



# Examining the Impact of Remittances and Exchange Rate on Economic Growth: Evidence from Some Selected sub-Sahara African Economies

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#### Abstract

This study investigates the impact of remittances and exchange rate on economic growth in some selected sub-Sahara African economies. Data were sourced from World Development Indicators of World Bank (2022). System Generalized Method of Moments (SYS-GMM) was employed to analyze the data. Findings indicate remittance, exchange rate, investment, trade openness, inflation rate has positive and significant impact on economic growth in Sub Saharan Africa. However, the results also reveal that the interaction between exchange rate and remittance has a negative but significant impact on economic growth. The study recommended a liberal exchange rate policy framework by the central bank of the region to safeguard the value of migrant remittances received.

Keywords: Economic Growth, Exchange Rate, GMM, Remittance, SSA JEL Classification: F43, E50, C61, F24, 055

Contribution to/Originality Knowledge

#### 1.0 Introduction

Remittances entering a country promote economic growth and alleviate poverty through increase in income of the recipients, easing financial constraints, fostering investment, and improving human development through investments in education and healthcare (Javid, Arif & Qayyum, 2012). These inflows are important source of external finance for regions like sub-Saharan Africa, akin to foreign exchange, external capital, and development assistance, particularly given the increased ease of electronic financial transactions and reduced cross-border restrictions. However, fluctuations in exchange rates dampen the impact of remittance inflows on the recipient economies. Guha (2013) has also observed that remittances can lead to a real exchange rate appreciation, prompting shifts in sectoral production.

Many individuals from sub-Saharan African countries have migrated to more developed nations, driven by a combination of push and pull factors that include pursuit of better income, education, welfare, standard of living, and business opportunities. Scholars such as Ogujiuba, Patience, and Nancy (2019), Oluwaseyi and Oluyemi (2020), and Kyaing (2012) have identified these factors as central to understanding migration patterns. Push factors are



circumstances that drive individuals to leave their place of origin, such as unemployment, low productivity, resource depletion, conflict, or natural disasters. Conversely, pull factors attract migrants to particular destinations by offering benefits like enhanced welfare, job prospects, higher wages, and improved working conditions. The dynamic interaction between these push and pull factors influences the flow of funds into sub-Saharan Africa, with exchange rate volatility playing a significant role. Against this backdrop, the study aims to investigate the effects of remittances and exchange rates on economic growth in sub-Saharan Africa.

The selection of the time frame spanning 1980 to 2021 is substantiated by the notable migration trends from Africa to the United States and Europe since the 1980s, as documented by the Migration Policy Institute (2022). Moreover, data is more readily accessible from 1980 onward compared to preceding years. Sub-Saharan Africa has grappled with underdevelopment during this period, leading to fluctuating remittance flows influenced by exchange rate volatility.

This paper aims to investigate the impact of remittances and exchange rates on economic growth of selected countries in sub-Saharan Africa, the rest of the study is structured into a literature review, methodology, results and discussion, and conclusion and recommendation.

#### 2.0 Literature Review

#### 2.1 Stylized fact

Figure 1.1 presents the inflows of remittances to African countries for some selected 8 sub-Sahara African countries for the period 1980 -2019. The eight countries representing the four regions in sub-Sahara Africa recorded inflows of remittances over the period of 1980 to 2019 are presented in percentage in Figure 1.1





Source: Author's Computation using Python, 2024

The inflows of remittances in Figure 1.1 for the period under study highly fluctuated. South Africa's remittance is steady and has the highest percentage as compared to the other African



countries because it has about 100 percent remittance inflows. Nigeria and Rwanda have the second largest inflow trends of inflows and have been relatively stable and steady from the year 2005 to 2019. This is possible because a lot of people from these two countries must have migrated as a result of push or pull factors which resulted in remitting money to the home country as you can see percentages of their remittances are above 90 percent. Kenya and Ghana inflows are a bit higher as compared to countries such as Botswana, Ethiopia, and Congo. Though the inflows of remittances were low, the trends gradually increased and steadily. Botswana, Ethiopia, and Rwanda inflows were very low as can be seen in their percentage increase.

