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The Role of Remittances, Financial Inclusion and Governance on Economic Growth in Sub-Saharan Africa

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Abstract

The goal of this study is to analyse the role of financial inclusion, governance, and remittances on growth in Sub-Saharan African countries (SSA), as well as the moderating influence of the role of financial inclusion on the remittances-growth nexus, using panel data spanning 1996–2020. Data were collected through secondary sources, including World Bank and IMF reports for the period 1996–2020. By using a principal component analysis method, we constructed composite FI indexes to measure the degree of FI. Cross-sectional dependence, slope homogeneity, and pooled mean grouping (PMG) are employed to evaluate the stated objectives. The study findings showed that remittances have a significant positive relationship with economic growth, and that positive financial inclusion moderates the remittance-growth nexus in SSA countries. Given the findings that the level of governance has an adverse influence on growth, hence stakeholders should improve financial infrastructure, which provides the underlying instrument for financial inclusion, and protect customers by instituting controls and procedures for reporting, fairness, and resorting to SSA countries. Governments should also promote the larger global remittances agenda, which includes leveraging remittances for better consumer and business financing, and exposure to global financial markets through refinancing and the issue of diaspora bonds.

Keywords: remittances, economic growth, financial inclusion, governance, SSA

JEL Classifications: *C1; F6; G2; O4*

1. Introduction

The inflow of foreign capital, remittances, and governance plays a crucial function in the global economy, and helps drive growth both at home and abroad. Good governance is not only a prerequisite for sustainable growth and development, it is also essential for reducing poverty and improving the lives of the citizenry, especially in developing economies (Azam, 2016). Similarly, over the past few decades, remittances have become a significant factor in the growth of numerous emerging economies (Jijin, Mishra & Nithin, 2021). In nations with high levels of financial development, it reduces the volatility of economic growth (Ahamada & Coulibaly, 2011). The global remittance brief on migration and development published by the World Bank in 2021 indicates that, notwithstanding the COVID-19 pandemic, remittances decreased marginally in 2020; but less than the projected decline. In 2020, remittances to low and middle-income countries totalled $540bn, which was just 1.6 percent less than the $548bn total for 2019. The data show, however, that following the Russian invasion of Ukraine, remittances to that country are

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anticipated to rise by over 20% in 2022, while growth is anticipated to be moderate in other regions: Asia, the Pacific, Latin America, and the Caribbean, the Middle East, Sub-Saharan Africa, and North Africa (UNHCR, 2022). Further, a number of countries in SSA have reported an increase in remittances due to the emergence of digital financial solutions for the economically underprivileged people of the countries, as well as improved governance and institutional framework.

The past decade has seen remarkable gains in the ownership and usage of financial accounts in SSA due to mobile money. The SSA region was the fastest growing in account ownership, with an increase of 60% between 2011 and 2021; and in account usage with an increase of 67% between 2014 and 2021 (along with South Asia). Compared to the global growth average of 50% (from 51% to 76% over the same period), account ownership more than doubled from 23% in 2011 to 55% in 2021. The impressive growth rate in account ownership in SSA is not surprising given that some regions like Europe and Central Asia had relatively high baselines in 2011. While SSA has seen growth in account ownership and usage, Findex (2021) shows that it still ranks among the bottom three regions globally regarding actual account ownership.

It is evident from the statistics that individuals lack access to essential financial products and services to meet their financial obligations. In addition to stifling the region's economic growth, the high rate of financial exclusion poses a threat to financial inclusion. As a result of the current study, it is presumed that poor and less-privileged people's involvement in the financial system is crucial to economic growth. Therefore, SSA countries need financial services that are tailor-made for their financial lives, such as low-cost accounts, mobile banking, transfer instruments, and digital-enabled payments. Since SSA economies have a high remittance-receiving population, financial markets, and a natural endowment to benefit from financial usage, it is crucial to examine the impact of financial inclusion, remittances, and governance institutions on economic growth in the region.

Although a large corpus of empirical literature has been documented on the influence of institutional factors as, well as governance, in mediating the relationship between remittances and economic growth, still their conclusions are incongruent (see Acemoglu & Robinson, 2010; Adekunle, Williams, Omokanmi et al., 2020; Cho, 2020; Effiong & Asuquo, 2017; Kratou & Gazdar, 2018; Ogede, 2019; Ogunniyi et al., 2020; Ojeka et al., 2019; Saadm & Ayoub, 2019; Tu et al., 2019). Other empirical literature has demonstrated the importance of financial development in mediating the remittances-economic growth nexus, as well as instituting causal linkages (see Ngoma et al, 2021; Ajefu & Ogebe, 2019; Chue et al, 2022; Olayungbo & Quadri, 2019; Kratou & Gazdar, 2016; Ramirez, 2013; Sobiech, 2019). Moreover, the documentation on the moderation role of financial inclusion in the remittance-growth nexus in the African continent is scarce. While the deleterious significance of financial development to the remittance-growth nexus is still debatable, the role of financial inclusion in the remittance-growth nexus is difficult to deduce due to the absence of evidence, and discrepancies in methodology.

