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Econometric Analysis of the Impact of Economic Growth on Remittances: A Case Study of select African Countries

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Abstract

The disparity in distribution of natural resources has caused varying levels of development in different world regions. The countries with higher development levels often attract skilled and semi-skilled workers from other regions. The consequence of this is a large-scale transnational movement of individuals. Migrant sending country is more often a beneficiary of their remittances. These remittances play a major role in the development and economic stability of the sponsoring countries. Remittances become a major foreign exchange contributor and often major income generator for migrant households. Ample scholarly work is available on the role and impact of remittances in the economic growth of the receiving countries. The assessment of the role and impact of country's economic growth on the remittances has been a neglected area. The present paper attempts to understand whether economic growth has any direct bearing on the flow of remittances to the country. A panel data of six countries including Kenya, Namibia, Ghana, Egypt, Tunisia and South Africa was compiled using the data from the World Development Indicators for the time period 2000-2023. A Generalised Least Square (GLS) technique of regression analysis of Econometrics has been used to understand the relationship between economic growth and remittances. The findings of the study show that economic growth has no significant direct impact on remittances in the panel of these select countries for the defined period.

Key Words: economic growth, remittances, Africa, foreign direct investment, inflation, unemployment

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1. Introduction

Any country's development is primarily dependent on its economic growth supplemented by the foreign financial inflows like foreign direct investment (FDI), equity investments, loans, aids, other financial transactions like trade balance and remittances. Major financial inflows of African countries are through official development assistance (ODA), FDI and remittances. Remittances have arisen as one of the important instruments of financial inflows in Africa. The relationship between the remittances and economic growth is multifaceted and complex as it is influenced by economic, social, political and geographical factors. An exhaustive investigation of the impact of remittances on economic growth has been well documented in literature, and a select studies have been listed below.

If the economic growth of the remittance-receiving country is low, indicates slow economic growth, it impacts employment levels and stagnates wages (Makun, 2018; Tchamyou et al., 2019). This may often lead to difficulty in maintaining existing living standards. Skilled and qualified individuals may avail the opportunity to migrate abroad to greener pastures. This provides an opportunity for increased remittance inflows (Asiedu & Gyimah-Brempong, 2008). In such countries, daily survival of the households of migrants finds increased dependency on remittances. For the household, remittances are primarily spent on basic daily requirements (Melesse & Beshir, 2020; Catrinescu et al., 2009). In low-income countries where GDP is often low, the proportion of remittances may be large enough to form up to 30% of the gross domestic product, becoming a significant contributor to foreign exchange earnings (Gupta, Pattillo, & Wagh, 2009; World Bank, 2020). Remittances become buffers for most countries.

The situation is just the reverse in the case of countries with high GDP growth. Employment levels improve and economic opportunities increase, discouraging potential migrants to seek employment abroad. Migration levels reduce consequently decreasing remittances. Households are not completely dependent on remittances, and remittances do not remain a financial buffer. To summarize, economic expansion enables the retention of its workforce within the country and it may reduce dependence on remittances. Equally strong argument is that improving economic stability of a country attracts remittances not for household consumption but for investment purposes. The former case maybe of the individuals with marginal incomes back home and latter for those who may be professionals and in better paid jobs. This has to be researched yet.

Often the remittances are used for household consumption or for expenses required for children's education or health of the family member rather than for the investment purposes. The perception is that remittances have a positive impact on economic growth of the receiving country. The impact of economic growth on the inflow of remittances in select African countries is explored in the present research paper. To consider all the African countries for the study is difficult as there are gaps in statistical data especially in financial statistics. Therefore, selection of the African countries was guided only by the availability of data related to dependent and independent variables. The realisation of the importance of data on remittances is not denied but availability of reliable data becomes a challenge for policy makers, government agencies and decision makers.

2. Research Objectives

- To analyze the impact of economic growth on remittance inflows in select African countries using an econometric approach.
- To examine the role of other explanatory macroeconomic factors such as Gross Domestic Product, unemployment, inflation, Foreign Direct Investment, Gross Domestic Savings, population growth, mobile subscription and political stability in shaping remittance flows.

3. Hypothesis

- **H0:** Economic growth has no significant effect on remittance inflows.
- **H1:** Economic growth significantly influences remittance inflows in African countries.

4. Literature Review

International remittances have emerged as an important source of external financing for many developing countries, particularly in the African countries. The role of remittances in economic growth has been widely examined in the literature, with varying conclusions regarding their effects. While some studies highlight the positive contributions of remittances to investment, financial liberalisation, and poverty reduction, other research articles suggest that remittances may not directly stimulate economic growth due to their predominant use in consumption rather than productive investments.

The literature review delves into the existing research on the impact of remittances on economic growth in Africa, highlighting key findings, theoretical frameworks, and empirical evidence. These are discussed in the following subsections. This literature review synthesizes recent empirical studies and theoretical perspectives on how remittances influence economic growth. Remittances can affect economic growth through three channels, first, by directly adding into capital accumulation; second, by amount of labour inputs used through labour force contributions and third, by analysing the impact on the growth of total factor productivity (Barajas et al. 2009, Rahman 2014, p. 141).

Yoshino, Taghizadeh-Hesary & Otsuka (2019) study is probably the only study that provides a good insight on the impact economic growth, FDI and political stability on remittances "investigate the determinant of international remittance inflows in 12 remittance recipient middle-income economies in East and South Asia defined by the World Bank. The period of the study is from 2002 to 2015." Their several findings are very important for the present research. They found that "the increase of GDP per capita growth rate leads to increasing remittance inflows in middle-income countries in Asia and the Pacific." Their study found that in case of economic growth of high-income countries, it gives people better job opportunities to stay home instead of going abroad, this reduces the remittances inflows. The increase of FDI inflows have a negative correlation with remittance inflows in middle-income countries. As middle-income economies develop, "FDI expands instead of the remittance inflows." Political stability is also negatively correlated with remittance inflows. The political volatility force people to migrate abroad for better jobs and remit a part of their earnings.

