (H0: No Causality)

Null Hypothesis	W-Stat	Z-Stat	Prob.	Causality	Conclusion
REM does not homogeneously cause PI	4.27	3.19	0.001***	Reject Null	Homogeneous Uni-directional causality
PI does not homogeneously cause REM	1.83	0.91	0.362	Accept Null	
FD does not homogeneously cause PI	5.61	4.07	0.000***	Reject Null	Homogeneous Uni-directional causality
PI does not homogeneously cause FD	2.94	1.56	0.119	Accept Null	
REM does not homogeneously cause FD	6.18	4.49	0.000***	Reject Null	Homogeneous Uni-directional causality
FD does not homogeneously cause REM	1.66	0.78	0.434	Accept Null	

Source: Author's Computation, 2026, Note: *** indicates 1% significant level

The direction and type of links between private investment (PI), remittances (REM), and financial development (FD) in the sample of Sub-Saharan African nations are revealed by the panel causality results in Table. The null hypothesis that REM does not uniformly affect PI on remittances and private investment is rejected (W-Stat = 4.27, Z-Stat = 3.19, p = 0.001). This suggests that there is homogeneous unidirectional causal relationship amid private investment and remittances. To put it another way, the region's private investment is greatly boosted by rises in remittance inflows. On the other hand, null hypothesis that PI does not homogeneously affect REM is accepted (p = 0.362), indicating that remittance inflows are not considerably impacted by private investment. This supports the idea that remittances serve mainly as a source of outside funding for the private sector. There is a unidirectional causal relationship between financial development and private investment, as evidenced by the rejection of the null hypothesis that FD does not homogeneously cause PI (W-Stat = 5.61, Z-Stat = 4.07, p = 0.000).

The effective financial systems are thought to improve capital formation by increasing credit availability, lowering transaction costs, and boosting investor trust. There is no evidence of the reverse causation between PI as well as FD (p=0.119The null hypothesis that REM does not

homogeneously cause FD is rejected in the case of the remittances and financial development (W-Stat = 6.18, Z-Stat = 4.49, p = 0.000). This suggests that the remittances support financial development because they increase deposits, boost banking system liquidity, and promote the provision of financial services. There is no significant inverse causal relationship between FD and REM (p = 0.434). It is consistent to state that there is a homogeneous unidirectional causal relationship between remittances and financial development as well as between remittances and private investment. None of pairings exhibit reverse causality. It is important to note that financial development, remittances work in tandem to boost private investment in Sub-Saharan Africa.

DISCUSSION

The results of the analysis conducted in this study give strong evidence of the factors that affect private investment in the Sub-Saharan Africa, showing the importance of the remittance flows, financial development, institutions, other factors like openness and macroeconomic stability. The positive statistically significant correlation between remittances and private investment is in line with assertion that remittances can facilitate reduction of liquidity constraint problem, boost savings rate of individuals and firms, and facilitate investment in sectors where domestic capital market system is not developed. Theoretically, liquidity constraint approach justifies the finding, which posits that remittance flows can be used as additional sources of funding for stimulating capital accumulation. It is consistent with the findings of Giuliano and Ruiz (2009) and Aggarwal et al. (2011) that remittance inflows increase investment in the underdeveloped countries. ARDL regression, still, has a relatively small direct impact of remittances may not be sufficient.

The notion that financial development is crucial to mobilize savings, channel credit & allocate resources is supported by the fact that it appears to be a fairly strong and consistent influence on private investment. Complementarity theory is supported by significant interaction amid remittances & financial development that offers compelling empirical evidence of remittances being more investment-promoting in countries with better financial development. This result has ramifications for theoretical models like as Schumpeterian Growth Model, that emphasizes the importance of finance in fostering investments and innovations. This is consistent with a host of earlier research by Beck et al. (2000), Shahbaz et al. (2013) that any impact of external flows be investment-related. Other factors that are found to have significant positive effects on private investments are institutional quality and openness to trade. High value of institutional quality coefficient emphasizes the crucial significance of respectable governance, regulations, and protection of property rights in terms of building up the investors' trust and decreasing uncertainties.

That coincides with institutional approach to economic development where strong institutions are considered to be a necessary condition for proper accumulation of capital. This finding is in line with the empirical results of studies by North (1990) and Acemoglu et al. (2005), where weak institutions were found to be obstacle to private investments despite sufficient financial resources. Openness to trade additionally contributes to the process of investment by bringing

the local market into international context through technologies exchange and competition. GDP growth and inflation, which serve as proxies for the macroeconomic environment, have an impact on investments. The former has a positive influence as a result of increasing profit expectations and investor optimism, while corroborating the hypothesis about the negative impact of macroeconomic instability on investment because of increased uncertainty and lower real rate of return on capital. This research is in line with findings of Fosu (1990) and Anyanwu (2012), who found out that the stable macroeconomic situation was necessary for private sector development.