Financial inclusion has a crucial role in improving the quality of the financial and economic sectors. It implies that both individuals and businesses have access to effective and affordable financial products and services that suit their requirements, and are sustainably provided (World Bank, 2022). All ages and businesses must have access to equitable financial services to satisfy their fundamental needs sustainably for an economy to be sustainable. However, it is important to keep in mind that remittances are not necessarily associated with promoting financial inclusion (Anzoategui et al., 2014). This, notwithstanding, remittances may increase formal financial access and inclusiveness when unbanked recipient households deposit their money in the financial sector and receive a wealth of financial services (Inoue & Hamori, 2016). Additionally, higher remittances can spur economic development in beneficiary countries by increasing financial inclusion (Aga & Martínez Pería, 2014; Ambrosius & Cuecuecha, 2016; Anzoategui et al., 2014; Demirgüç-Kunt et al., 2011; Ngoma, Ismail & Law, 2021; Tu et al., 2019). Ngoma et al (2021), for instance, argued that remittances have a positive impact on economic growth in Asian countries. The authors further demonstrated that Asian nations with stronger financial development, but weaker governance, appear to experience a greater growth effect. Thus, despite the diverse and sparse empirical investigation recorded on the subject, the debate remains a contested subject among scholars and policymakers with regard to how well financial inclusion and governance moderate the remittances-economic growth nexus.

In light of the foregoing, it is clear that the role of an inclusive financial system and well-defined governance, as well as the influence of financial inclusion in mediating the remittance-economic growth nexus, are intricate questions that have received little attention from scholars. Financial inclusion is argued in the literature to improve access to financial services and increase economic growth, as well as improve the long-term growth of the financial sector (Ngoma, Ismail & Law, 2021). Regardless, we argue that if remittance inflows are not accompanied by good governance and financial policies that promote an equitable financial system, their impact on the economy may be negligible. However, various questions remain. Does financial inclusion have an impact on the remittance-economic growth nexus? Likewise, how might the quality of governance enhance the relationship between remittances and growth in SSA? Is the interplay of financial inclusion, governance, and remittances having an impact on the growth of SSA countries? Remittances and financial inclusion are therefore assumed to complement each other in enhancing economic growth, while the critical role of good governance in this interplay cannot be overemphasized. Given the foregoing, the current study explores the ambivalent role of financial inclusion, governance, and remittances on the economic growth in SSA countries (SSA), as well as moderating influence of the role of financial inclusion on the remittances and growth nexus using panel data spanning 1996 to 2020.

As a result, by focusing on SSA countries with moderate levels of financial inclusion, this paper adds to the body of prevailing works on financial inclusion. Unlike the earlier studies that used the first-generation panel estimation

techniques, ignoring cross-sectional dependence, this study employs a pooled mean group (PMG) estimator to take care of sectional dependence and provide a more robust analysis of the nexus among the selected variables. The choice of the estimator is based on the need to measure the long-run equilibrium and take into account the diversity of the interactive modification adjustment process. Third, rather than utilizing a single indicator, we create a composite index that considers two elements of financial inclusion, allowing us to acquire a better knowledge of the effect of financial inclusion on remittance growth. The results of the PMG estimation show that remittances and economic growth are positively and significantly related to SSA countries. The results further indicate that financial inclusion does not significantly affect economic growth when the economic and political governances are considered. Our findings show that the interaction of the effect of remittances and financial inclusion is positive across all model specifications. The remaining part of the paper is categorized as follows. Section 2 focuses on the related literature. Section 3 provides information on data and methodology while Section 4 offers the empirical results. Section 5 is on summary and policy recommendations.

2. Literature Review

Numerous empirical literature have demonstrated that remittances have contradictory implications on output growth over the years (Alkhathlan, 2013; Bangake & Eggoh, 2020; Chami et al., 2009; Ekanayake & Moslares, 2020; Faini, 2001; Fayissa & Nsiah, 2010; Jawaid & Raza, 2016; Kadozi, 2019; Lim & Simmons, 2015; Yang, 2004). A summary of these investigations reveal three empirical perspectives. The first viewpoint contend that remittances favourably affect economic expansion (Bangake & Eggoh, 2020; Kadozi, 2019 Yang, 2004). Fayissa and Nsiah (2010) asserted that remittances had a positive effect on the economic growth of 36 selected African nations using the system-GMM estimation technique. Similarly, Kadozi (2019) argued that the SSA's level of development and education have a positive and statistically significant influence on the remittance-growth impact. On the contrary, some studies indicated a negative correlation between remittances and economic growth (see, e.g., Alkhathlan, 2013; Chami et al., 2009; Ekanayake & Moslares, 2020). According to Faini (2001), however, the connection between remittances and economic growth was insignificant.

Additionally, some literature has examined the connection between workers' remittances and financial inclusion (see, e.g., Adeoye et al., 2019; Chowdhury, 2016; Coulibaly, 2014; Jukan, Okičić & Hopić, 2020; Saydaliyev et al., 2020; Ur Rehman & Hysa, 2021). These empirical studies used several methodologies to analyse the connection, as well as the possible direction of causality, and yielded inconsistent results. For instance, Saydaliyev et al (2020), argued that remittance inflows exert an adverse effect on financial inclusion in low-remittance countries. This relationship, on the other hand, benefits countries that received a large corpus of remittances. According to the authors, remittances and financial inclusion have a nonlinear relationship. Likewise, Coulibaly (2014) examined the causative relationship between remittances and financial development in 19 SSA countries from 1980 to 2010, using

the panel Granger causality testing approach. According to the study's findings, there is not enough evidence to prove that remittances boost financial development in SSA countries, and financial development does not seem to be a reliable indicator of remittances received in SSA countries.