#### 2.2 Theoretical Framework

#### 2.2.1 Endogenous Growth Model

Ahuja (2016) suggested that the new growth theory integrates technological progress as an endogenous element. Unlike the Solow (1956) growth model, which relies on exogenous technological changes, this theory seeks to internally explain productivity growth and the output growth rate within the model itself. This implies that the long-term economic growth rate hinges on internally determined rates of saving and investment, rendering the economy self-sustaining. According to Sani (2021), the endogenous growth theory provides a mathematical framework for understanding technological advancement. It introduces the concept of human capital, encompassing the skills and knowledge that enhance worker productivity. Moreover, the theory incorporates elements of Joseph Schumpeter's approach to growth, highlighting innovation and the process of creative destruction. This process involves entrepreneurs introducing new products, aiming for temporary monopolies and profits, while simultaneously displacing previous innovations. This approach underscores technical progress driven by investment rates and the size of the capital stock. The rationale for adopting this theory lies in its capacity to incorporate various variables affecting economic growth, such as remittances, enabling the assessment of their impact on economic development.

For instance, growth model equation can be determined by simple AK model. Following Cobb and Douglas (1928), the mathematical expression of the AK production function takes the form:

### Y=A K (1)

In this economic model, Y represents the total output or GDP, while A stands for Total Factor Productivity (TFP), which signifies the stock of technology. Ahuja (2016) suggested that K represents both physical and human capital, serving as the capital stock. According to this equation, the influence of remittances, among other factors, is captured through changes in TFP (A). Durlauf et al. (2005) observed a multitude of variables affecting TFP in empirical studies, with as many as 145 identified. Therefore, the effect of remittances on economic growth is inferred through alterations in TFP (A). It's presumed that TFP (A) is influenced by remittances, foreign direct investment, domestic investment, and the degree of openness, which are considered control variables in this framework. K represents the capital stock, proxied by



the domestic investment to GDP ratio, indicating the consistent relationship between output and capital.

Additionally, remittances have influenced economic growth by boosting the capacity for capital formation at both macro and micro levels within the economy. This has the potential to stimulate private investment and enhance consumption, consequently driving aggregate demand and productivity growth, thereby elevating national output.

## 2.3 Empirical Review

Lawal et al. (2022) investigated the relationship between economic growth, exchange rates, and remittances utilizing Dumitrescu and Hurlin (2012) time domain Granger causality test, as well as Croux and Reusens frequency domain Granger causality test. Their findings from the time domain analysis showed causality among economic growth, exchange rates, and trade, while no significant relationship was found between economic growth, remittances, and agricultural output. The frequency domain model revealed bidirectional temporary and permanent causality between economic growth and exchange rates, trade, agriculture, and remittances.

Tenny (2022) in Liberia used Granger causality test and Vector Error Correction Mechanism (VECM) to examine the relationship among economic growth, remittances, and inflation. The study found a significant and positive relationship between inflation and GDP. Additionally, it found that inflation and remittances Granger significantly caused GDP, while inflation Granger caused remittances. Thus, there was a one-way causality from inflation to GDP and from inflation to remittances in Liberia. In another investigation, Azizi (2021) analyzed data from 101 developing countries spanning from 1990 to 2015. The study utilized bilateral remittances and constructed weighted indicators of remittance-sending countries, which were then used as instruments for remittance inflow to remittance-receiving countries. The research investigated the impact of workers' remittances on real exchange rates and net exports. The findings indicated that remittances led to an increase in real exchange rates and a reduction in net exports in the home countries.

Tenny (2021) using Vector Error Correction Mechanism (VECM) found a strong relationship between foreign direct remittances, inflation, and their impact on the economic growth of Liberia. Again, Kuncoro (2020) investigated the economic significance of the exchange rate in Indonesia by examining whether exchange rates determine remittance inflows for the period 2005-2018. The study employed Granger causality test, and ARDL techniques for analysis. The results from the ARDL analysis indicated that remittance inflows are pro-cyclical both in the short and long run, driven by altruistic motives. Despite the depreciation of the remittancereceiving country's currency, the value sent by migrants remained unaffected.

