

# Impact of Remittances on Financial Development: Revisiting the Evidence for ECOWAS Countries

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## Abstract

This study examines the impact of remittances on financial development in selected West African countries over the period from 1980 to 2017. Contrary to previous panel studies which relied on standard panel estimators, it uses an estimation method which controls both parameter heterogeneity and cross-section dependence among countries. Remittance inflows were found to reduce domestic credit to private sector whereas they contribute to increasing money supply in the long run. Country-level results reveal, however, considerable heterogeneity across countries.

## Keywords

Remittances, Financial Development, Heterogeneity, Cross-Sectional Dependence, ECOWAS

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## 1. Introduction

The inflow of remittances to developing countries has increased significantly in recent years, becoming the second largest source of external finance for these countries after foreign direct investment (FDI). Remittance inflows to Sub-Saharan Africa as a share of GDP have increased from 0.9 percent in 1994 to 1.6 percent in 2004 and reached 2.3 percent in 2014. This growing trend in inflow of remittances has caught great interest of academic scholars and policymakers, and stimulated a large body of empirical studies examining their impact on various aspects of development, including poverty, inequality, education, health and economic growth [1]-[13]. Another strand of the economic literature has been devoted to investigating the relationship between remittances and financial development. Do remittances promote financial development in the recipient coun-

tries? The conventional view is that remittances can promote financial development. This belief is based on the idea that money transferred through financial institutions can pave the way for recipients to demand and gain access to other financial products and services. Remittances may increase banking credit to people if banks become more willing to extend credit to recipients because the transfers they receive from abroad are perceived to be stable over time. On the contrary, as remittances can help relax liquidity constraints faced by recipients, they might lead to a lower demand for credit, thus dampening credit market development. Furthermore, if banks are reluctant to lend to private agents and prefer to finance the government or hold liquid assets, then increases in remittances might not stimulate banking credit to the private sector. Finally, remittances might not increase bank deposits if they are immediately consumed or if recipients distrust financial institutions and prefer other ways to save these funds. Thus, at the theoretical level, the impact of remittances on the development of financial sector is ambiguous. The effect may be positive, negative or insignificant.

On the empirical side, a number of studies have explored the link between remittances and financial development. However, the empirical evidence is quite mixed and inconclusive. Some studies support the conventional view that remittances deepen financial sector development [14]-[20] while others fail to support it [21] [22].

The empirical approaches examining the nexus between remittances and financial development are based on time series or panel data methods. A major problem with panel data analyses is the implicit assumption that the effect of remittances on financial development is homogeneous across countries. This is likely to not be true given differences in institutional and economic structures of countries. Another shortcoming is that they assume cross-sectional independence across countries. This assumption is unlikely to hold because countries of a panel may be linked one to another. Thus, the estimates from standard panel data regression methods are potentially misleading because of cross-sectional dependence and heterogeneity. Therefore, in this study we use panel data estimation method that accommodates both cross-sectional dependence and heterogeneity. The objective of the study is to examine whether remittances contribute to the development of the financial sector of the Economic Community of West African States (ECOWAS).

The remainder of the paper is organized as follows. Section 2 discusses the modeling framework for empirical examination of the relationship between financial development and remittances. Section 3 presents and discusses the empirical results. Section 4 concludes the study and provides some policy recommendations.

## **2. Econometric Methodology and Data**

### **2.1. Model Specification**

To investigate the aggregate impact of remittances on the financial development of selected West African countries, we follow existing studies including [14] [15]

and [18]. We specify the empirical model as follows:

$$FD_{it} = \beta_{0i} + \beta_{1i}REM_{it} + \beta_{2i}X_{it} + \mu_{it} \quad (1)$$

where  $i = 1, \dots, N$ , denotes the country,  $t = 1, \dots, T$  refers to the time period, FD refers to financial development indicator, REM is the ratio of remittances to GDP, and X is a set of control variables that are expected to be correlated with the level of financial intermediation and access to financial services. The term  $\beta_{0i}$  represents individual country heterogeneity and captures the unobserved and time-invariant effects which affect financial development. The variable  $\mu_{it}$  represents the error term which is normally distributed with mean zero and constant variance. There are a number of variables that have been regarded as potential determinants of financial development. Based on the empirical literature, we include inflation measured as the annual percentage change in GDP deflator, real GDP per capita in constant US dollar used as proxy for income, and the ratio of FDI to GDP as a measure of current and capital account openness. Inflation distorts economic agents' decision-making regarding nominal variables, discouraging financial intermediation, and increasing saving in real assets [23]. Current and capital account openness is expected to have a positive effect on financial development [24]. An important feature of our econometric model is that we do not impose a common coefficient on each explanatory variable. Accordingly, the long run effect of remittances on financial development is allowed to vary across countries.