Besides, a handful of researchers have explored the mediation roles of institutional quality or governance on the remittance–growth linkage (Adekunle et al, 2020; Ajide, Adeniyi, Bello & Raheem, 2017; Ajide et al., 2016; Cho, 2020; Effiong & Asuquo, 2017; Muhammad et al, 2021; Ngoma et al., 2021; Ogede, 2019; Ogunniyi et al, 2020; Saadm & Ayoub, 2019; Tu et al, 2019). To understand the impact of governance on remittances, Effiong and Asuquo (2017) studied the relationship between governance and heterogeneity in remittances. In this study, the relationship between 109 countries and World Governance Indicators (WGI) is analysed using nonparametric kernel methods that are robust to nonlinearity, heterogeneity, and model specification. The study findings revealed that all six measures were highly correlated with remittances: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption. In a study of countries of different income levels, Tu et al. (2019) argued that remittances and financial inclusion are engines of growth. It was found that policies to attract extra inward remittances and improve financial inclusion status are important and could help middle-income countries escape middle-income traps. On their part, Ogunniyi et al. (2020) examined remittances and quality of governance were examined with regards to food and nutrition security in SSA countries. As a means to account for unobserved heterogeneity and potential endogeneity, the authors used a dynamic two-step system GMM approach. In addition to shedding light on the interaction between remittances and governance quality, the findings also suggest that remittances and governance quality positively affect food production on average; as well as contribute to the improvement of dietary energy supply adequacy in SSA.

Thus, several research studies have focused on the impact of financial development, or financial inclusion, in mediating the remittance-economic growth nexus (Bangake & Eggoh, 2020; Karagöz, 2009; Ur Rehman & Hysa, 2021). These studies used different methodologies, and reported diverse outcomes. Recently, Ur Rehman & Hysa (2021) applied the system GMM estimation on data from six Western Balkan countries (WBC), and found that financial development and remittances had a positive impact on economic growth. However, remittances were found to be negatively correlated with financial development, thereby negatively impacting economic growth. Further findings indicated that financial development and remittances offset the economic growth of the WBCs.

Following from the foregoing literature review, it is apparent that studies have not yet fully addressed the importance of financial inclusion in the relationship between remittances and economic growth. Similarly, the literature on how financial inclusion and governance affect the growth of remittances is very limited. These are the gaps that this study aims to address.

3. Methodology

3.1 Data Sources and Measurement

We analysed the role of financial inclusion, governance, and remittances on economic growth in SSA countries, as well as the moderating influence of the role of financial inclusion on the remittances and growth nexus using panel data spanning 1996–2020. The data for the study is collected from 21 countries covers 25 (1996–2020). The data are obtained from what was available in the Global Findex database, World Development Indicators (WDI), and World Governance Indicators (WGI). The countries in this sub-region[1] were chosen due to evidence of tremendous remittance inflows and recorded economic growth over the years. A measure of economic growth, gauged with the real gross domestic product per capita (GDPC), is the dependent variable. In this study, economic growth is gauged with per capita income because productivity is fundamental to economic growth (Lucas, 1988). A rise in total factor productivity will translate into an increase in per capita income. By increasing the level of per capita income, an increase in productivity—along with other relevant variables such as remittances, gross capital formation, financial inclusion, and level of governance—is expected to promote economic growth (Rao & Hassan, 2012).

Remittances received and financial inclusion have been identified as the key regressors, whereas the control variables include foreign direct investment (FDI), trade openness (TR), and gross fixed capital formation (CPF). Remittances are expressed as a percentage of GDP in the study, which aligns with Meyer and Shera (2017), and Barajas et al. (2009). In addition to providing a large source of foreign exchange, remittances have a significant impact on long-run economic growth. However, remittances can help recipient countries increase their long-term output by relieving a country's liquidity constraints (Rapoport, 2002). However, when remittances are used to finance private consumption, they can negatively impact economic growth since this increases the relative price of nontraded goods, and discourages labour supply and work effort among recipients, resulting in increased leisure time (Chami et al., 2005). As such, remittances can either contribute to long-run economic growth, or harm it depending on the economic activities they finance.

As mentioned earlier, financial inclusion implies that both individuals and businesses have access to effective and affordable financial products and services that suit their requirements, and are sustainably provided (World Bank, 2022). A well-functioning financial system can influence saving rates, investment decisions, and technological innovation; and, in turn, lead to the long-term growth of per capita income in a country. Some variables have been used to measure financial inclusion in the literature, including automated teller machines (ATMs), account ownership at banks (ACNT), and commercial bank branches (BRCH) (Park & Mercado, 2021; Sarma, 2016). A singular use of these indicators is not always

[1] These countries include Angola, Benin, Botswana, Burkina Faso, Cameroon, Ethiopia, Gabon, Gambia, Ghana, Guinea-Bissau, Kenya, Madagascar, Malawi, Mali, Niger, Nigeria, Senegal, South Africa, Togo, Uganda, and Zimbabwe.

indicative of the comprehensiveness of a financial system (Sarma, 2016), and does not eliminate the possibility of high correlations among these variables. Thus, this study uses the principal component analysis (PCA) of ATM, ACNT, and BRCH, a composite index of FI (PAINC) to assess the physical access index of financial inclusion (see Table 1). In its distinctiveness, the PCA eliminates redundant details and correlations among variables. As another key element in promoting financial inclusion (FI), information and communication technology (ICT) has been praised for its crucial role in bridging the financial infrastructure gap in many African nations, as well as enhancing social and economic inclusion (Kpodar & Andrianaivo, 2011; World Bank Group, 2016). Thus, consistent with Ajide et al. (2020), this study also measures FI with the measures of ICT (ICINC). ICINC is generated through principal components analysis of mobile cellular subscriptions per 100 people (MOB), and fixed broadband subscriptions per 100 people (FBB). Thus, the interactive effect of remittances and financial inclusion on long-term economic growth is expected to be positive.