Adejumo and Ikhide (2019) employed dynamic Ordinary Least Squares (DOLS) to investigate the impact of remittances on the real exchange rate in Nigeria from 1981 to 2014 reported that remittance inflows wass associated with the appreciation of the real exchange rate in Nigeria, exerting depreciating pressure on the nation's currency. Interestingly, this contradicted the



Dutch disease proposition, suggesting that high remittance inflows in Nigeria did not result in an overvalued exchange rate. Nketiah et al. (2019) employed Ordinary Least Squares (OLS) to examine the impact of remittances on the real exchange rate in Ghana from 1970 to 2016. They used variables such as trade openness, government public debt, remittances, terms of trade, and capital flow as independent variables, with the real exchange rate as the dependent variable. Their study revealed that neither remittances nor terms of trade had a significant impact on the real exchange rate in Ghana. Moreover, Kim (2019) investigated the impact of migrants' remittances on exchange rates and money supply in developing countries, as well as the effect of openness on this impact, spanning from 1970 to 2018. They employed instrumental variable and System Generalized Methods of Moment (Sys-GMM) estimation techniques. Their findings indicated that remittance inflows led to the appreciation of the nominal exchange rate and increased the money supply in countries operating under fixed exchange rate regimes. Additionally, they found that a higher degree of openness helped mitigate the rise in the exchange rate. In another study, Diushalieva (2019) investigated the effect of remittances on the real effective exchange rate, focusing on the Commonwealth Independent States (CIS) from 2004 to 2018. They utilized Ordinary Least Squares fixed effects and 2SLS with instrumental variables. Their results demonstrated a statistically significant positive effect of remittances on the real exchange rate, suggesting that workers' remittances contributed to the Dutch disease effect in the CIS countries.

Brahim et al. (2018) provided a different perspective from Kim (2019) by empirically investigating the long-term relationship between the real exchange rate (REER) and its fundamentals, with a focus on remittances. Their study covered nine countries in the Middle East and North America from 1980 to 2015, employing various models such as ARDL panel model, group mean, pooled mean, and dynamic common related effects. Their findings highlighted the diverse effects of both appreciation and depreciation of the real exchange rate. Specifically, they found that remittances led to a decrease in the value of the effective exchange rate without adversely affecting the price competitiveness of the recipient countries. Ibraheem (2019) conducted a study on the impact of remittances from Nigeria's diaspora on exchange rate stability. Utilizing Autoregressive Distributed Lag (ARDL) estimation technique, the study covered the period from 1990 to 2018. The findings indicated a statistically significant positive relationship between remittances and the exchange rate in both the short and long run. However, the study revealed that remittances resulted in a decrease in the value of the Nigerian currency. Conversely, foreign direct investment and oil prices were associated with an appreciation of the value of the Naira in Nigeria. Essayyad (2018) examined the relationship between remittances and real exchange rates in South Asia, with a focus on Nepal. Employing Autoregressive Distributive Lag (ARDL) and Augmented Dickey Fuller (ADF) unit root tests to consider short-run and long-run cointegration, the study found that an increase in remittance inflows led to currency depreciation in the short run and appreciation in the long run. Furthermore, the study highlighted that remittances had a statistically significant influence on currency appreciation in the short run, and net exports also significantly influenced currency appreciation.



Khurshid et al. (2017) presented findings contrary to those of Adejumo and Ikhide (2019) while investigating the effects of workers' remittances on exchange rate volatility and export dynamics in Pakistan. They utilized the system generalized method of moments (SYS-GMM) and Granger causality test. Their findings revealed that remittances led to a depreciation of the exchange rate and had a positive impact on export competitiveness. Furthermore, they found that remittance inflows appreciated the exchange rate when savings were solely allocated to remittances, but this did not negatively affect competitiveness if the funds were used for consumption. Additionally, the study highlighted that changing the exchange rate regime from multiple to flexible depreciation of the exchange rate, while the global financial crisis appreciated the currency rate and reduced competitiveness. The Granger causality test indicated a bi-directional causal relationship between remittances and the exchange rate. Moreover, the parameters in the VAR model were deemed unstable, indicating the presence of structural changes.