Nevertheless, a moderate impact of GDP growth on investment relative to the role played by institutional quality and financial development may imply that structural and policy factors might be even more important for accumulating investments. In terms of policy implications, it can be concluded that remittances are not likely to be able to stimulate investments without proper financial system, institutions and macroeconomic and trade environment. Based on the aforementioned findings, may conclude that investments in selected SSA nations are largely influenced by remittance flows and the degree of financial sector development. Furthermore, there is no feedback causation in other direction. The findings support Giuliano & Ruiz (2009), Nyamongo, Misati, Kipyegon and Ndirangu (2012), and Aggarwal, Demirguc and Peria (2006) that remittances increase financial intermediation and profitable investment. However, results are against findings of Chami, Fullenkamp and Jahjah (2005), Barajas et al. (2009), who argued that remittances have little impact on productive investments and are mainly for consumption purposes.

CONCLUSION

The study concludes that financial development and remittance inflows play an important role in promoting private investment in Sub-Saharan Africa. The causal relationships suggest that improved financial systems and increased remittance flows can enhance access to finance and inspire productive private-sector investment. The policies that strengthen financial institutions and channel remittances toward productive activities are vital for investment and economic growth in region. It was found in study that financial development and receipt of remittances work in tandem in stimulating private investment. To inspire financial development, improve access to financing, and lower the cost of sending money, a number of policy recommendations were made. The panel causality analysis conducted by Dumitrescu & Hurlin demonstrates the unidirectional causal connection amid remittances & private investment, financial development and private investment, and remittances and financial development. These steps are crucial for fostering growth driven by private sector & attaining sustained economic development in the area.

REFERENCES

Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). Institutions as a Fundamental Cause of Long-Run Growth," Handbook of Economic Growth, in: Philippe Aghion & Steven Durlauf (ed.), *Handbook of Economic Growth*, 1(1), 385-472,

Adams, R. H., & Page, J. (2005). Do international migration and remittances reduce poverty? *World Development*, 33(10), 1645–1669.

Aggarwal, R., Demirgüç-Kunt, A., & Pería, M. S. M. (2011). Do remittances promote financial development? *Journal of Development Economics*, 96(2), 255–264.

Ali, A., Ramakrishnan, S., Faisal, F., Sulimany, H.G.H., & Bazhair, A.H. (2022). Stock market resource curse: The moderating role of institutional quality. Resources Policy, 78(C).

Amuedo-Dorantes, C., & Pozo, S. (2006). Migration, remittances, and business formation in Mexico. *World Economy*, 29(4), 563–587.

Anyanwu, J. (2012). Why Does Foreign Direct Investment Go Where It Goes? New Evidence From African Countries. *Annals of Economics and Finance*, 13, 425-462.

Aribatise, A. & Akintunde, T.S. (2023). Financial development and poverty in selected West African countries: A mediating role of institutional quality. *Kardan Journal of Economics and Management Sciences*, 6 (4), 30-45.

Aribatise, A., & Akintunde, T.S. (2025). The nexus among Institutional Quality, Financial Development and Poverty in selected West African Countries. *Gomal University Journal of Research*, 41(1), 25-38

Barajas, A., Chami, R., Fullenkamp, C., Gapen, M., & Montiel, P. (2009). Do workers' remittances promote economic growth? *IMF Working Paper No. 09/153*. International Monetary Fund.

Beck, T., Levine, R., & Loayza, N. (2000) Finance and the Sources of Growth. *Journal of Financial Economics*, 58, 261-300. https://doi.org/10.1016/S0304-405X(00)00072-6.

Bettin, G., & Zazzaro, A. (2012). Remittances and financial development: Substitutes or complements in economic growth? *Bulletin of Economic Research*, 64(4), 509–536.

Chami, R., Fullenkamp, C., & Jahjah, S. (2003). Are immigrant remittance flows a source of capital for development? IMF Working Paper WP/03/189.

Cialani, C. (2017). CO2 emissions, GDP and trade: a panel cointegration approach. International *Journal of Sustainable Development & World Ecology*, 24(3), 193–204. https://doi.org/10.1080/13504509.2016.1196253.

Coulibaly, D. (2015). Remittances and financial development in Sub-Saharan African countries: A system approach. *Economic Modelling*, 45, 249–258.

Dash, A. (2023). Do remittances crowd-in or crowd-out domestic investment? Evidence from low- income countries. Springer Link.