According to the World Bank Report 2019, the existing empirical literature gives a viewpoint that impact of remittances on the economic growth of the recipient country is also questionable. While some studies support the idea that remittances have a positive effect on the economic growth, while others found a negative impact on the economic growth. Some research studies have found no

significant impact of remittances on the economic growth on the empirical grounds (Vesna Bucevska, 2022). Given below is the summary of research papers that analyzed the impact of remittances on economic growth, categorized by positive, negative and no significant effects first global impacts followed by impacts in African countries:

Table 1. Positive Impact of Remittances on Economic Growth

Study	Year	Author	Findings
"Remittances and Economic Growth: What Lessons for the CEMAC Countries"	2023	Tchekoumi, Louis Bernard and Nya, Patrick Danel	This study investigates the role of remittances in the economic growth of the Central African Economic and Monetary Community (CEMAC) countries. The findings suggest that remittances serve as a significant source of external financing, contributing positively to economic growth in the region.
"Remittances and Economic Growth: The Role of Financial Development in Nepal"	2024	Pradeep Panthi and Jeevanath Devkota	The study investigated whether financial development intermediates the effects of remittances on economic growth using time series data from 1980 to 2021 for Nepal. Using autoregressive distributed lag (ARDL) model, results showed that remittances and financial development significantly and positively enhance the economic growth of Nepal.
Nexus Between Indian Economic Growth and Remittance Inflows: A Non-linear ARDL Approach	2023	Muhammed Ashiq Villanthenkodath & Mohd Arshad Ansari	This study investigates the empirical link between remittance inflows and India's economic growth using data for the period from 1975 to 2021using non-linear ARDL technique. The results reveal an increase in the remittance inflows leads to an increase in economic growth, whereas a decrease in the remittance inflows ends up in a reduction of economic growth.
"The impact of remittances on economic development in the Central and Eastern European Countries"	2022	Ines Kersan-Škabić and Lela Tijanić	This paper analyzes the impact of remittances on the economic growth of six South-East European countries using quarterly data from 2008 to 2020. The study concludes that remittance inflows have positively stimulated economic growth in these nations.
"Understanding the Impact of Remittances on Mexico's Economy and Safeguarding Their Future Impact"	2025	Berg et al.	This research examines the significance of remittances sent by workers to low- and middle-income countries, focusing on Mexico. The study highlights that remittances have become a crucial source of external financing, with Mexico receiving a substantial share, thereby impacting its economic growth.
"Remittances and Economic Growth: Empirical Evidence from Bangladesh, India and Sri Lanka".	2012	Jawaid, S. T., & Raza, S. A.	The paper investigates the relationship between remittances and economic growth in three South Asian countries using annual data from 1975 to 2009. The results indicate a positive and significant impact of remittances on economic growth in both the short and long run for Bangladesh, India, and Sri Lanka.

Migration, Remittances and Economic Growth in India	2015	Halima Sadia Rizvi and Nisar M.P	This study examines the trends of remittance to Indian economy. It also checks the causal relationship between remittances and economic growth in India using annual data over the period 1971-72 to 2013-14. The study revealed that there is a long run relationship per capita income and remittances and Granger Causality results reveal that there exists bidirectional causality between remittances and economic growth
"The impact of remittances on economic growth: An econometric model"	2017	Dietmar Meyer & Adela Shera	This study reveals the impacts of remittances on economic growth, using panel data set of six high remittances receiving countries, Albania, Bulgaria, Macedonia, Moldova, Romania and Bosnia Herzegovina during the period 1999–2013. The results indicate that remittances have a positive impact on growth and that this impact increases at higher levels of remittances relative to GDP.
"Do Remittances Promote Economic Growth? Evidence from a Panel of Developing Countries"	2008	Pradhan, G., Upadhyay, M., & Upadhyaya, K.	Analysing data from 1980 to 2004 for 39 developing countries, this study finds that remittances have a positive impact on economic growth, suggesting that remittances can supplement domestic savings and provide a source of external financing for capital formation.
"Remittances and Financial Development: Substitutes or Complements in Economic Growth?"	2009	Giuliano, P., & Ruiz-Arranz, M	This research analyzes whether remittances and financial development act as substitutes or complements in promoting economic growth. The findings indicate that remittances boost growth in countries with less developed financial systems by providing an alternative means of financing investment and overcoming liquidity constraints.
"Remittances and Economic Growth Nexus: Evidence from Panel ARDL Approach".	2016	Jawaid, S. T., & Raza, S. A	Using a panel ARDL approach, this study investigates the relationship between remittances and economic growth in selected South Asian countries from 1975 to 2011. The results reveal a positive and significant long-run relationship between remittances and economic growth.
"Remittances and Economic Growth: The Role of Financial Development".	2011	Aggarwal, R., Demirgüç-Kunt, A., & Martinez Peria, M. S.	This study examines the impact of remittances on financial development and, in turn, economic growth. The findings suggest that remittances promote financial development, which subsequently enhances economic growth in developing countries.
Workers' Remittances, Capital Inflows, and Economic Growth in Developing Asia and the Pacific	2019	Jongwanich, J., and A. Kohpaiboon.	This paper examines the impact of remittances on economic growth, using developing countries in Asia and the Pacific as a case study. Using data for the period 1993–2013, our results show that remittances only generate negative and significant impacts on economic

			growth if they reach 10 percent of GDP or higher.
"Remittances, Financial Development and Economic Growth: A Panel Data Analysis"	2011	Ahmed, J., Zaman, K., & Shah, I. A.	This study explores the relationship between remittances, financial development, and economic growth in selected South Asian countries. The results indicate that remittances and financial development positively influence economic growth, both individually and interactively.
Role of remittances in India's economic growth	2012	Jayaraman et.al.	The study focuses on the likely linkages between economic growth and remittances, facilitated by financial sector development for the period 1970-2009. The results showed that remittances and the interaction between remittances and financial sector development have had a positive and significant effect on growth over the last four decades under study.
"Remittances and Economic Growth: Larger Impacts in Smaller Countries?"	2014	Feeny, S., Iamsiraroj, S., & McGillivray, M	The paper analyzes the impact of remittances on economic growth in transition countries from 1990 to 2010. The findings suggest that remittances have a positive and significant effect on economic growth in these countries.
"The Impact of Remittances on Economic Growth: An Econometric Model"	2013	Kumar, R.R.	This study develops an econometric model to assess the impact of remittances on economic growth in Fiji from 1980 to 2010. The results indicate that remittances have a positive and significant effect on economic growth.
Role of Financial Inclusion in the Remittances and Output Nexus: An Empirical Study of Fiji over 1980-2012	2015	Hong Chen and T.K Jayaraman	This paper examines the interaction between remittances and financial sector in Fiji Islands for a period 1980-2012. The results of the study demonstrate that financial development and remittances have both had a substantial positive impact; nevertheless, because the interaction term has a negative sign, suggesting that financial development and remittances are substitute to each other, the financial system is shallow. At this point, there is no complementary relationship between remittances and financial inclusion.