### 3.0 Methodology

This section presented the methodology used in the study and all other relevant information which entails how the study was structured and conducted expeditiously.

### 3.1 Data and Sources

Data for all the variables are drawn from World Development Indicators of the World Bank (2022), the variables are Gross domestic product (GDP), remittances (REM), foreign direct investment (FDI), exchange rate (EXR), inflation (INFL), investment (INV), trade openness (TOP) and interaction between remittances and exchange rate (REM\*EXR).

## 3.2 Model Specification

The model of this study is specified in accordance with the objective of the study. As stated below:

To determine the impact of interaction between remittances and exchange rate on economic growth in some selected countries in sub-Sahara Africa

$$GDP_{it} = \beta_0 + GDP_{it-1} + \beta_1 REM_{it} + \beta_2 EXR_{it} + \beta_3 INV_{it} + \beta_4 TOP_{it} + \beta_5 INF_{it} + \beta_6 REM * EXR_{it} + \mu_{it}$$
(3)

Where GDP = Gross domestic product (Current LCU)

LogGDP <sub>it-1</sub>	=	lagged value of Gross domestic product
LogREM	=	Personal Remittances Received (Current US Dollars)
LogINV LCU)	=	Investment proxied by gross fixed capital formation (Current
EXR	=	Official Exchange Rate (LCU Per US Dollar, Period Average)



LogTOP	=	Trade Openness proxied by trade (% of GDP)
INF	=	Inflation proxied by Consumer Price Index (2010=100)
LogREM*EXR	=	Interaction term of Personal Remittances and Exchange Rate

Variable	Measurement	Expected
		Sign
Gross Domestic	GDP at purchaser's prices is the sum of gross value added	-
Product (GDP)	by all resident producers in the economy plus any product	
	taxes and minus any subsidies not included in the value of	
	the products. Data are in current local currency.	
Remittances(REM)	Personal remittances comprise personal transfers and	Positive
	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. 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. Data are in current U.S.	
	dollars.	
Exchange	Official exchange rate refers to the exchange rate	Negative
Rate(EXR)	determined by national authorities or to the rate	
	determined in the legally sanctioned exchange market. It	
	is calculated as an annual average based on monthly	
	averages (local currency units relative to the U.S. dollar).	
Investment (INV)	Portfolio investment covers transactions in equity,	Positive
	securities and debt securities. Data are measured in current	
	US Dollars.	
Trade Openness	Trade openness is the measure of the extent to which a	Positive
(TOP)	country in engaged in global trading system. It is usually	
	measured by the ratio between the sum of exports and	
	imports and gross domestic product (GDP).	
Inflation (INFL)	Inflation as measured by the consumer price index reflects	Negative
	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.	

Table 3 2 1	Variables and Measurement
1 auto 3.2.1	variables and measurement

Source: World Development Indicators, 2022.



### 3.3 Methods of Data Analysis

The data used in this study were analyzed using dynamic panel data estimation technique -System Generalized Method of Moments (SGMM) even though pre-estimation was conducted to establish relationships between the variables and to see whether there is a sign of multicollinearity. One of the common weaknesses of using the conventional static panel data estimation technique of fixed effects and random effects is the endogeneity problem. The problem often leads to biased estimations as a result of misspecification of the models. Jongwanich (2007) used Generalized Method of Moments (GMM) to solve for the endogeneity problem. In this study, dynamic panel data approach were used because of the inclusion of lagged dependent in the model where Difference GMM as exemplified by Arrelano-Bond and System GMM. The rationale behind the use of GMM as a method of estimation is the fact that economic variables are dynamic in nature. Also, the method has ability to deal with biases resulting from measurement error and the endogeneity problem (Durlauf et al., 2004). Both the difference GMM and System GMM analysis were carried out, the system GMM were interpreted because it is more superior, less bias, more precision, and more importantly, twosteps GMM is more efficient. Since the system GMM combines both equation at level and first difference, while the difference GMM uses only the first difference equation.

