

## A BOUNDS TESTING ANALYSIS OF MIGRANTS REMITTANCES AND FINANCIAL DEVELOPMENT IN SELECTED SUB-SAHARA AFRICAN COUNTRIES

TAIWO AJILORE AND SYLVANUS IKHIDE

**ABSTRACT.** The study investigated the short and long run impact of remittances on financial development, using country-level data on five selected sub-Saharan African countries, which are Cape-Verde, Lesotho, Nigeria, Senegal and Togo. The study utilized the Auto-Regressive Distributed Lag (ARDL) bounds testing approach for testing the existence of co-integration relationships. The study documented the existence of long-run level relationships between remittances and financial development, and documented evidences which show that remittances promote financial development in Cape Verde, Lesotho, Senegal and Togo, but not in Nigeria. The study advocated policies that encourage and facilitate the uninterrupted flow of remittances transfers, adequate institutions, regulatory strengthening and sound macro-economic policies in the selected countries.

### 1. INTRODUCTION

The past decade witnessed a phenomenal rise in the aggregate value and growth of remittances to recipient countries. Recorded remittances received by developing countries peaked at an estimated US\$325 billion in 2010, up from a paltry US\$84.5 in year 2000. This represents nearly three times the amount of official aid, almost as large as foreign direct investment (FDI) flows and constitutes more than 10 percent of gross domestic product (GDP) in many developing countries (World Bank, 2011). The volume and increasing proportion of remittances relative to other external flows and to GDP suggests that the macroeconomic effects of remittances may be of critical importance in many of these countries. Yet, remittances still remain one of the least studied areas of research in migration literature in sub-Saharan Africa, notwithstanding that remittances are one of the least volatile external financings and have become an important source of development finance in many countries in the sub-region.

Although most of the reported global remittances flows go to regions other than Sub-Saharan Africa (SSA), the region has been part of the overall rising global trend in remittance inflows to labor-exporting countries. For most countries in the sub-region, the growth profile of remittance receipts in recent times has been phenomenal. For instance, in 2008, remittances accounted for more than 5 per cent of GDP in ten African countries: Lesotho (27.3 per cent), Togo (10.1 per cent), Senegal (9.8 per cent), Cape Verde (9.0 per cent), the Gambia (8.2 per cent), Morocco (8 per cent), Sierra Leone (7.7 per cent), Liberia and Guinea-Bissau (7 per cent), and the Sudan (5.0 per cent). Nigeria and Lesotho have since 2006 prominently rank among the world's top 10 remittance recipients countries.

---

Received by the editors February 7, 2012. Accepted by the editors November 6, 2012.

*Keywords:* Remittances, Financial Development, Sub-Sahara Africa.

*JEL Classification:* F22, E44, O55.

Taiwo Ajilorea (corresponding author) is post-doctoral research fellow at Govan Mbeki Research and Development Centre, University of Fort Hare, East London, South Africa. Email: tajilore@ufh.ac.za.

Sylvanus Ikhider, Ph.D., is Professor and Nedbank Chair in Economics at the University of Fort Hare, South Africa. Email: sikhide@ufh.ac.za.

This paper is in final form and no version of it will be submitted for publication elsewhere.

The conventional wisdom about remittances had been that it is mostly used for consumption by mostly poor migrants' relatives in the home country. Consequently an overwhelming amount of research efforts on the phenomenon has been focused on its effects on households' micro-level variables such as consumption, savings, poverty, inequality, education, infant mortality, and entrepreneurship<sup>1</sup>. However, an equally rich amount of empirical analysis has documented that remittances have been utilized not only for consumption, but in addition for investment goods<sup>2</sup>. This realization coupled with the increasing volume and stable nature of remittances to developing countries has stimulated a shift of research attention to its effects on macroeconomic aggregates. However, the focus of attention of this strand of literature has remained disproportionate in favor of its economic growth effects<sup>3</sup>, while its financial deepening effects remain largely unexplored. More so, existing literature on growth effects had emphasized that it was likely that remittances can affect long-term growth only in the presence of well-developed financial markets.