Table 1: PCA of ATM, ACNT, and BRCH for Financial Inclusion Index

Principal Component	Eigenvalue	Cumulative (%)
One	1.9244	0.6415
Two	0.8811	0.9352
Three	0.1945	1.0000

Source: Authors' calculation

The variable capital formation (CPF) refers to the amount of fixed investment and capital accumulation in an economy's growth process. The inquiry into endogenous growth models suggests a positive relationship between fixed investment levels and economic growth (Romer, 1986). Governance (GOV) also refers to established and ingrained social rules that organize social interactions (Hodgson, 2006). Governance is measured using three indices: institutional governance, economic governance, and political governance. Economic governance is measured by government efficiency and effectiveness, whereas institutional governance is measured by corruption control and the rule of law. Political governance is defined as the sum of political stability, voice, and accountability. High-quality governance frameworks—such as political and institutional governance—together with a solid legal and regulatory system that protects property rights and assures law enforcement: all attract remittances and investments.

On the other side, an inadequate and untrustworthy institutional structure exacerbates uncertainty. It also diminishes receivers' motivation to invest in remittance earnings. As a result, it is expected that a strong and effective governance system will increase economic growth. Following Khan et al. (2020), foreign direct investment is measured as a percentage of GDP; while gross fixed capital formation is used to measure the level of investment. The selection of this measurement agrees with Meyer and Shera (2017). Following Khan et al. (2020), trade openness (TR) is gauged by the percentage of GDP.

In terms of the a priori expectation, remittances may have either a direct or indirect relationship with economic growth, depending on whether they are utilized for investment purposes or otherwise ($z_1 \gtrless 0$). Studies such as Iqbal and Satter (2008), and Vargas-Silva (2008), support a positive relationship; while Barajas et al. (2009) reported the existence of a negative nexus. Furthermore, the coefficient of the interaction between remittance inflows and the measures of financial inclusion is expected to be positive ($z_3 > 0$). Additionally, the coefficients of $z_4, z_5, z_6,$ and $z_7 > 0$ are predicted to be positive because they are growth-enhancing (Haider et al., 2016). Table 2 provides an outline of the variable descriptions, as well as their measurements.

Table 2: Description of Variables

Variables	Notation	Measurement	Data Source
Economic growth	GDPC	GDP per capita (constant 2015 US$)	WDI
Physical access measure of financial inclusion	PAINC	Physical access measure of financial inclusion index generated through PCA of ATM, ACNT, and BRCH	Authors computation
ICT measure of financial inclusion	ICINC	ICT index of financial inclusion (PCA of MOB & FBB)	Authors computation
Remittance	REM	Personal remittances received (% of GDP)	WDI
FDI inflows	FDI	Foreign direct investment, net inflows (% of GDP)	WDI
Capital formation	CPF	Gross fixed capital formation (% of GDP)	WDI
Trade openness	TR	Trade (% of GDP)	WDI
Institutional Gov.	ISGOV	Institutional governance	Authors computation
Economic Gov.	ENGOV	Economic governance	Authors computation
Political Gov.	PTGOV	Political governance	Authors computation

Source: Authors' computation

3.2 Empirical Model

Following the work of Sobiech (2019) and Saydaliyev et al. (2020), we augment and specify a baseline model that expresses economic growth as a function of remittances, financial inclusion (FI), and a set of explanatory variables as follows:

$$GDPC_{it} = z_{0i} + z_{1i}REM_{it} + z_{2i}FI_{it} + z_{3i}Q_{it} + \epsilon_{it} \qquad (1)$$

where $GDPC_{it}$ represents economic growth; REM_{it} denotes remittances; FI is a vector of both the physical access measure (PAINC) and ICT measure (ICINC) of financial inclusion; φ_{it} represents the vector of control variables; $z_1 - z_3$ denotes parameters to be estimated; and μ_{it}represents the general error term.

Remittances in this model are one of the vital components of global economic growth, as they help fund the various initiatives that are aimed at addressing the funding gaps that exist due to the rapid emergence and growth of new research and development. In addition, they can also indirectly affect the economic variables of other countries. We suggest that a comprehensive financial system can help boost

the flow of remittances and contribute to the overall economic growth of a country. The set of control variables aligns with those used in remittances-economic growth models: gross fixed capital formation (CPF), foreign direct investment (FDI), trade openness (TR), and governance (GOV). Hence, we augment equation (1) to include the interaction of remittances and financial inclusion ($FI * REM$).

$$GDPC_{it} = z_{0i} + z_{1i}REM_{it} + z_{2i}FI_{it} + z_{3i}FI_{it} * REM_{it} + z_{4i}Q_{it} + \epsilon_{it} \quad (2)$$