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Table 2. Negative Impact of Remittances on Economic Growth

Study	Year	Author	Findings
"Remittances, Institutions, and Economic Growth"	2009	Catrinescu et.al.	The study examines the impact of remittances on economic growth considering the role of institutional quality. Using data from 114 countries over the period 1996–2003, the findings suggest that remittances alone do not promote economic growth unless complemented by sound institutions and governance.
"Remittances and the Dutch Disease: Evidence from Cointegration and Error-Correction Modelling"	2012	Acosta et.al	This paper investigates the potential for remittances to cause Dutch Disease in recipient countries. The findings indicate that remittances do contribute to real exchange rate appreciation, leading to a decline in the competitiveness of the tradable goods sector, which may negatively affect economic growth. The effect of remittances depends on the level of financial development and the structure of the economy in the recipient country. The author employs panel data for a group of Latin American and Caribbean countries over several decades.
"Do Workers' Remittances Promote Economic Growth?"	2009	Barajas et. al.	Analyzed data from a broad set of countries and found that remittances do not appear to have a significant positive effect on economic growth. Instead, they may create a dependency that reduces labor force participation and incentives for productive investment.
"Remittances and Economic Growth: The Role of Financial Development"	2009	Catrinescu et.al	Examined the impact of remittances on economic growth considering the role of institutional quality. Findings suggest that remittances alone do not promote economic growth unless complemented by sound institutions and governance
"Remittances and Economic Growth: Evidence from a Panel of Developing Countries"	2005	Chami et.al	Analyzed data from 113 countries over the period 1970–1998 and found that remittances do not have a significant impact on economic growth and may even have a negative effect, possibly due to moral hazard problems leading to reduced labor market participation.
"Remittances and Economic Growth: The Role of Corruption"	2012	Abdih et. al.	Examined how corruption influences the impact of remittances on economic growth. Found that in countries with high levels of corruption, remittances have a negative effect on economic growth, as they are less likely to be channelled into productive investments.
"Remittances and Economic Growth: A Dynamic Panel Approach"	2012	Ziesemer, T.	Used dynamic panel data techniques to analyze the relationship between remittances and economic growth. Found that remittances do not have a significant direct effect on economic growth but may indirectly affect growth through investment in education and health.
"Remittances and Economic Growth: The Importance of Financial Development and Institutional Quality"	2012	Cooray, A.	This paper analyzed the interaction between remittances, financial development, and institutional quality for 15 Asian countries for the period from 1984-2010. He found that remittances have a negative impact on economic growth in countries with low financial development and poor institutional quality.

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Table 3. No Impact of Remittances on Economic Growth

Study	Year	Author	Findings
"An Economic Lifeline? How Remittances From the US Impact Mexico's Economy".	2022	Ivan et.al.	The study finds no significant relationship between remittances and economic growth at the state level in Mexico, suggesting that remittances do not necessarily translate into broader economic development.
"Do Remittances Boost Economic Development? Evidence From Mexican States"	2010	Orrenius, P. M., & Zavodny, M.	The study observes that remittances have a limited effect on economic development indicators in Mexican states, suggesting that remittances alone may not be sufficient to spur significant economic growth.
"Remittances and Economic Growth in Pakistan: A Time Series Analysis"	2016	Sheikh. et.al.	The authors analyze the relationship between remittances and economic growth of Pakistan using time series data of 35 years for the period 1980-2014. They found that personal remittances have no effect on economic growth of Pakistan.

The summary of research papers that analyze the impact of remittances on economic growth, categorized by positive, negative and no significant effects for African economies are listed below:

Table 4: Positive Impact of Remittances on Economic Growth in Africa

Study	Year	Author	Findings
"Remittances and Economic Growth in East Africa".	2025	Abdirahman Abdullahi Adow	This study investigates the impact of remittances on economic growth across 15 East African countries from 2000 to 2022. The findings suggest that remittances have a positive and significant effect on economic growth in these countries
Impact of Remittances on Economic Growth in Africa: An Econometric Analysis	2024	Md. Zobayer Bin Amir and Md. Khaled Bin Amir	Using panel data for the period 2001 to 2020 from 42 African nations using fixed effects model showed that remittances significantly promote economic development of African countries. They used, the generalized momentum method (GMM) estimation to deal with endogeneity issue using unemployment rate as instrumental variable in the study.
Remittances and the Future of African Economies	2021	Ibrahim A. Adekunle & Sheriffdeen A. Tella	This paper examined the altruistic motives of sending money back to the home countries by using a panel data for 30 African countries from 2003 to 2017. They used the dynamic panel system generalised method of moment (dynamic system GMM) estimation method. The results showed that a percentage increase in remittances inflow has a short-run, positive relationship with financial development in Africa. The result also showed that the exchange rate negatively influences financial development in Africa.
"Causal Relationship Between Remittances and Industry Value: A Case of Selected Sub-Saharan Africa Countries"	2023	Anthony Tapiwa Mazikana	The study explored the relationship between remittances and industrial value for African economies for the period 2015-2021. Using ANOVA model, results showed that there is a