The need to seek an understanding of the effects of the increasing remittances inflows into the financial system of countries of sub-Saharan Africa is multidimensional. One, the devastating effects of the recent global financial crisis have made factors that affect the financial system to be at the top of policy agenda worldwide (Beck, et al (2010), and especially for most of the fragile countries in the sub-region, with about 80 percent of its remittances coming from high-income countries. Thus, understanding how remittances impact on fragile financial systems in SSA economies is important for policymaking, considering precarious vulnerabilities of these systems to economic vagaries in the global marketplace, as demonstrated by the recent global financial shock, and their increasing inclination towards integration into global financial markets and the world economy.

Second, existing theoretical and empirical literature on remittances and financial development nexus still presents open and unresolved questions. Authors, including Aggrawal, et al (2010); Fajnzylber and Lopez (2008), Gupta, et al (2009), documented a positive, significant and robust link between remittance and financial development on the one hand, while Martinez Peria, Mascaro and Moizeszowicz (2007), provided evidence that suggests that remittances might have a smaller impact on financial development in Latin America. Gulde, Pattillo, Christensen, Carey, and Wagh (2006) observed that lack of access to formal financial services in Sub-Saharan Africa serves as a significant impediment to financial deepening. Also on-going is the debate of the role of financial depth in the growth promoting effects of remittances. While scholars like Mundaca (2005) show that remittances' impact on growth increases with financial development, Guiliano and Ruiz-Arranz (2009) find evidence that remittances boost growth in countries with less developed financial system by providing an alternative way to finance investment and helping overcome liquidity constraints.

Third, not only that the interrelationship between remittances and financial development has been largely under researched, the available few are mostly focused on other developing economies of Asia and Latin America, apart from Sub-Saharan Africa. Gupta, et al (2009) remains the only effort at examining this issue in the context of data on Sub-Saharan African countries, utilizing cross-country panel OLS regressions. However, World Bank (2009 and 2011)

---

<sup>1</sup>(See Adams (2004), Esquivel and Huerta-Pineda (2007) on the poverty link, Massey and Parado (1998), Woodruff and Zenteno (2007) investigate entrepreneurship in Mexico and Yang (2005) in The Philippines; on education and mortality, see, among others, Cox and Ureta (2003) on El Salvador and Hildebrandt and McKenzie (2005) and López Córdova (2005) on Mexico.)

<sup>2</sup>CityplaceTaylor (1992) shows that remittances enhance asset accumulation in housing and land acquisition. Conway and Cohen (1998) established that migrant workers in StateplaceNew York transferred remittances to their home country to finance a local sewer system. Ketkar and Ratha (2001) identify the use of future yen remittances as collateral for bond financing in country-regionBrazil, while Adams (1998) finds that savings propensities in country-regionplacePakistan were higher out of remittances when compared to other sources. Woodruff and Zenteno (2001) estimate that remittances accounted for about 20% of the capital invested in micro enterprises in urban country-regionplaceMexico.

<sup>3</sup>See Fajnzylber and López (2008) for a review of these studies.

has emphasized the pitfalls of using data on international remittances in cross-country analysis, because these data are often lacking in cross-country comparability, a caveat that potentially limits the reliability of outcomes of such cross-country pool analysis.

Finally, recently the finance-growth literature has focused on the financial development policies issues, namely the sources of financial development. These issues are particularly important for SSA countries that perennially lag behind other regions of the world on all indices of financial development. Thus, the objective of this paper is to investigate, the short and long run impact of remittances on financial development in five selected sub-Saharan African countries of Cape-Verde, Lesotho, Nigeria, Senegal and Togo using country-level data. The study utilized the Auto-Regressive Distributed Lag (ARDL) bounds testing approach for testing the existence of co-integration relationships. The approach has certain econometric advantages in comparison to other single co-integration procedures. Despite these advantages, existing studies on the remittances-financial development nexus have not made sufficient use of the approach.