The post estimation tests of validity of instruments (Sargan test) was also conducted in each case to ascertain the validity of the instruments. The Sargan test has a null hypothesis, Ho- the instruments as a group are exogenous. The Sargan p-value must not be less than 5%. The higher the p-value of the Sargan statistics, the better. Rather than rejecting null hypothesis at 5% and 10% it is easier to produce a Sargan (J) statistic with a perfect p-value of 1.000 (Roodman, 2009). The Arellano- Bond test of autocorrelation AR (1) and Arellano-Bond test of autocorrelation AR (2) test were also conducted to test the absence of serial correlation in the results. The presence of first order serial correlation AR (1) is expected because of the presence of the lagged dependent term, and it should not be a problem, but not the second order serial correlation (Law, 2018).

#### 4.1 Correlation Analysis

Table 4.1 presents the correlation matrix of the variables modelled. This analysis was conducted to examine if some of the explanatory variables modelled are likely to create multicollinearity problem in the analysis.

Table 4.	I. Correlation							
	GDP	REM	FDI	INV	ТОР	INFL	EXR	
GDP	1.000							
REM	0.3914	1.000						
FDI	0.1677	0.3431	1.0000					
INV	0.1149	0.0688	0.1773	1.000				
TOP	0.0170	-0.0574	0.0279	0.4625	1.000			
INFL	0.1046	0.0753	0.0713	0.0997	0.0271	1.000		
EXR	-0.0072	-0.0040	-0.0051	0.0217	0.0285	-0.0095	1.000	

### Table 4.1: Correlation Matrix



Source; Author's analysis using STATA 12, 2023

The result of the correlation analysis in Table 4.1, remittances REM has a weak positive correlation with Economic Growth (GDP). There are also weak positive correlations between Economic Growth (GDP), AND Foreign Direct Investment (FDI), Investment (INV), Trade Openness (TOP), as well as inflation (INFL) as the coefficients suggests (0.1677, 0.1149, 0.017 and 0.1046) respectively. There is however a very weak negative correlation between Economic growth and Exchange rate (-0.0072) as the coefficient suggests. The correlation between Remittances (REM) and foreign direct investment (FDI) is a weak positive one (0.3431). There are also weak positive correlations between Remittances (REM) and Inflation rate (INFL) as the coefficients suggests (0.0688 and 0.0753) respectively. On the other hand, there are very weak negative correlations between Remittances (REM) and Trade Openness and exchange rate (EXR) as their coefficients suggests (-0.0574 and -0.0040) respectively.

The correlation of the other variables as seen in the correlation Table 4.1 show weak correlations among the variables modelled. There are no correlations that are so high as to suggest the likelihood of the occurrence of multicollinearity problem in the analysis that will be conducted.

Variables	One step	Two step	One step	Two step
	Difference	Difference	System GMM	system GMM
	GMM	GMM		
GDP <sub>t-1</sub>	0.9432931***	0.9428518***	0.9687227***	0.9568575***
LREM	0.115621***	0.0087308***	0.207702***	0.263589***
EXR	0.0001172*	0.0000865***	0.0003786***	0.0002147***
LINV	0.391291***	0.31343*	0.0812399***	0.0256911
LTOP	0.0316815***	0.061947	0.094716***	0.1700038***
INFL	0.0003956***	0.0003986***	0.0003901***	0.0004019***
LREM_EXR	-6.58E-06	-4.83E-06***	-0.0000227***	-0.0000123***
Sargan test	1200.233	41.16762	1880.234	39.72497
(P-value)	(.0000)	(1.0000)	(0.0000)	(1.0000)
AR 1	-10.925	-3.8943	-	-3.7505
(P-value)	(0.000)	(0.0001)		(0.0002)
AR 2	-0.79399	0.60054	-	-0.23863
(P- value)	(0.4272)	(0.5481)		(0.8114)
Ν	48	48	48	48
Т	41	41	41	41

4.2	Results of Remittances and Exchange Rate Impact on Economic Growth of some
selecte	ed sub-Sahara African Countries

Table Till Difference Official and Orgicial Optical Regula Louinated	Table	4.2:	Difference	GMM	and S	System	GMM	Results	Estimated
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Source: Author's analysis using STATA 12, 2023