## 2.2. Econometric Methodology

In examining the relationship between variables within a panel framework, a number of econometric issues have to be addressed. The first issue is to test for cross-sectional dependence across panel members. Cross-sectional dependency has become a crucial econometric issue in a context of increasing globalization of the world, which implies a strong interdependence between countries. It has been shown that ignoring cross-sectional dependence by relying on standard panel estimation methods is likely to yield inconsistent and biased results [25] [26]. We test for cross-sectional dependency among countries using the Lagrange Multiplier (LM) statistic test proposed by [27] and its adjusted version provided by [28].

The second issue examines whether the data can be pooled across countries and whether panel estimates account for country heterogeneity. To test for heterogeneity in the relationship between financial development and remittances we rely on delta tilde and adjusted delta tilde tests suggested by [29]. The third step of our empirical investigation examines the integration level of the variables using the CIPS unit root test provided by [30] which deals with both cross-sectional dependency and heterogeneity. The fourth issue investigates the existence of long run relationships among the variables. To this regard, we use the Common Correlated Effects Mean Group (CCEMG) estimator developed by [25]. The CCEMG estimator solves the issue of cross-section dependence by

augmenting the regression equation with the cross-sectional averages of the dependent variable as well as the observed regressors:

$$FD_{it} = \beta_{0i} + \beta_{1i}REM_{it} + \beta_{2i}X_{it} + d_{1i}\overline{FD}_t + d_{2i}\overline{REM}_t + d_{3i}\overline{X}_t + \mu_{it} \quad (2)$$

This equation is estimated by OLS for each cross-section. The mean group estimator is derived as the simple average of the group-specific estimates. Simulation studies by [25] [26] [31] show that the CCEMG estimator is robust to omitted variables bias and endogeneity of regressors, and also performs well even when the cross-section dimension  $N$  is small, when variables are nonstationary, cointegrated or not, subject to structural breaks.

To test whether there is a long-run relationship among the variables under study, we test for unit root in the residuals obtained from the CCEMG estimator using the Cross-sectionally Augmented Dickey-Fuller (CADF) panel unit root test proposed by [30]. This test follows the Common Correlated Effects approach by augmenting the standard ADF regressions carried out separately for each country with cross section averages. In presence of cointegration among the variables, the short run dynamics is estimated through a panel error correction model given by:

$$\Delta FD_{it} = \gamma_{0i} + \gamma_{1i}\Delta REM_{it} + \gamma_{2i}\Delta X_{it} + \lambda_i ect_{it-1} + d_{1i}\overline{\Delta FD}_t + d_{2i}\overline{\Delta REM}_t + d_{3i}\overline{\Delta X}_t + d_{4i}\overline{\Delta ect}_{t-1} + v_{it} \quad (3)$$

where  $\Delta$  is the first difference operator and  $ect_{it-1}$  is the lagged residuals of the long run relation.

### 2.3. Data

The study uses annual time series data for ten member countries of the Economic Community of West African States (ECOWAS), over the period from 1980 to 2017. The countries under study include: Benin, Burkina Faso, Cote d'Ivoire, Ghana, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo. The coverage of countries and time period has been determined by the availability of data. Domestic credit to private sector as share of GDP and broad money supply (M2) as share of GDP were used to measure financial sector development. These indicators have been widely used in the empirical literature on financial development and economic growth (e.g., [22] [32] [33] [34] [35]). Data were extracted from the World Bank's World Development Indicators database and the electronic databank of the United Nations Conference on Trade and Development (UNCTAD). All series except for inflation and FDI are transformed into natural logarithm.

**Table 1** shows the descriptive statistics and correlation matrix of the variables. There are considerable variations among ECOWAS countries. The correlation matrix shows a positive and significant relationship between financial development indicators and remittances. Further, financial development and per capita GDP are positively related to one another. On the other hand, inflation is negatively related to financial development.