The rest of the paper is structured as follows: following this introduction, section 2 examined the trends in flows of migrants' remittances and financial development in the sub-region, with particular reference to the selected countries and over the period of study. In section 3, a synopsis of existing literature in the study area is presented, while section 4 deals with the methodological issues. Section 5 presents the results and discussions of the empirical analysis, while section 6 concludes and gives perspectives for policy.

## 2. TRENDS OF REMITTANCES FLOWS AND FINANCIAL DEVELOPMENT IN SUB-SAHARAN AFRICA

Sub-Saharan Africa as a group lags behind other developing regions in terms of magnitude of remittances receipts. As indicated in Table 1, remittances to the region in 2009 sum up to US\$20.7 billion, accounting for a meager 6.7% of remittances flows to all developing countries, compared to countries in Latin America and the Caribbean, as well as East Asia and the Pacific with above 25% share. The indicated record generally obscures the true size of remittances for all recipient countries, because IMF reports data on official worker remittance flows, that is, remittance funds which are transmitted through official banking channels, leaving those transmitted through private unofficial channels unaccounted for. Especially for sub-Saharan Africa, the true amount of remittances is least estimated relative to other developing regions of the world. Freund and Spatafora (2005) estimated that 45-65% of remittances flows to sub-Saharan Africa are informally routed, compared to only about 5-20% in Asian and Latin American countries. This is mainly accounted for by the rudimentary nature of the financial and other fund transmission mechanism that leads to relatively high transaction costs in most African financial markets, which favors informal transmission channels, especially for non-lumpy transfers.

Relative to Gross National Product, remittances have maintained a consistently increasing share in Sub-Saharan Africa, increasing from 1.5% share of GDP in 2000 to 2.5% in 2009, which compares favorably with Latin America (1.5%), South Asia (4.8%), East Asia (1.9%), amongst others. Relative to other sources of financial flows, remittances still remain considerably lower than other sources like foreign direct investments (FDI) and overseas development assistance (ODA).

In sharp contrast to the lackluster profile of remittance flow to the region as a group, the selected countries of Cape Verde, Lesotho, Nigeria, Senegal and Togo present an interesting case study of the link between remittances and financial development, with the phenomenal profile of the magnitudes and proportions of remittances flows to these economies. Cape Verde has one of the world's highest numbers of emigrants, with emigrants as percentage of population ranging between 35.8 percent in 2005 to 37.5 percent in 2010, ranking third on the list of 10 top remittance recipients in sub-Saharan Africa in 2006 and 2009. As Table 1 indicates, remittances accounted for well over 10 percent of GDP in Cape Verde consistently for the period 2000 – 2010. In comparison to other sources of resource inflows, remittances consistently

outstrip foreign direct investments (FDI) and compete well with inflows of overseas development assistance (ODA) in terms of prominence. Lesotho ranks 3rd amongst top remittance receiving countries globally in 2009, and in terms of economic dependence on remittances inflows, ranks highest in sub-Saharan Africa with remittances-GDP ratio ranging between 34 percent in 2000 and 26 percent in 2009. The pre-eminence of remittances flows in Lesotho's economy is further demonstrated by the fact that it consistently more than doubles FDI and ODA flows as a proportion of GDP for the entire period of 2000 to 2009.

While Nigeria has a moderate (mostly below 5 percent) proportion of remittances in its GDP composition, it stands out prominent in the profile of aggregate remittances inflows into sub-Saharan Africa as a whole. In 2010 for instance, Nigeria was the 10th in global ranking and SSA's highest recipient of remittances of over US\$10billion, accounting for about 50 percent of total inflows of remittances to Sub-Saharan Africa. As Table 1 indicates, remittances remain a prominent source of external finance in the Nigeria's economy as it widely outpaces overseas development assistance, and on the average at par with foreign direct investment during the period 2000 – 2009. Equally ranking prominently on the list of top ten remittances recipients in sub-Saharan Africa is Senegal and Togo with recent evidences suggesting that remittances constitute substantial proportion of their national earnings. In recent years, the proportion of remittances in their GDP has remained in excess of 10 percent and outpaces other sources, including foreign direct investment and overseas development assistance.