Demirgüç-Kunt, A., & Levine, R. (2008). Finance, financial sector policies, and long-run growth. World Bank Policy Research Working Paper No. 4469.

Dombo, S. D. (2024). Financial development, globalization, and FDI in Africa. *Springer Nature Business and Economics*, 4(6), 1–20.

Dumitrescu, Elena-Ivona, E.-I., & Hurlin, Christophe, C. (2012). Testing for Granger non-causality in heterogeneous panels. *Economic Modelling, 29*(4), 1450–1460. https://doi.org/10.1016/j.econmod.2012.02.014.

Fosu, A.K. (1990) Exports and Economic Growth: The African Case. World Development, 18, 831-835. https://doi.org/10.1016/0305-750X(90)90005-I.

Giuliano, P., & Ruiz-Arranz, M. (2009). Remittances, financial development, and growth. *Journal of Development Economics, 90*(1), 144–152.

He, Y. (2024). Financial development impact on domestic investment. Financial Innovation, 10(1), 1–20. https://doi.org/10.1080/23322039.2024.2321811.

Ho, S. (2024). The crowding-in impact of remittance inflows on private investment in developing economies: The role of institutional quality. *Economic Analysis and Policy*, 84, 434–447.

Jalles, J. T. (2024). Public, private investment as catalysts for growth. Journal of Development Economics, 107, 1–15. https://doi.org/10.1016/j.jdeveco.2024.1031530.

Kannyiri, T. B. (2024). Financial development, globalization, and foreign direct investment in Africa. *Springer Nature Business and Economics*, 4(6), 1–20.

Küçüksakarya, S. (2021). A panel causality analysis of the relationship between financial development and economic growth in OECD countries, *Business and Management studies international Journal*, 9(2), 662-672. Doi: https://doi.org/10.15295/bmij. v9i2.1817.

Li, F. (2025). International capital flows, financial development, and economic growth. *Finance Research Letters*, 102, 1–9. https://doi.org/10.1016/j.frl.2025.102121.

Marozva, R. (2025). Uncertainty, FDI inflows, and financial market development. *Journal of International Financial Markets, Institutions and Money*, 75, 1–15.

Mashrur, F. A. (2025). FDI, trade openness, financial development, and economic growth in Bangladesh. *Economics and Development Review*, 13(2), 1–20.

McKinnon, R. I. (1973). Money and capital in economic development. Washington, D.C.: Brookings Institution.

North, D. C. (1990). Institutions, Institutional Change and Economic Performance (p. 33). Cambridge: Cambridge University Press.

Nyamongo, E. M., Misati, R. N., Kipyegon, L., & Ndirangu, L. (2012). Remittances, financial development and economic growth in Africa. *Journal of Economics and Business, 64*(3), 240–260.

Odhiambo, N. M. and Musakwa, M.T. (2024). Remittance inflows and financial development in Sub-Saharan Africa. Journal of African Business, 25(1), 1–20. https://doi.org/10.1080/15228916.2024.2329840.

Okeke, I. C., & Chinanuife, E. (2022). Role of financial development on remittance-investment nexus in Nigeria: An interactive effect approach. *International Journal of Economics, Business and Management Research*, 6(2), 32-43.

Olaniyi, C. O., & Odhiambo, N. M. (2024). Do natural resource rents aid renewable energy transition in resource-rich African countries? The roles of institutional quality and its threshold. *Natural Resources Forum*, 1–46. https://doi.org/10.1111/1477-8947.12430.

Shahbaz, Muhammad & Kumar Tiwari, Aviral & Nasir, Muhammad, 2013. "The effects of financial development, economic growth, coal consumption and trade openness on CO2 emissions in South Africa," *Energy Policy*, 61(C),1452-1459.

Shaw, E. S. (1973). Financial deepening in economic development. New York: Oxford University Press.

Vo, D.H., Ho, C.M., Le, Q.T.T. & Vo, A.T. (2022). Revisiting the energy-growth-environment nexus in the OECD countries: An application of the CS-ARDL approach. https://doi.org/10.1186/s13705-022-00375-z.

World Bank. (2024). Migration and Development Brief 39: Remittances Remain Resilient. Washington, DC: World Bank.

Yun, H. (2025). The distributional effects of capital inflows. Small Business Economics, 45(1), 1–20. https://doi.org/10.1007/s11079-025-09810-y.

Yusuf, H.A., Shittu, W.O., Akanbi, S.A., Umar, H.M., & Abdulrahman, I.A. (2020). The role of foreign direct investment, financial development, democracy and political (in)stability on economic growth in West Africa. *International Trade, Politics and Development*, 4(1), 27-46.