			positive relationship between remittances and industry value.
"Remittance inflows and economic growth in Rwanda"	2019	Edward Kadozi	This paper investigate the effect of remittance inflows on economic growth in Sub-Saharan Africa (SSA) countries and Rwanda in particular for the period between 1980 and 2014. The influence of remittances on growth is positively and statistically significantly conditioned by the country's level of education, financial development, and development, whereas the impact of remittances on growth in the region is negatively impacted by the quality of institutional determinants.
Remittances, financial development and economic growth in sub-Saharan African countries: evidence from a PMG-ARDL approach	2019	D. O. Olayungbo and Ahmod Quadri	In a panel of 20 sub-Saharan African nations, the study examined the connection between remittances, financial development, and economic growth between 2000 and 2015. Both Mean Group/ARDL and Pooled Mean Group estimates were employed in the study, along with panel unit root and cointegration tests. Following the establishment of cointegration, it was discovered that financial development and remittances had both short run and long-term positive effects on economic growth.
"The Impact of Remittances on Economic Growth: Evidence from African countries"	2024	Abebe Gule Girma	The paper examines the relationship between remittance inflows and economic growth across 25 African nations from 1991 to 2020. Utilizing a panel Auto-Regressive Distributed Lag (ARDL) model, showed that in nations with high GDP per capita, remittances have a favorable and substantial effect on short-term economic growth. The productive motives theory regarding the impact of remittances is supported by this study. Additionally, the study reveals that remittances have a favorable impact on both the short-term economic growth of South African economies and the long-term economic growth of North African nations.
"Remittances and emerging African economies' growth nexus in a post COVID -19 Era".	2024	Offor et al.	This research examines the relationship between remittances and economic growth in emerging African economies within a global context. The study concludes that remittances have a positive impact on economic growth, particularly when complemented by sound institutional frameworks and financial development.
"Remittances and Economic Growth in Sub-Saharan Africa: A Panel Data Analysis"	2010	Fayissa, B., & Nsiah, C.	This study examines the impact of remittances on economic growth in 36 Sub-Saharan African countries over the period 1980–2004. The findings suggest that remittances have a positive and significant effect on economic growth, primarily by providing an alternative way to finance investment and helping to overcome liquidity constraints.
Impact of Remittances on Economic Growth: Evidence from Selected West African	2015	Muriel Animwaa Adarkwa	This study investigates how remittance inflows influence the economic growth of these nations namely, Cameroon, Cape Verde, Nigeria and Senegal. between 2000 and 2010. It was found that

Countries (Cameroon, Cape Verde, Nigeria and Senegal)			inflow of remittances to Senegal and Nigeria has a positive effect on these countries' gross domestic product whereas for Cape Verde and Cameroon it had a negative effect. One important finding was that remittance inflows need to be invested in productive sectors for a meaningful impact on economic growth of these countries.
"Remittances and Economic Growth: The Role of Financial Development".	2011	Aggarwal et.al.	This study examines the impact of remittances on financial development and, in turn, economic growth using data for 109 developing countries during the period 1975-2007. The findings suggest that remittances promote financial development, which subsequently enhances economic growth in developing countries. There is evidence that there exist a positive significant and a robust relationship between remittances and financial development in developing countries.
"Remittances and Economic Growth in MENA Countries: The Role of Financial Development".	2014	Abida, Z., & Sghaier, I. M.	Investigating the MENA region, this paper finds that remittances have a positive impact on economic growth, particularly in countries with well-developed financial systems, highlighting the importance of financial development in harnessing the growth benefits of remittances.
Remittances-and-Economic-Growth-Dynamics -Does-Corruption-Augment or-Impede-This-Nexus	2024	Umar Mohammed	This study investigates the complex connection between remittances, economic growth, and corruption in Sub-Saharan Africa (SSA) using data from 2006-2021. Using a two-stage least squares (2SLS) estimator results showed that remittances have a more beneficial and direct impact on economic growth in countries with low levels of corruption. The study also revealed that robust and transparent institutions could mitigate the negative impact of corruption on the remittances-economic growth nexus.

Table 5. Negative Impact of Remittances on Economic Growth for Africa

Study	Year	Author	Findings
"Are Remittances Curse or Blessing? Evidence from Sub-Saharan Africa"	2011	Balde, Y.	This research explores the effect of remittances on economic growth in Sub-Saharan Africa using panel data from 1980 to 2004. The study concludes that remittances have a negative impact on economic growth, potentially due to their use in consumption rather than investment, leading to a lack of productive capital formation.
"Remittances and Economic Growth: The Role of Corruption"	2012	Abdih et. al.	Examined how corruption influences the impact of remittances on economic growth. Found that in countries with high levels of corruption, remittances have a negative effect on economic growth, as they are less likely to be channelled into productive investments.

Table 6. No Impact of Remittances on Economic Growth for Africa

Study	Year	Author	Findings
"Do Remittances Spur Economic Growth in Africa?"	2015	Kayode Taiwo	Analyzing data from 1975 to 2015, the study concludes that remittances do not significantly influence economic growth in Africa, attributing this to factors such as measurement issues, internal conditions, labor market implications, and effects on tradable sectors.
"The Relationship between Remittances and Economic Growth in Togo: A Vector Equilibrium Correction Mechanism".	2017	Ahmed and Hakim	They analyzed the relationship between remittances and economic growth in Togo for the period over 1974-2015 using time series techniques of Johansen cointegration test, Wald test and vector equilibrium correction mechanism (VECM) approach to check the short run and long run relationship. The results revealed that there is no causal relationship between remittances and economic growth in Togo, however, it holds true only in the short run period.
"Remittances and economic growth: Empirical evidence from South Africa".	2019 & 2022	Nyasha S& Odhiambo N M.	They analyzed the dynamic causal relationship between remittances and economic growth for South Africa over the period from 1970-2017. The authors employed autoregressive distributed lag (ARDL) approach and results pointed out that there is no causal relation between remittances and economic growth in South Africa.
"Remittances And Growth in Sub-Saharan African Countries: Evidence from a Panel Causality Test"	2013	Ibrahim Ahamada & Dramane Coulibaly	This paper examines the causality between remittances and economic growth in Sub-Saharan African (SSA) countries. Using annual data over the period 1980-2007 for 20 SSA countries, it was found that in SSA countries, there is no causality between remittances and growth. An explanation of why remittances do not increase economic growth in SSA countries is given by the causality test that shows that remittances do not increase physical capital investment.