The current study contends that different measures of governance (economic, political, and institutional governance) are crucial in securing an improved financial institution and a suitable regulatory framework for remittance inflows. Hence, this necessitates the augmentation of equation (2) to include each measure of governance and other control factors as specified below:

$$GDPC_{it} = z_{0i} + z_1REM_{it} + z_{2i}FI_{it} + z_{3i}FI_{it} * REM_{it} + z_{4i}CPF_{it} + z_{5i}FDI_{it} + z_{6i}ENGOV_{it} + z_{7i}TR_{it} + \epsilon_{it} \quad (3)$$

$$GDPC_{it} = z_{0i} + z_1REM_{it} + z_{2i}FI_{it} + z_{3i}FI_{it} * REM_{it} + z_{4i}CPF_{it} + z_{5i}FDI_{it} + z_{6i}PTGOV_{it} + z_{7i}TR_{it} + \epsilon_{it} \quad (4)$$

$$GDPC_{it} = z_{0i} + z_1REM_{it} + z_{2i}FI_{it} + z_{3i}FI_{it} * REM_{it} + z_{4i}CPF_{it} + z_{5i}FDI_{it} + z_{6i}ISGOV_{it} + z_{7i}TR_{it} + \epsilon_{it} \quad (5)$$

where FI is the vector of the physical access index (PAINC), or ICT index (ICINC) of financial inclusion; $i = 1,2,\ldots N$, and $t = 1,2,\ldots T$.

Thus, by looking at the coefficient of the interaction terms, z_3, we can understand whether the long-run marginal effects of remittances on influencing or deteriorating economic growth are dependent on the degree of financial inclusion in SSA countries.

However, equations (1)–(5) do not allow differentiating between the short-run and long-run influences of the vector of explanatory variables. Accordingly, the study adopted a pooled mean group (PMG) estimator, which employs the maximum likelihood technique, to evaluate parameters of dynamic panels developed ARDL model as documented by Pesaran et al. (1999). The choice of the PMG technique was motivated by its capabilities to provide better consistent results than traditional dynamic panel models for many reasons. First, it accepts variables with diverse degrees of stationarity such as level and first difference. The method is also suitable for studies with a small number of subjects. There are 25-year time series in this study, which is relatively small by panel study standards, but is manageable with the PMG model. Finally, it captures the short- and long-run dynamics variables of interest given the efforts of stakeholders in the SSA countries to enhance the remittance drive. Following Pesaran et al. (1999), an ARDL ($p, q,\ldots q$) is defined as:

$$GDPC_{it} = \sum_{j=1}^{p} z_{ij}GDPC_{i,t-j} + \sum_{j=0}^{p} \delta_{ij}X_{i,t-j} + \mu_i + \epsilon_{it} \quad (6)$$

where X represents the vector of independent variables, and μ_i denotes group-specific effects.

Thus, the model is transformed to become equation (7) after parametrizing equation (6):

$$\Delta GDPC_{it} = \varphi_i\left(\Delta GDPC_{i,t-1} - \beta_i X_{it}\right) + \sum_{j=1}^{p-1} z_{ij} GDPC_{i,t-j} + \sum_{j=0}^{q-1} \delta_{ij} \Delta X_{i,t-j} + \mu_i + \epsilon_{it} \quad (7)$$

where β_i represents various vectors that gauge the long-run effect of the independent variables; and φ_i stands for the error corrector mechanism effect (ECT). The error terms ϵ_{it} are independently distributed across time and units.

4. Research Findings and Discussion

4.1 Pre-estimation Results

Tables 3 and 4 present the descriptive statistics and the correlation matrix, respectively. The descriptive statistics explain the dataset, and specifically do so by describing the mean, standard deviation, skewness, and kurtosis of the variables employed. The average per capita income is $1,775, and it is accompanied by maximum and minimum values of $9267.8 and $248.8.

Table 3: Descriptive Statistics

Variable	Mean	Median	Maximum	Minimum	St. Dev.	Skewness	Kurtosis
GDPPC	1775.3	964.13	9267.8	248.8	2016.0	1.827	5.184
PAINC	-0.098	-0.358	2.554	-0.835	0.815	1.098	3.422
ICINC	-0.263	-0.459	4.028	-1.286	0.899	2.078	8.610
REMGDP	2.949	1.742	22.291	0.000	3.308	1.542	5.604
FDI	2.602	1.905	40.167	-6.369	3.414	3.939	35.622
GCF	20.818	20.496	42.792	2.001	6.844	0.166	3.365
TRADE	59.089	53.288	152.547	20.723	22.141	1.446	5.736
ISGOV	-0.611	-0.653	0.974	-1.604	0.528	0.586	3.456
ECNGOV	-0.569	-0.592	0.768	-1.834	0.504	0.427	3.367
PLTGOV	-0.455	-0.534	0.938	-1.862	0.600	0.148	2.398

Note: (a) Descriptive statistics include mean, standard deviation, skewness, kurtosis, minimum, and maximum of the dependent, explanatory, and control variables employed in this study.
(b) *p < 0.01; ***p < 0.0

Source: Authors' computation

Table 4: Correlation Matrix

Variables	Growth	Financial Inclusion		Remittance	Control Variables			Institutional Variables		
	GDPPC	*PAINC*	*ICINC*	*REM*	*FDI*	*CPF*	*TR*	*ISGOV*	*ECNGOV*	*PLTGOV*
GDPPC	1									
PAINC	0.45	1								
ICINC	0.645	0.652	1							
REM	-0.34	0.195	-0.052	1						
FDI	-0.014	0.053	-0.069	0.094	1					
CPF	0.203	0.049	-0.018	-0.269	0.211	1				
TR	0.444	0.129	0.204	-0.095	0.303	0.226	1			
ISGOV	0.329	0.219	0.341	-0.138	-0.011	0.178	0.079	1		
ECNGOV	0.42	0.201	0.421	-0.238	-0.087	0.126	0.015	0.774	1	
PLTGOV	0.337	0.195	0.262	-0.113	-0.119	-0.013	0.139	0.797	0.734	1

Source: Authors' computation

Likewise, the average remittance value is $2.949, and it is accompanied by a maximum and minimum value of $22.291 and 0, respectively. Similarly, foreign direct investment net inflows (FDI) increased from $2.602 to $40.167; while trade openness also increased from $59.089 to $152.547. The gross fixed capital formation ranged from $2.001 to $42.792. The correlation matrix indicates that all the variables, except remittances, have a positive correlation with GDP per capita. The correlation matrix also shows that the correlation coefficients between GDP per capita and all the independent variables are low, but that there is a moderate level of association between the measures of governance.