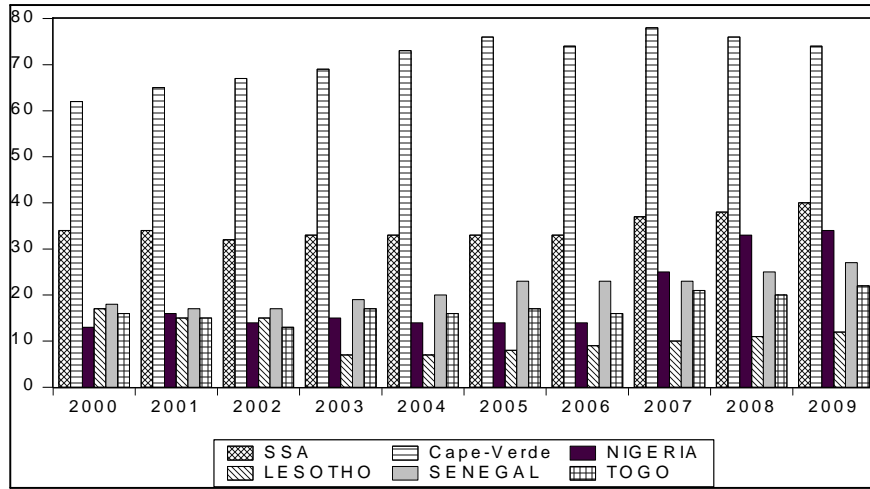
**Table1: Trend of Remittances, and other Resource Flows to sub-Sahara Africa: 2000 - 2009**

		<b>A.</b>									
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>SSA</b>	Remittances (US\$b)	4.6	4.7	5.1	5.9	8.0	9.4	12.6	18.6	21.6	20.7
	Remittances (% GDP)	1.5	1.6	1.6	1.5	1.6	1.6	1.9	2.4	2.3	2.5
	FDI (% of GDP)	2.0	4.5	3.8	3.13	2.1	2.9	2.7	3.4	3.6	3.4
	ODA (% of GDP)	3.5	3.9	4.8	5.1	4.4	4.7	5.0	3.6	3.4	3.8
<b>C-Verde</b>	Remittances (US\$ m)	86.9	80.9	85.1	108.5	113.3	136.6	136.7	138.9	155.1	146.1
	Remittances (% GDP)	16.3	14.7	13.8	13.6	12.3	13.7	12.3	10.4	10.1	9.4
	FDI (% of GDP)	6.3	1.6	2.4	4.9	7.3	8.1	11.9	14.4	13.7	7.7
	ODA (% of GDP)	17.6	14.1	14.8	18.4	15.4	16.1	11.5	11.4	12.6	12.1
<b>Lesotho</b>	Remittances (US\$ m)	252.2	209.4	194.2	287.9	354.9	326.5	361.4	451.1	438.5	414.1
	Remittances (% GDP)	33.8	30.5	30.4	30.3	29.4	24.8	25.5	28.6	27.5	26.2
	FDI (% of GDP)	15.8	17.1	13.1	12.2	10.2	7.1	7.9	8.2	4.5	3.9
	ODA (% of GDP)	4.6	7.7	11.4	7.9	7.6	4.90	4.6	7.7	8.8	8.7
		<b>B.</b>									
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Nigeria</b>	Remittances (US\$ m)	1392	1167	1209	1063	2273	3329	5435	9221	9980	9584
	Remittances (% GDP)	3.1	2.4	2.1	1.6	2.58	2.9	3.7	5.6	4.8	5.5
	FDI (% of GDP)	2.5	2.5	3.2	2.9	2.13	4.43	6.0	3.6	2.7	3.3
	ODA (%of GDP)	0.2	0.1	0.1	0.2	0.3	0.4	0.4	0.3	0.3	0.3
<b>Senegal</b>	Remittances (US\$ m)	233.5	304.7	344.5	510.9	632.9	788.8	925.2	1192	1476	1365
	Remittances (% GDP)	4.9	6.3	6.5	7.4	7.9	9.1	9.9	10.5	11.2	10.6
	FDI (% of GDP)	1.3	0.7	1.46	0.8	0.9	0.5	2.3	2.6	5.3	1.6
	ODA(%of GDP)	9.0	8.7	8.4	6.6	13.1	7.8	8.7	7.7	8.0	8.4
<b>Togo</b>	Remittances(US\$ m)	34.2	68.5	103.2	148.6	179.0	192.5	232.1	284.5	337.1	306.8
	Remittances (% GDP)	2.6	5.2	7.0	8.5	8.7	9.1	10.5	11.4	11.6	10.7
	FDI (% of GDP)	3.2	4.8	3.6	1.9	2.9	3.7	3.5	1.9	2.3	1.8
	ODA (% of GDP)	5.2	3.4	3.4	2.8	3.1	3.9	3.6	4.8	4.7	4.1