5. Theoretical Framework

Several economic theories attempt to explain the relationship between remittances and economic growth. These are developmental optimistic school, development pessimistic school and remittances development pluralists' theory (Jushi et al. 2021). The first theory has an optimistic approach on analysing the impact of remittances on the economic growth. It suggests that remittances enhance economic growth by increasing investments, financial development, and human capital accumulation. Studies such as Ramirez & Sharma (2008) and Fayissa & Nsiah (2010) support this view, showing that remittances promote economic growth in developing economies, including Africa.

According to the pessimistic theory, international migration raises the degree of dependency of the remittance recipient nation on remittance inflows and has a detrimental impact on economic development of migrant sending country because only a small percentage of households get remittances, which widens the inequalities among the population. This theory argues that remittances create dependency, discourage labor force participation, and reduce incentives for domestic production. Studies such as Chami et al. (2024) reaffirmed their earlier findings that remittances negatively correlate with economic growth due to their countercyclical nature. Similarly, Tolcha & Rao (2024) found that, in case of Ethiopia, excessive reliance on remittances led to reduced labor productivity and inflationary pressures.

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The third theory suggests that the impact of remittances depends on their usage and the recipient country's economic environment. It recognizes both positive and negative effects, suggesting that the impact of remittances depends on how they are used. De Haas (2007, 2010) highlights that while remittances can support local economies, their developmental potential is contingent on government policies, financial inclusion, and investment incentives. Since economists don't have a common consensus on the effect of remittances on economic growth, this debate is understood by examining the empirical underpinnings of these theories.

Several factors influence the economic development of a country. The most relevant variables have been selected based on a review of literature and research conducted by the IMF, World Bank, ADB, and UNDP. This explanation provides us a better way of understanding the methodology to analyze the impacts of remittances inflows and other related variables on economic growth. This Section establishes a theoretical framework for the empirical research.

6. Conceptual Frame work

6.1. Economic Growth

One of the best metrics for assessing an economy's performance is GDP per capita. GDP per capita growth (annual percentage) has been used as a proxy for the economic growth in this study. This variable's popularity in the remittance literature is the main reason it is used instead of other variables like GDP or GDP per capita in constant dollars (Pradhan et al. 2008).

6.2. Remittances

In this research paper, personal remittances, received (percentage of GDP) is used as a proxy variable for remittances (Beine et al., 2001 and Catrinescu et al., 2009).

6.3. Population Growth

Population growth may impact remittances, but the impact is complex and depends on the income level of the country and age of the dependents of the migrant household. Study of Adams Jr. (2009) found that remittances increase in case when there are higher proportion of young dependents. Population growth can be measured in different ways. In the growth and convergence literature, many authors use a combination of population growth, technological growth and depreciation in their model (Mankiw et al., 1990). This combination is based on Solow model. However, only population growth rather than the combination of these three variables is used in remittance literature. In this study, the proxy for population growth is population growth (annual percentage) (Giuliano and Ruiz-Arranz, 2009).

6.4. Foreign Direct Investment (FDI)

Foreign direct investment, net inflows (percentage of GDP) is used as a proxy for foreign direct investment (FDI). Nikšić & Bogdan (2024) study shows that FDI boosts economic growth in Croatia, which, in turn, causes the flow of remittances. Ravinder & Saini's (2024) study also try to comprehend the role of FDI and exports on remittances-growth nexus for India from 1991–2022.

6.5. Unemployment

This indicator measures the per centage of the total labor force that is unemployed but actively seeking employment and willing to work. The estimates are modelled by the International Labour Organization (ILO). Study of Schrooten (2005) shows that remittances can increase with the domestic unemployment rate**.**

6.6. Inflation

This study utilizes inflation, consumer prices (annual %) as a proxy for inflation (Pradhan et al. 2008), although numerous benchmarks exist. The inflations data is taken from World Bank database. It is commonly believed that high inflation rate in migrant's country may reduce the remittance inflows as higher inflation decreases the purchasing power and the value of currency reducing the value of money and the attractiveness remit money back home. Even the potential risk in the instability of the value of the local currency or economic environment might attract lower remittances. According to El-Sakka and Mcnabb (1999) "A high rate of domestic inflation may thus act as a proxy for uncertainty and risk and, therefore, discourage the flow of remittance earnings." Katseli and Glytsos (1986) used the data from Greece and found that remittances were negatively correlated with the inflation of the home countries.

6.7. Digital financial inclusion (DFI)

DFI is access and using digital devices for financial services. Mobile phones have become one of the most convenient ways for money transfers. The present study uses mobile phone subscription as a proxy for DFI. Households with mobile money subscribers are more likely to receive remittances and receive higher total annual remittance amounts compared to those without. Research literature has shown that there is positive correlation between remittances and mobile phone subscription. Inoue (2024) study investigates the impact of interaction of DFI and remittances on poverty reduction in developing countries. Munyegera & Matsumoto (2016) found a positive and significant effect of mobile money access on household welfare, through the facilitation of remittances as these receive frequent and significantly higher remittances. Mobile subscription is the proxy for DFI.

6.8. Political Instability (Institutional Quality)

This indicator reflects perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism. The percentile rank indicates the country's rank among all countries, ranging from 0 (lowest) to 100 (highest) rank. Institutional quality can be measured in many ways, such as government effectiveness, regulatory quality, rule of Law, and control of corruption (Catrinescu et al., 2009). In this paper, political stability is used as a proxy for Institutional Quality and 'Polity' (Pradhan et al. 2008). Elorabi, Ishak & Maher (2024) study found that countries with high level of political stability have positive influence on economic growth, remittances and unemployment levels. Banao (2024) investigates "whether political stability moderates the effect of migrant remittances on domestic tax revenues in a panel of 40 African countries from 2000 to 2019."