**Table 1.** Descriptive statistics and correlation matrix.

	CRED	M2	REM	GDP	INF	FDI
<i>Panel A: Summary Statistics</i>						
Mean	2.518	3.063	0.224	6.580	11.439	1.987
Median	2.652	3.068	0.654	6.481	4.761	1.160
Std. Dev.	0.690	0.370	1.781	0.552	21.691	3.329
Minimum	0.433	1.878	-5.638	5.612	-8.1967	-14.53
Maximum	3.743	4.043	2.369	7.848	219.002	32.302
<i>Panel B: Correlation Matrix</i>						
CRED	1.000					
M2	0.663*	1.000				
REM	0.508*	0.316*	1.000			
GDP	0.306*	0.174*	-0.031	1.000		
INF	-0.477*	-0.267*	-0.537*	0.044	1.000	
FDI	0.027	0.130*	0.204*	-0.008	-0.060	1.000

*Notes:* CRED: log of domestic credit to private sector as share of GDP, M2: log of broad money supply as share of GDP, REM: log of remittances as share of GDP, GDP: log of real GDP per capita, INF: inflation rate calculated from GDP deflator, FDI: foreign direct investment inflows as share of GDP. \* and \*\* indicate significance at the 5% and 10% levels, respectively.

### 3. Empirical Results and Discussion

Before proceeding with the estimation of the relationship between financial development and remittances, we test for cross-sectional dependency and slope homogeneity. The results reported in **Table 2** suggest that the relationship between financial development and remittances is plagued by cross-sectional dependency. Furthermore, the null hypothesis of slope homogeneity is rejected in favor of the alternative hypothesis that heterogeneity exists in the relationship between the variables.

The next step of our empirical analysis is to determine the order of integration of the series by means of unit root tests. We first apply the well-known IPS test developed by [36], which is less restrictive and more powerful compared to the other first generation panel unit root tests. The IPS test allows heterogeneity in the autoregressive coefficients. However, it assumes cross-section independence across countries. Given the existence of cross-sectional dependency among the countries, we further employ the Cross-sectional Augmented Dickey-Fuller (CADF) test proposed by [30], which deals with both heterogeneity and cross-section dependence. The results of these tests are presented in **Table 3**. According to the IPS test, all series except for inflation rate and FDI are stationary in first difference. When heterogeneity and cross-section dependence are accounted for, the results indicate that the null hypothesis of unit root cannot be rejected for all series. However, when applied to the first differences, the null hypothesis of unit root is rejected. Thus, we can regard the variables under study

**Table 2.** Results of cross-sectional dependence and homogeneity tests.

Test statistics	Model 1		Model 2	
	<i>FD = Domestic credit to private sector</i>		<i>FD = M2/GDP</i>	
	Statistics	<i>p</i> -value	Statistics	<i>p</i> -value
<i>Cross-sectional dependency tests</i>				
LM (Breusch and Pagan, 1980)	530.354*	0.000	320.106*	0.000
LM adjusted (Pesaran 2004)	51.160*	0.000	28.998*	0.000
CD (Pesaran, 2004)	9.688*	0.000	4.497*	0.000
<i>Homogeneity tests</i>				
Delta tilde	42.282*	0.000	49.322*	0.000
Delta tilde adjusted	50.313*	0.000	52.632*	0.000

Note: \* indicates rejection of the null hypothesis at 5% significance level.

**Table 3.** Results of panel unit root tests.

Variables	Level		First difference	
	IPS test	CADF test	IPS test	CADF test
CRED	0.265 [0.604]	2.010 [0.978]	-13.622* [0.000]	-1.949* [0.026]
M2	0.798 [0.787]	0.077 [0.531]	-15.750* [0.000]	-2.004* [0.023]
REM	1.414 [0.921]	-0.772 [0.220]	-15.689* [0.000]	-2.847* [0.002]
GDP	2.352 [0.990]	2.223 [0.987]	-12.470* [0.000]	-4.953* [0.000]
INF	-11.954* [0.000]	1.266 [0.897]	-18.550* [0.000]	-2.396* [0.008]
FDI	-2.301* [0.010]	-0.310 [0.378]	-18.572* [0.000]	-1.995* [0.023]

Notes: CRED: log of domestic credit to private sector as share of GDP, M2: log of broad money supply as share of GDP, REM: log of remittances as share of GDP, GDP: log of real GDP per capita, INF: inflation rate calculated from GDP deflator, FDI: foreign direct investment inflows as share of GDP. The IPS test provides  $W$ -t-bar statistic, whereas the CADF test provides  $z$ -t-bar statistic of Pesaran (2007) test. Tests are conducted for model with intercept and *p*-values are given in brackets. Optimal lag length was determined using AIC with a maximum of 5. \* and \*\* denote rejection of the null hypothesis of unit root at the 5% and 10% significant levels, respectively.

as being integrated of order one, which suggests that there might be a long-run relationship among them.