It is critical to determine the unit root of each variable when estimating the PMG model. This ensures that no variable is stationary at I(2). In Table 5, the Levin-Lin-Chu and Harris-Tzavalis tests—which were developed by Levin et al. (2002) and Harris and Tzavalis (1999)—are used in the study to figure out the stationarity of the variables. The Levin-Lin-Chu test shows that the level of stationarity of the variables is a mix of orders of integration I(0) and I(1). Likewise, the Harris-Tzavalis unit root test reveals that the variables used in the study are integrated at orders I(0) and I(1), but not at I(2). Besides, literature has expounded that international trade links and the globalization process have conditioned the economic activities of countries to be interdependent (Appiah et al., 2022). Therefore, the evaluation of a model with a high number of cross-sections should not overlook this crucial aspect.

Table 5: Panel Unit Root Test

Variables	Levin-Lin-Chu		Harris-Tzavalis	
	Level	*1st Difference*	*Level*	*1st Difference*
GDPC	-0.084	-18.258 ***	3.897	-50.534 ***
PAINIC	-3.657 ***	-30.472 ***	-5.168 ***	-77.694 ***
ICINT	-8.968 ***	-13.441 ***	-12.982 ***	-67.304 ***
REM	5.6234	-28.075 ***	4.098	-67.020 ***
FDI	-13.278 ***	-50.000 ***	-35.964 ***	-120.00 ***
CPF	-6.155 ***	-32.190 ***	-10.834 ***	-96.224 ***
TR	-3.703 ***	-32.606 ***	-4.620 ***	-86.789 ***
ISGOV	0.475	-22.034 ***	0.482	-83.177 ***
ENGOV	-2.280 **	-29.098 ***	0.507	-86.247 ***
PTGOV	-0.720	-25.445 ***	-0.940	-84.053 ***

Note: **p < 0.05; ***p < 0.01

Source: Authors' computation

The study performs and presents the results of cross-sectional dependence tests (Pesaran et al., 2008; Friedman, 1937, and Frees, 1995) in Table 6. The probability values for the three cross-sectional dependence tests of all variables within the panel are significant at either the 1% or 5% levels, resulting in the rejection of the null hypothesis of cross-sectional independence. So, this suggests that there is enough cross-sectional dependence between variables in all countries in different panels. Table 5 further presents the results of the test for

homogeneity. Using the respective probability values of the delta (Δ̃) and adjusted delta (Δ̃) tests, the study firmly rejects the null hypothesis of slope coefficient homogeneity at a significance level of 0.1%. This indicates that heterogeneity exists for all variables analysed in the various cross-sections, necessitating the use of heterogeneous panel methods in which parameters vary across individual cross-sections within the panels.

Table 6: Result of Cross-sectional Dependence and Slope Homogeneity Tests

Tests	Statistic	Prob.
Pesaran's cross-sectional dependence test	3.306 ***	0.001
Friedman's cross-sectional dependence test	71.697 **	0.012
Frees cross-sectional dependence test	7.506 ***	0.000
Slope Homogeneity (delta (Δ̃) test)	14.650 ***	0.000
Slope Homogeneity (adj. delta (Δ̃) test)	17.206 ***	0.000

Note: **p < 0.05; ***p < 0.01

Source: Authors' computation

The findings of the cointegration tests of Kao (1999), Pedroni (1999), and Westerlund (2005) are shown in Table 7. The Kao cointegration test demonstrates that, across countries' panels, there is cointegration between the dependent variable and the independent variable. It turns out that the test values for Kao, Pedroni and Westerlund cointegrations are significant; suggesting that there is cointegration between the selected variables.

Table 7: Panel Cointegration Tests

	Kao Statistic	Pedroni Statistic	Westerlund Statistic
Modified Dickey-Fuller t	-1.963 **	–	–
Dickey-Fuller t-	-2.249 **	–	–
Augmented Dickey-Fuller t	-2.357 ***	5.372 ***	–
Unadjusted modified Dickey-Fuller t	-2.619 ***	–	–
Unadjusted Dickey-Fuller t	-2.615 ***	–	–
Modified Phillips–Perron t	–	7.648 ***	–
Phillips–Perron t	–	3.887 ***	–
Variance ratio	–		19.339 ***

Note: **p < 0.05; ***p < 0.01

Source: Authors' computation

4.2 Result Findings and Discussion

Table 8 reports the results of the PMG estimation method. It shows the long-run result in its upper part; and the short-run result in its lower section. The negative and significant values of the error correction term (ECT (-1)) signify a speed of adjustment of 22.9, 5.0, 20.9, 18.9, 64.0, and 18.9 years, respectively. This means that the response to long-run equilibrium deviations is fast.