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Table 7: Definitions of the Variables under study (Data taken from database: World Development Indicators)

Variable	Definition
GDP per capita growth (annual %)	"Annual percentage growth rate of GDP per capita based on constant local currency. GDP per capita is gross domestic product divided by midyear population. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources."
Personal remittances, received (% of GDP)	"Personal remittances comprise personal transfers and compensation of employees. Personal transfers consist of all current transfers in cash or in kind made or received by resident households to or from nonresident households. Personal transfers thus include all current transfers between resident and nonresident individuals. Compensation of employees refers to the income of border, seasonal, and other short-term workers who are employed in an economy where they are not resident and of residents employed by nonresident entities. Data are the sum of two items defined in the sixth edition of the IMF's Balance of Payments Manual: personal transfers and compensation of employees."
Population growth (annual %)	"Annual population growth rate for year t is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship."
Foreign direct investment, net (BoP, current US$)	"Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP."
Unemployment, total (% of total labor force) (modeled ILO estimate)	"Unemployment refers to the share of the labor force that is without work but available for and seeking employment."
Gross domestic savings (% of GDP)	"Gross domestic savings are calculated as GDP less final consumption expenditure (total consumption)."
Inflation, consumer prices (annual %)	"Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used."
Political Stability and Absence of Violence/Terrorism: Percentile Rank	"Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. Percentile rank indicates the country's rank among all countries covered by the aggregate indicator, with 0 corresponding to lowest rank, and 100 to highest rank. Percentile ranks have been adjusted to correct for changes over time in the composition of the countries covered by the WGI."
Mobile cellular subscriptions	"Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service that provide access to the PSTN using cellular technology. The indicator includes (and is split into) the number of postpaid subscriptions, and the number of active prepaid accounts (i.e. that have been used during the last three months). The indicator applies to all mobile cellular subscriptions that offer voice communications. It excludes subscriptions via data cards or USB modems, subscriptions to public mobile data services, private trunked mobile radio, telepoint, radio paging and telemetry services."

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7. Methodology

Various statistical tools and statistical packages have been used to analyse the data. Panel data regression analysis has been conducted. Panel data is used as the focus is 'group' with a particular characteristic and that group behaviour is of interest. Data was collected from World Development Indicators for the time period 2000 to 2023 for five coastal countries of Africa that include Kenya, Namibia, Ghana, Egypt, Tunisia and South Africa. Selection of country and time period was completely guided by the availability of the relevant data.

The reason for using Panel regression was as de Haan et al. (2022) explain that the "cross-country regressions is unable to control for unobserved country-specific effects and do not exploit the time-series dimension of the data Panel model." Correlation and Generalised Least Square method have been employed. The sample is random. Dependent variable (DV) is Gross Domestic Product which has been taken as proxy for economic growth and is the independent variable (IDV) is Personal Remittances. On the basis of extensive literature review unemployment, inflation, Foreign Direct Investment, Gross Domestic Savings, population growth, mobile subscription and political stability have been found to have relationship with GDP. Therefore, these variables were used as control variables.

8. Empirical Model

The impact of economic growth on remittance to be estimated in the present paper is based on the simple linear model. The model that has been adapted from the linear model and can be represented as below:

The empirical model for the present study is

PR = f (GDP, FDI, PS, UNE, IN, GDS, MS, PGR) … (1)

Where:

i. PR is Personal Remittances
ii. GDP is Gross Domestic Product
iii. FDI is Foreign Direct Investment
iv. UNE is Unemployment
v. IN is Inflation
vi. GDS is Gross Domestic Savings
vii. PGR is Population Growth rate
viii. MS is Mobile Subscription
ix. PS is Political Stability
x. $\boldsymbol{\varepsilon}$ = Error term

The linear form of regression equation (1) is specified as:

$$\boldsymbol{PR_{it}} = \propto_0 + \propto_1 \boldsymbol{GDP_{it}} + \propto_2 \boldsymbol{UNE_{it}} + \propto_3 \boldsymbol{IN_{it}} + \propto_4 \boldsymbol{FDI_{it}} + \propto_5 \boldsymbol{GDS_{it}} + \propto_6 \boldsymbol{PGR_{it}} + \propto_7 \boldsymbol{MS_{it}} + \propto_8 \boldsymbol{PS_{it}} + \boldsymbol{\varepsilon_{it}} \quad \ldots(2)$$

9. Data Analysis and discussion

9.1. Before regression analysis, descriptive analysis of all the variables was conducted to "highlight the distribution of the variables"

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Table 8: SUMMARY STATISTICS

Variable	Obs	Mean	Std. Dev.	Min	Max
perremit	144	3.43e+09	6.51e+09	7555143	3.15e+10
unemp	144	13.32608	8.286567	2.173	34.007
inf	144	8.71589	7.309103	-.6920303	41.50949
gdp	144	1.80917	2.891671	-10.73729	11.33704
fdi	144	3.050354	3.002756	-1.4189	18.5764
gds	144	12.43783	6.327129	-2.963369	24.52847
popgrowth	144	1.880262	.694168	.5851732	3.146264
mobsubs	144	3.11e+07	3.36e+07	82000	1.08e+08
polstabi	144	25.59743	17.01403	3.791469	72.11539

In Table 1 the mean of personal remittance received in US $ to these four countries for the period from 2000-2023 is 2.41 indicating that remittances received are not very high in these countries. This may mean that remittances do not contribute significantly towards the economic growth of these countries. The mean of the GDP is 2.09 which is very low indicating that the growth rate in most of these countries is quite low. The average of FDI is 3.372 and it is more than the average of personal remittances. FDI more than personal remittances suggests that there may not be large number of skilled people going abroad and remitting finances. The high mean inflation of 8.715 suggests price instability in these countries. GDS of 12.43 on an average means that only 12 % of total GDP is saved. This indicates low level of savings in relation to GDP. Mean population growth is 1.88 which is on the lower side. Average Mobile subscription is 31,100,000 and standard deviation as 336,000,000 suggests that data is scattered. 17.014 standard deviation for political stability suggests considerable variability in the data. Standard deviation data indicates that the political stability is most unstable of all the variables and population growth the most stable.