As argued in the methodology section, we rely on the CCEMG method to estimate the long relationship among the variables. The results are reported in **Table 4**. To test whether there is a long run relationship among the variables, we employ a residual-based approach. Looking at the unit root tests, the residual term is stationary in both models. The long run estimates show that remittances reduce domestic credit to private sector whereas they increase money supply. Furthermore, real GDP per capita does not exert significant effect on financial development. The long run effect of income is positive but not statistically significant. Inflation is detrimental to financial development both in the long and short run. This finding is consistent with study by [15] which established that financial development is negatively influenced by inflation in a panel of 99

**Table 4.** CCEMG long and short run estimates.

	Long Run Coefficient			Short Run Coefficient		
	Coef.	Std. Err.	z-stat.	Coef.	Std. Err.	z-stat.
<i>Model 1: Dependent variable is the log of domestic credit to private sector (% GDP)</i>						
REM	-0.110*	0.044	-2.52	-0.065**	0.033	-1.94
GDP	0.200	0.285	0.70	-0.049	0.304	-0.16
INF	-0.004*	0.000	-7.38	-0.002*	0.000	-3.45
FDI	-0.017*	0.004	-4.37	-0.005	0.004	-1.33
ECM	-	-	-	-0.672*	0.062	-10.70
Diagnostic tests						
IPS	-10.231* [0.000]			-12.759* [0.000]		
CADF	-2.215* [0.013]			-3.304* [0.000]		
<i>Model 2: Dependent variable is the log of M2/GDP</i>						
REM	0.037**	0.023	1.65	-0.008	0.018	-0.40
GDP	0.335	0.216	1.55	0.214	0.237	0.90
INF	-0.002*	0.001	-1.96	-0.002*	0.000	-2.28
FDI	-0.007	0.009	-0.82	-0.009	0.006	-1.58
ECM				-0.620*	0.070	-8.84
Diagnostic tests						
IPS	-10.395* [0.000]			-12.973* [0.000]		
CADF	-3.163* [0.001]			-2.651* [0.004]		

*Note:* CRED: log of domestic credit to private sector as share of GDP, M2: log of broad money supply as share of GDP, REM: log of remittances as share of GDP, GDP: log of real GDP per capita, INF: inflation rate calculated from GDP deflator, FDI: foreign direct investment inflows as share of GDP. The IPS test provides W-t-bar statistic, whereas the CADF test provides z-t-bar statistic of Pesaran (2007) test. Tests are conducted for model with intercept and *p-values* are given in brackets. Optimal lag length was determined using AIC with a maximum of 5. The asterisks \* and \*\* indicate significance at the 5% and 10% levels, respectively.

developing countries. Foreign direct investment inflows reduce significantly domestic credit to private sector in the long run but have no significant effect on money supply. The coefficient on the lagged error term is negatively signed and statistically significant. This provides additional evidence of the presence of a long run relationship among the variables under investigation. Overall, the results provide mixed evidence regarding the impact of remittances on financial sector development.

We report the country-level results in **Table 5**. As expected, the results show considerable heterogeneity in the relationship between remittances and financial development. A significant positive long run effect of income is found for five countries (Benin, Burkina Faso, Cote d'Ivoire, Nigeria and Senegal) whereas a negative effect is reported for Mali. The effect of GDP is insignificant for the remaining countries. In the long run, remittances promote financial development in Benin, Burkina Faso, and Nigeria, they hurt it in Cote d'Ivoire, Mali, and Togo.