Table 8: Pooled Mean Group Regression Result of Remittance, Financial Inclusion, Governance and Economic Growth in SSA

	Dep. Variable: GDP per Capita (GDPC)					
Variables	1	2	3	4	5	6
	PAINC with measures of Financial Inclusion			**ICINC with measures of Financial Inclusion**		
Long-run						
PAINC	**-2.744 (0.746) *****	-0.3320 (0.144) *	**0.264 (0.131) ****			
ICINC				-0.950 (0.594)	-0.550 (0.0003)	**0.510 (0.107) *****
REM	**3.527 (1.507) ****	**0.411 (0.116) *****	**0.382 (0.156) ****	**1.317 (0.427) *****	**1.009 (0.001) *****	**1.281 (0.398) *****
PAINC x REM	**0.349 (0.094) *****	**0.023 (0.010) ****	**0.486 (0.127) *****			
ICINC x REM				**0.416 (0.166) ****	0.849 (1.513)	0.379 (0.925)
FDI	**3.747 (1.677) ****	-1.305 (4.278)	0.119 (0.340)	**0.531 (0.229) ****	-0.180 (0.302)	-0.307 (0.337)
CPF	-2.970 (33.265)	5.144 (2.640) *	**0.759 (0.150) *****	-0.327 (0.349)	-46.000 (0.031)	-0.316 (0.324)
TR	**0.119 (0.014) *****	**-7.740 (1.247) *****	**1.252 (0.158) *****	**1.275 (0.168) *****	**128.7 (0.016) *****	**1.241 (0.158) *****
ENGOV	**-0.530 (0.254) ****			-1.325 (3.092)		
PTGOV		**0.187 (0.030) *****			**-608.8 (0.279) ****	
ISGOV			-0.712 (0.536)			-3.034 (2.451)
						Short-run
ECT (− 1)	**-0.229 (0.013) *****	**-0.050 (0.012) *****	**-0.209 (0.105) ****	**-0.189 (0.061) *****	**-0.64 (0.308) *****	**-0.189 (0.083) ****
D.PAINC	-1.631 (1.354)	-1.362 (1.076)	-0.887 (0.663)			
D.ICINC				-1.410 (1.309)	-1.060 (0.983)	-1.042 (0.887)
D.REM	31.385 (74.032)	0.219 (0.849)	0.233 (0.626)	0.210 (0.705)	0.177 (0.661)	0.024 (0.611)
D.PAINC x REM	2.710 (1.473) *	**0.905 (0.310) *****	0-.117 (0.250)			
D. ICINC x REM				1.326 (2.562)	1.510 (1.063)	1.540 (0.914) *
D.FDI	1.242 (2.476)	1.670 (2.495)	1.196 (2.264)	1.302 (2.516)	1.349 (2.539)	1.088 (2.307)
D.CPF	**3.709 (1.856) ****	**4.726 (2.291) ****	3.450 (1.817) *	**3.757 (1.819) ****	**3.573 (1.798) ****	3.504 (1.831) *
D.TR	**1.964 (0.762) ****	1.516 (0.805) *	**2.047 (0.787) *****	**2.057 (0.770) *****	**2.249 (0.798) *****	**2.130 (0.791) *****
D.ENGOV	-0.451 (0.328)			-4.702 (3.747)		
D.PTGOV		0.007 (29.33)			29.726 (28.591)	
D.ISGOV			-0.278 (0.343)			-8.908 (37.842)
Constant	1.038 (1.725)	-0.675 (0.352) *	1.244 (1.687)	0.169 (0.151)	0.1761 (0.156)	0.128 (0.148)
Hausman chi²	**5.135**	**0.23**	**1.307**	**1.932**	**5.474**	**10**
	-0.296	**-0.998**	**-0.531**	**0.932**	**-0.346**	**-0.069**
Observation	524	524	524	524	524	524

Note: Standard errors in parentheses; **p < 0.05; ***p < 0.0

Table 8 presents the answer to the stated objectives of the paper: to ascertain whether financial inclusion has an impact on the remittance-economic growth nexus; and how the quality of governance enhances the relationship between remittances and growth in SSA. It also explains whether the interplay of financial inclusion, governance, and remittances has an impact on the growth of SSA countries. The findings reveal that, in columns 1–2, the coefficient of financial inclusion (PAINC) is negative and statistically significant at a 1% and 10% levels, respectively, suggesting that financial inclusion inhibits economic growth in SSA. These outcomes are in tandem with the findings of Khan (2011), who found that financial inclusion has a significant negative impact on economic growth. This means that a percentage change in financial inclusion, proxy with PAINC, will denigrate economic growth by 2.744% and 0.332%, respectively. In contrast, the coefficient of financial inclusion is positive and statistically significant at 5% level when modelled with institutional governance. This outcome is in tandem with the findings of Erlando et al. (2020) and Ratnawati (2020), who found that financial

inclusion has a significant positive impact on economic growth. The finding implies that financial inclusion improves the growth of the SSA economy with robust institutional governance; suggesting that a percentage change in financial inclusion—proxy with PAINC, as well as institutional governance—will enhance economic growth by 0.264%.

The findings of the interplay between remittance and economic growth are also presented in Table 8, in columns 1–3. The findings reveal that the coefficient of remittances is positive and statistically significant at a 1% level, suggesting that remittances are associated with increased economic growth. Put differently, this means a percentage change in remittances will boost economic growth by 3.527%, 0.411%, and 0.382%, respectively. This finding follows the assertion that an increase in revenue from remittances improves economic growth. These findings are partly consistent with the works of Bangake and Eggoh (2020), Kadozi (2019), and Yang (2004), who found that remittances have a significant positive impact on economic growth. However, the findings contradict the claim that workers' remittance has no income growth effect when simply added as an explanatory variable in a standard growth regression.