9.2. Correlation matrix

After declaring the data set to be panel data, correlation amongst the variables was determined through the correlation matrix for the whole group of eight variables that displays the paitwise correlation coefficients between the two variables. It also shows the linear relationship between the two variables. Correlation between any two variables was less than .32 therefore it shows absence of multi-collinearity (Table 9). Presence of multicollinearity can result in spurious regression results. Data was accepted for further analysis.

Table 9: Correlation of diff_perremit diff_unemp inf gdp fdi diff_gds popgrowth mobsubs diff_polstabi (obs=138)

	diff_p~t	diff_u~p	inf	gdp	fdi	diff_gds	popgro~h	mobsubs	diff_p~i
diff_perre~t	1.0000								
diff_unemp	0.0059	1.0000							
inf	-0.0835	-0.1470	1.0000						
gdp	0.0367	-0.3055	0.0697	1.0000					
fdi	0.0218	-0.0595	0.0407	0.3218	1.0000				
diff_gds	-0.0917	-0.1688	0.0256	0.2552	-0.0154	1.0000			
popgrowth	0.0375	-0.0487	0.3136	-0.0771	0.0437	0.0503	1.0000		
mobsubs	0.0731	0.1116	0.1171	-0.0764	-0.2382	0.0023	-0.1407	1.0000	
diff_polst~i	0.0412	-0.2199	0.0479	0.2282	0.0970	-0.1361	-0.0289	-0.0930	1.0000

9.3. Simple regression

Then regression analysis was conducted with personal remittances as dependent variable (DV) and all the other independent variables (IDV) GDP, FDI, political stability,

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unemployment, inflation, GDS, MS and population growth. This was the initial regression analysis.

9.4. Various assumptions of linear regression were checked

To avoid any inaccurate model results or incorrect interpretations, several assumptions of the linear regression are checked. If assumptions are violated then the model will be biased. It will not show the true relationship.

9.4.1. Stationarity test

Regression analysis conducted with the non-stationarity series leads to spurious results. The analysis or forecasting based on the spurious regression will yield wrong results. The Levin-Lin-Chu panel unit root test was used to check for stationarity in the data as time series data is not very large. The null hypothesis in the Levin-Lin-Chu unit root test is that Panels contain unit roots where the alternative hypothesis being Panels are stationary. The test assumes a homogeneous panel structure, meaning that the autoregressive parameter (ρ) is the same across all panels. The results for all the variables show that PR, GDS, UNE and PS are not stationary at levels but became stationary when their first difference was taken. The other variables GDP, FDI, IN, MS and PGR were stationary at levels (Table 10). There is absence of level 2 series of variable, therefore, no variable was rejected.

Table 10: Results of stationarity test

Variable	At levels	First levels
PREMITTANCES	X	✓
GDP	✓	X
FDI	✓	X
UNE	X	✓
IN	✓	X
GDS	X	✓
MS	✓	X
POPGROW	✓	X
POLSTAB	X	✓

9.4.2. Multicollinearity test:

Test for multicollinearity was performed using VIF command after simple regression. Since the VIF value for all the variables is less than 5 and even the mean VIF is less than 5 (Table 12), therefore, it can be inferred that multicollinearity is absent. Even if collinearity exists among the variables, STATA software will remove it.

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Table 11: Regression results of diff_perremit diff_unemp inf gdp fdi diff_gds popgrowth mobsubs diff_polstabi

Source	SS	df	MS		
Model	9.1038e+18	8	1.1380e+18	Number of obs	138
Residual	2.2611e+20	129	1.7528e+18	F(8, 129)	0.65
Total	2.3522e+20	137	1.7169e+18	Prob > F	0.7350
				R-squared	0.0387
				Adj R-squared	-0.0209
				Root MSE	1.3e+09

diff_perre~t	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
diff_unemp	-1.31e+07	1.10e+08	-0.12	0.905	-2.31e+08	2.05e+08
inf	-2.60e+07	1.78e+07	-1.46	0.145	-6.12e+07	9137782
gdp	3.41e+07	4.56e+07	0.75	0.456	-5.61e+07	1.24e+08
fdi	9379022	4.06e+07	0.23	0.818	-7.10e+07	8.98e+07
diff_gds	-4.82e+07	4.02e+07	-1.20	0.232	-1.28e+08	3.12e+07
popgrowth	2.05e+08	1.78e+08	1.15	0.250	-1.46e+08	5.56e+08
mobsubs	4.635987	3.583363	1.29	0.198	-2.453784	11.72576
diff_polst~i	8295736	3.08e+07	0.27	0.788	-5.26e+07	6.92e+07
_cons	-2.24e+08	3.96e+08	-0.57	0.573	-1.01e+09	5.60e+08

Table 12: Test for Multicollinearity (VIF)

Variable	VIF	1/VIF
gdp	1.39	0.721505
fdi	1.20	0.834769
diff_unemp	1.19	0.840045
inf	1.18	0.844956
popgrowth	1.18	0.849473
diff_gds	1.16	0.865064
diff_polst~i	1.15	0.871787
mobsubs	1.14	0.877297
Mean VIF	1.20	

9.4.3. Heterogeneity

Panel estimation takes the heterogeneity into consideration as it allows for subject-specific variables.

9.4.4. Heteroskedasticity

Xttest 3 was performed. Prob> chi^2 is 0 (Table 13), the result shows the presence of heteroskedasticity. Since the panel data has large number of observations and their variations, therefore it reduces the noise of the individual time series.

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Table 13: Modified Wald test for groupwise heteroskedasticity

```
H0: sigma(i)^2 = sigma^2 for all i

chi2 (6)     =        80708.07
Prob > chi2  =          0.0000
```

9.4.5. Test for normality

Shapiro-Wilk W test for normal data was performed for the statistical inference to be valid. Table 14 shows that the data is non-normal.