**Table 5.** Individual country long run results.

Country	<i>Domestic credit to private sector (% GDP)</i>				<i>Money Supply M2/ GDP</i>			
	REM	GDP	INF	FDI	REM	GDP	INF	FDI
Benin	-0.115 (-0.75)	0.483 (0.31)	-0.005 (-0.67)	-0.008 (-0.32)	0.123* (2.00)	1.366* (2.25)	0.005** (1.91)	0.018** (1.67)
Burkina Faso	0.036 (0.58)	1.445* (2.62)	-0.006 (-0.95)	-0.022 (-0.90)	0.143** (1.73)	0.534 (0.82)	-0.001 (-0.02)	-0.017 (-0.59)
Cote d'Ivoire	-0.223** (-1.61)	1.005* (2.78)	-0.002 (-0.73)	-0.017 (-0.57)	0.020 (0.22)	0.451** (1.82)	-0.003 (-1.58)	0.023 (1.03)
Ghana	-0.097 (-1.45)	0.734 (0.58)	-0.005* (-2.02)	-0.036 (-1.02)	-0.037 (-0.96)	0.077 (0.09)	-0.004* (-2.98)	-0.016 (-0.68)
Mali	-0.359* (-3.24)	-1.223* (-3.06)	-0.005 (-1.43)	0.004 (0.27)	0.101 (0.92)	0.145 (0.47)	-0.004 (-1.53)	0.006 (0.45)
Niger	-0.006 (-0.07)	-1.029 (-1.34)	-0.002 (-0.39)	-0.005 (-0.34)	-0.042 (-0.59)	-0.976 (-1.33)	-0.010* (-2.29)	-0.005 (-0.45)
Nigeria	0.028 (0.52)	1.092** (1.77)	-0.002** (-1.73)	-0.030 (-0.60)	0.089** (1.92)	1.053* (2.03)	-0.002** (-1.91)	-0.079** (-1.85)
Senegal	-0.122 (-1.24)	-0.330 (-0.53)	-0.002 (-0.52)	-0.026 (-1.31)	-0.029 (-0.45)	0.942* (2.26)	0.000 (0.24)	-0.001 (-0.05)
Sierra Leone	0.029 (1.01)	-0.011 (-0.03)	-0.004* (-4.83)	-0.021** (-1.95)	0.041 (1.32)	-0.130 (-0.32)	-0.002** (-1.80)	-0.001 (-0.06)
Togo	-0.279* (-3.63)	-0.158 (-0.23)	-0.006 (-1.10)	-0.009 (-0.69)	-0.034 (-0.63)	-0.110 (-0.26)	-0.005 (-1.21)	0.001 (0.03)

Note: Figures in parentheses are t-statistics. \*(\*\*) indicates significance at the 5% (10%) level.

#### 4. Conclusions

This study attempted to empirically examine the effect of remittances on financial development in selected West African countries over the period from 1980 to 2017. Contrary to previous panel studies which relied on standard panel estimators, we have made use of a more flexible and efficient panel estimation method which controls both parameter heterogeneity and cross-section dependence among countries. In this study, financial development was proxied by domestic credit to private sector as a ratio of GDP and broad money supply as a ratio of GDP. The results show that the relationship between remittances and financial development is mixed. Remittance inflows were found to reduce domestic credit to private sector whereas they contribute to increasing money supply in the long run. Financial development of ECOWAS countries was in a significant way negatively associated with inflation. Furthermore, domestic credit to private sector was found to be negatively related to foreign direct investment. The results also indicate that the level of domestic income has no significant effect on the development of the financial sector. Country-level results reveal, however, considerable heterogeneity across countries.

The findings of this study indicate that remittances positively and significantly influence certain aspects of financial development such as money supply. How-

ever, these remittances do not increase credit to private agents. This finding may be explained by the fact that remittances in most African countries are basically used for meeting basic needs such as consumption, education, clothing and housing. These uses of remittances are not finance development-promoting. In addition, there is evidence that remittance flows to Africa are underreported as formal financial sector is less developed in this region than in other developing countries. It is estimated that informal remittances could add at least 50 percent of the recorded remittances to developing countries [37]. According to [38] informal remittances to Sub-Saharan Africa amount to 45 - 65 percent of official flows. Lowering the transaction costs of remittances to African countries may help increase the flow of remittances through official channels and this may increase their contribution to financial development. It is also important to bring remittance recipients into the formal financial sector and channel their savings into productive uses that can generate long-term benefits. This could be achieved by adopting credit facility programs by financial institutions.

### Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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