**Note**: The variables are defined as follows;  $LGPD_{t-1} = lagged of Gross domestic product, LREM = log of Remittances, EXR = exchange rate, LINV = log of Investment, INFL = Inflation, LREM_EXR = log of interaction term of Remittances and exchange rate. ***, ** and * indicate significance at 1%, 5% and 10% respectively.$ 



A look at Table 4.2 showed that both the difference GMM and System GMM analysis was conducted, the system GMM were interpreted because it is more superior, less bias, more precision, and more efficient. Based on the result of the System GMM estimation presented in Table 4.2, the one step GMM result is not efficient because the instruments are not valid as the Sargan test result, 1670.827 (0.000) suggested. The Sargan test of exogeneity tests whether the instruments are correlated with the error term (Law, (2018). The two-step GMM result is more efficient because the instruments are valid 39.72497 (1.0000) and the variables are statistically significant, hence the two-step system GMM interpreted in this study. Based on the two-step GMM result, the lagged of dependent variable (GDP<sub>t-1</sub>), which measures the contemporaneous or catch up effect has a coefficient of 0.9568575 (95%) suggests a strong and statistically significant positive relationship between the lagged dependent variable and the current dependent variable at 5 percent. This implies that changes in the lagged dependent variable can reliably predict and explain variations in the current dependent variables.

The coefficient of Remittances (LREM) as presented in Table 4.2 has a statistically positive significant impact on economic growth in sub-Sahara African countries. Its coefficient being 0.263589 indicates that 1 percent increase in remittances is associated with a 26 percent increase in gross domestic product (GDP) in some selected sub-Sahara African countries. This implies that economic growth of the region will increase by 26%. This can be attributed to the fact that funds remitted by migrants to their home countries are used for consumption, human capital development and productive investments purposes which translated into the wellbeing of the people in the region, hence impacted on the economic growth of the region. The study is in line with the findings of Oladipo (2020), Bucevska (2022). Salahuddin and Gow (2015), Atilaw (2021) whose findings revealed that remittances have a statistically positive significant impact on economic growth indicating mix findings among the scholars. Thus, this study found remittances to have statistically significant positive impact on economic growth indicating mix findings among the scholars. Thus, this study found remittances to have statistically significant positive impact on economic growth indicating mix findings among the scholars. Thus, this study found remittances to have statistically significant positive impact on economic growth indicating mix findings among the scholars.

The coefficient of exchange rate was found to have a statistically significant positive impact on economic growth. The coefficient of exchange rate (0.0002147) is positive indicating 1percent increase in the exchange is associated with a 0.0002147 percentage point increase in gross domestic product (GDP) in some selected sub-Sahara African countries holding other variables constant. This result contradicts a priori expectation. The p-value of the coefficient is 0.025 indicating that there is a 2 units chance of observing a coefficient as extreme as 0.0002147 or more extreme with no impact of exchange rate on economic growth of some selected countries in sub-Sahara Africa. The result of the exchange rate was found to have a statistically significant positive impact on economic growth of some selected sub-Sahara African countries.

The coefficient of Investment (INV) was found to have a positive but statistically insignificant impact on economic growth in the context of studying the impact of remittances on economic growth of some selected countries in sub-Sahara Africa. The coefficient of the variable being



0.256911 suggests that a 1percent increase in investment in sub-Sahara African countries will result to a 0.256911 or 25 percent increase in the economic growth of sub-Sahara African countries. The p-value of the coefficient is 0.385 indicates that log of investment (LINV) is not statistically significant implying that investment is not the only variable that impact on economic growth of some selected countries in sub-Sahara Africa. Thus, the finding of this study revealed that investment have statistically positive but insignificant impact on economic growth of some selected sub-Sahara African countries.

Trade openness (LTOP) has a statistically significant and positive impact on economic growth. Its coefficient being 0.1700038 indicates that a 1-unit increase in trade openness (TOP) is associated with a 0.1700038-unit increase or 17 percent increase in gross domestic product (GDP) in some selected sub-Sahara African countries. This implies that economic growth of the region will increase by 17 percent. The p-value of 0.000 indicates that the coefficient of trade openness (TOP) is statistically significant at the conventional significant level of 0.05 or 5 percent. This means that the observed relationship between trade openness and gross domestic product (GDP) is unlikely to have occurred by chance alone given the no true impact of trade openness on economic growth in some selected countries in sub-Sahara Africa.