Table 14: swilk diff_perremit diff_unemp inf gdp fdi diff_gds popgrowth mobsubs diff_polstabi

Variable	Obs	W	V	z	Prob>z
diff_perre~t	138	0.55677	48.024	8.739	0.00000
diff_unemp	138	0.87483	13.562	5.885	0.00000
inf	144	0.71856	31.622	7.813	0.00000
gdp	144	0.91422	9.638	5.125	0.00000
fdi	144	0.84100	17.866	6.522	0.00000
diff_gds	138	0.95922	4.418	3.354	0.00040
popgrowth	144	0.95957	4.543	3.424	0.00031
mobsubs	144	0.82003	20.222	6.802	0.00000
diff_polst~i	138	0.98123	2.033	1.602	0.05458

9.4.6. Model estimation

Estimation Technique

Data set was declared to be panel data in STATA software. Since the given panel dataset is longitudinal, that is, T (time series dimension, in present case 24 years) is greater than N (the cross-sectional dimension) therefore, xtgls model is preferred than xtreg fe, xtreg re or OLS. Also, the dataset is non normal and exhibits heteroskedasticity, also indicate that GLS regression to be used (Gujarati & Porter 2009). GLS is used for the present data set as it accounts for violations of few assumptions of the Ordinary Least Square method and improves the efficiency of the estimates. In this case GLS is BLUE (Best Linear Unbiased Estimator).

Command xtgls was used in STATA software for GLS Regression technique. xtgls uses feasible generalized least squares to fit panel-data for linear models. The uniqueness of xtgls is that it fits panel data linear models when there is cross-sectional correlation or when panels are correlated; or in the presence of AR(1) autocorrelation within panels when correlation coefficient may be unique with command corr(psar1); and xtgls allows to model with heteroskedasticity (stata.com).

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The command used was xtgls with panels(heterosk), corr(psar1)
The command panels (heterosk) specifies a heteroskedastic error structure, corr(psar1) "specifies that, within panels, there is AR(1) autocorrelation and that the coefficient of the AR(1) process is specific to each panel. psar1 stands for panel-specific AR(1). The command force specifies that estimation be forced (stata.com)."

xtgls diff_perremit diff_unemp inf gdp fdi diff_gds popgrowth mobsubs diff_polstabi, panels(heterosk) corr(psar1)

```
Cross-sectional time-series FGLS regression

Coefficients:  generalized least squares
Panels:        heteroskedastic
Correlation:   panel-specific AR(1)

Estimated covariances      =         6          Number of obs      =       138
Estimated autocorrelations =         6          Number of groups   =         6
Estimated coefficients     =         9          Time periods       =        23
                                                Wald chi2(8)       =      5.65
                                                Prob > chi2        =    0.6860

------------------------------------------------------------------------------
diff_perre~t |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  diff_unemp |    8250991   2.01e+07     0.41   0.681    -3.11e+07    4.76e+07
         inf |   -1569624    7240553    -0.22   0.828    -1.58e+07    1.26e+07
         gdp |    9863617    8649246     1.14   0.254     -7088593    2.68e+07
         fdi |    1653523    9791984     0.17   0.866    -1.75e+07    2.08e+07
    diff_gds |    3743570    9184625     0.41   0.684    -1.43e+07    2.17e+07
   popgrowth |   -1.80e+07   4.65e+07    -0.39   0.699    -1.09e+08    7.32e+07
     mobsubs |   2.572359   1.733579     1.48   0.138    -.8253946    5.970112
diff_polst~i |  -571521.7    6080895    -0.09   0.925    -1.25e+07    1.13e+07
       _cons |   7.04e+07   1.09e+08     0.65   0.518    -1.43e+08    2.84e+08
------------------------------------------------------------------------------
```

10. Results:

The prob > chi2 statistic is a test of the joint null hypothesis which is that "there is no relationship between independent and dependent variables." The GLS regression of the present data set shows that prob > chi2 is .6860 and this value is much greater than a 0.05 significance level. This indicates that it is consistent with the null hypothesis. Therefore, there is insufficient evidence to infer that that the panel of independent variables do not have a "statistically significant impact on the dependent variable."

The Generalised Least Square model results shows that GDP does not impact remittance inflows in the select African remittance-receiving countries. In fact, none of the other variables i.e. unemployment, inflation, FDI, GDS, population growth, mobile subscriptions and political stability, have any significant impact on the remittances in these countries. Though unemployment, inflation and GDS show inverse relation with the remittances, but these impacts are not statistically significant.

GDP may not directly impact the remittances as they are not the total value of goods and services produced in the country. They are rather inflow of resources from one country to another. But remittances are part of national disposable income. GDP may indirectly influence remittances as improved economic growth can increase educational levels or skill levels along with enhancing the health standards of its human resource. This may increase their employability in other countries and enhance remittances. Therefore, the direct impact of economic growth on the quantum of remittances is difficult to determine.

11. Limitations

i. Availability of the data for the African countries is limited. Missing data restricts the researcher's selection of the panel both for the countries and the variables. This may not assist in providing the clear situation of the ground reality.
ii. The large standard deviation seen in the summary statistics suggest that there are data points that could be outliers and dataset may have high degree of variability.

12. Conclusions

The analysis reveals that economic growth does not have any impact on remittance inflows of the panel of countries under considerations. There is ample literature on positive impacts of remittances on the economic growth of remittance-receiving countries. But studies on the impact of economic growth on remittance inflows are very sparse. Remittances are an important source of foreign exchange, especially for countries with low domestic economic base. The countries that receive very low remittances are hard pressed to initiate the economic growth cycle that impacts all the sphere of lives of its populace. Summary statistics of all the countries included in the study clearly shows a very low collection of remittances. The cycle of fuelling the economy through the resources received gets disrupted, thus not bringing substantial change in the lives of the citizenry. Policy makers should focus on these aspects so that the mutual reinforcing could continue achieve higher growth process. The other variables like political stability, are equally important for receiving the remittances, as political stability or savings or educational level can help to develop the human resource that has skill that makes them employable. Policies that provide for enabling environment for education and health, and at the same time provisioning for ease of travelling to other countries for work and ease of remitting money to home country will encourage the migration for work and remitting money back home. The low levels of remittances of the countries under study reflects their economic levels.

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