Further, in columns 1–3 the interaction of financial inclusion (PAINC) and remittances produces a statistically significant positive effect at a 1% and 5 % levels, suggesting that the interaction enhances economic growth. On the other hand, the financial inclusion rate has contributed to a positive influence of remittances on the growth of SSA countries. The result was expected since funds from remittances are transformed into investment activities by strengthening the capital base of financial institutions, and the growth of the financial sector, hence, portending a positive impact on the economy. These findings are partly consistent with Nyamongo et al. (2012), Chuc et al. (2022), and Ur Rehman and Hysa (2021), who reported that financial development/inclusion has a significant positive impact on the remittances-economic growth nexus.

The robustness of the results was confirmed using another index of financial inclusion (ICINC), as measured by ICT access, on economic growth for the three measures of governance. Still, the coefficients of financial inclusion in Table 8 are negative and statistically significant when economic and political governance measures are introduced differently, indicating that financial inclusion reduces economic growth. The coefficient of remittances is positive and statistically significant at a 1% level, suggesting a positive association with economic growth. These findings are not significantly and quantitatively diverse from the results in columns 1, 2, and 3 when PAINC was employed as the financial inclusion index. However, the interaction terms in columns 4, 5, and 6 yield a positive impact on the economic growth of SSA countries. The findings are significantly and quantitatively different from the results in columns 1, 2, and 3. For columns 5 and 6, the coefficients are not statistically significant. Besides, the coefficients of the estimated control variables yield diverse outcomes concerning impact and magnitudes when modelled with different measures of governance (see Table 8, columns 1–3).

5. Conclusion

The goal of this study was to conduct an econometric evaluation of the role of financial inclusion, governance, and remittances on the growth of SSA countries, as well as to moderate the influence of financial inclusion on the remittances and growth nexus using panel data spanning from 1996 to 2020. The homogeneity and cross-section dependence tests and pooled mean group (PMG) estimators are employed to take care of sectional dependence, and provide for a more robust analysis of the nexus among the selected variables. As opposed to past studies, the present study provides essential insights into the immediate significance of inclusive financial services, while also providing empirical evidence of whether remittances and financial inclusion stimulate economic growth independently. The outcomes of the PMG estimation show that remittances and growth are positively and significantly linked for SSA countries. In addition to its contribution to economic growth, the evidence suggests that remittances can be seen as an integral element of growth and development for the SSA region, therefore inspiring foreign exchange inflows, employment opportunities, and human capital development.

As well, the study results indicate that financial inclusion has an adverse and significant implication on growth when the economic and political governances are considered. However, a sample of institutional governance demonstrates that it has a positive and significant impact on economic growth. Our findings indicate that financial inclusion is negatively affecting economic growth in the sub-region, demonstrating that the inclusion of financial services is detrimental to economic growth in the sub-region as a whole. It has been theorized that financial inclusion and economic growth can be positively correlated (Erlando et al., 2020; Ratnawati, 2020), or negatively correlated (Khan, 2011). Our findings, among others, can lend insight into the relationship of financial inclusion with economic growth, and determine the benefits of inclusive financial services as well as products. Given the SSA economy and the performance of the financial sector, the relationship between financial inclusion and the economy is less than robust due to the structure of the current economy, and the influences on financial inclusion.

The study also looked at the interacting influence of remittance inflows and financial inclusion on the economic growth of SSA countries. Our outcomes reveal that the interaction of the influence of remittances and financial inclusion is positive across all model specifications. Furthermore, the literature demonstrates that positive interaction is sufficient to sustain a positive impact of remittances on growth. The finding indicates that remittances play a significant role in spurring economic activity, irrespective of the contribution of financial inclusion across model specifications. The sensitivity checks were conducted to measure financial inclusion with ICT access (ICINC). The findings reveal that the index of financial inclusion gauge with physical access (PAINC) index, supporting our initial findings for the SSA of countries. In light of these findings, all stakeholders need to take action. Overall, the results indicate that remittances positively impact growth, and financial inclusion negatively impacts growth for SSA countries-findings: all of which are consistent with the literature and theoretical discourse.

The study concludes that remittances have a sizable influence on growth. Therefore, policymakers in SSA countries must place a premium on designing efficient policies, and fostering the development of financial development to ease remittance channels and documentations. However, the finding that financial inclusion exerts an adverse influence on growth when modelled using various governance measures give policymakers in SSA an insight into the importance of promoting heterogeneity among financial institutions, and allowing for variations in the quality of services from one provider to another. Beyond commercial banks, financial sectors do have many competitors like microfinance institutions and credit cooperatives, which function in diverse locations to serve diverse consumer demographics. The government needs to provide a regulatory environment that allows for the admission of various institutions, and imposes fair prudential standards geared towards various particular levels of risk to reach customers who are underserved by commercial banks. Measures that encourage a robust and competitive market, together with a fair society for all service providers, are also required. Given the findings that the level of governance has an adverse influence on growth, stakeholders should improve financial infrastructure that provides the underlying instrument for financial inclusion, and protect customers by instituting controls and procedures for reporting, fairness, and resorting to SSA countries. Governments should also promote the larger global remittances agenda, which includes leveraging remittances for better consumer and business financing, and exposure to global financial markets through refinancing and the issue of diaspora bonds.

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