Inflation (INFL) was found to exert a positive and statistically significant impact on economic growth. Its coefficient being 0.0004019 suggests that a 1-unit increase in inflation in some selected sub-Sahara African countries will result in a 0.0004019 unit increase in economic growth of some selected sub-Sahara African countries which is contrary to a priori expectation. The p-value of 0.000 indicates that the coefficient of inflation (INFL) is statistically significant at the conventional significant level of 0.05 or 5 percent. This means that the observed relationship between inflation and gross domestic product (GDP) is unlikely to have occurred by chance alone given the true impact of inflation on economic growth in some selected countries in sub-Sahara Africa. The finding is in consonance with the findings of Tenny (2021) who found inflation to be driver of economic growth, Hence, inflation significantly positively have impact on economic growth in some selected countries in SSA.

Interaction between remittances and investment (LREM\_EXR) coefficient of -0.0000123 suggest that the interaction term has a statically significant negative impact on the gross domestic product in the context of the study on the impact of remittances on economic growth of some selected countries in sub-Sahara Africa. Specifically, a 1percent increase in the interaction between remittances and exchange rate is associated with a percentage point decrease of -0.0000123 in gross domestic product (GDP), holding other variables constant. This finding does not coincide with findings of Oleksiv and Mirzoleva (2022), Lawal et al. (2022). They did not interact the variables but established a relationship between remittances and exchange rate to have positive impact on the economy, and influence of remittances appreciates the receiving country currency thereby reducing the competitiveness of exports. Additionally, Diushalieva (2019) admitted that there were statistically positive effects of remittances appreciates currency making the exports more expensive and import cheaper hurting other sectors in the economy. The finding of this study



showed an inverse relationship between remittances and exchange rate which in turn can impact in the aspect of the economy, trade balances, inflation and overall economic stability. Hence, interaction between remittances and exchange rate reduces the value of the economy. This means that exchange rate volatility in the region do not favours remittances' receiving nations (sub-Sahara Africa) in the reference period.

The post-estimation test suggests that the results of the two-step GMM estimation are efficient. The Sargan test (test of validity of instruments), with a result of 39.72497 (1.0000) suggests that the instruments are valid. This is because the p-value of 1.0000 suggests that there is sufficient evidence to reject the null hypothesis that the model is correctly specified. This means that the model satisfied the moment conditions and is not subject to certain types of misspecification. The AR (1) and AR (2) tests of autocorrelation, with results -3.7505 (0.002) and -0.23863 (0.8114) respectively both suggests the absence of autocorrelations among the residuals of the model.

### 5.0 Conclusion

Based on the findings of this study, it is concluded that remittances and exchange rate negatively and significantly impact economic growth of the region. This is because interactive term reduced the value of the economy. This is connected with the fact that exchange rate volatility in sub-Sahara Africa negatively affects the value remittances received thereby putting a strain on the economy of the region resulting to macroeconomic instability. Trade openness, exchange rate, inflation and investment coefficients are positive and significantly have impact on economic growth of some selected sub-Sahara African countries. The study concluded that foreign direct investment net inflows reduced the value of the economy of some selected countries in sub-Sahara Africa in the referenced period.

### 5.1 Policy Recommendations

The following recommendations are made according to the findings of the study;

- i. To mitigate the effect of exchange rate on the remittances received, this study suggests that the Central Bank of the region needs to come up with a liberal exchange rate policy frame work that can help maintain the value of remittances sent my migrants into their home countries. This will enable the recipient of remittances save and invest substantial part of the money sent in order to boost the economy of the region.
- ii. Government in sub-Sahara Africa should design a policy of channelling all remittances through official means, develop it financial sector to ensure more inflows of remittances in the region.
- iii. Recipients of the remittances should invest the money remitted in a productive business that can improve the economy as this will encourage the migrants to send more money in the home country thereby attracting more foreign investors.



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