Source: Authors compilations from World Bank Development Indicators Database (Online), International Financial statistics (IMF) Database, and IMF World Economic Outlook Database.

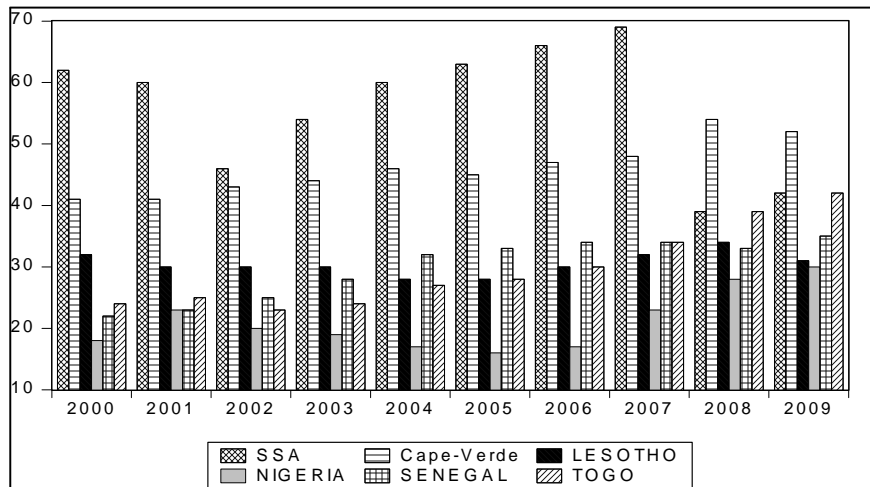
Developing countries typically suffer from weakly developed financial markets and a low degree of monetization of the economy, measured as a low ratio of credit to GDP and a low ratio of the monetary aggregates M2 or M3 to GDP. Sub-Saharan Africa has not been an exception. Financial markets in sub-Saharan Africa remain largely less developed and fragmented with substantial gaps in the financing of economic activities by private agents. This is notwithstanding that financial systems globally have continued to deepen along many dimensions, with rising values for standard indicators of financial intermediation and market development in many regions of the world. (See Beck, et al, 2010).

**Figure 1: Money and quasi money (M2) (% of GDP) in Selected SSA Countries**



Source: Authors compilations from World Bank Development Indicators Database (Online), International Financial statistics (IMF) Database, and IMF World Economic Outlook Database.

**Figure 2: Domestic Credit to Private Sector (% of GDP) in Selected SSA Countries**

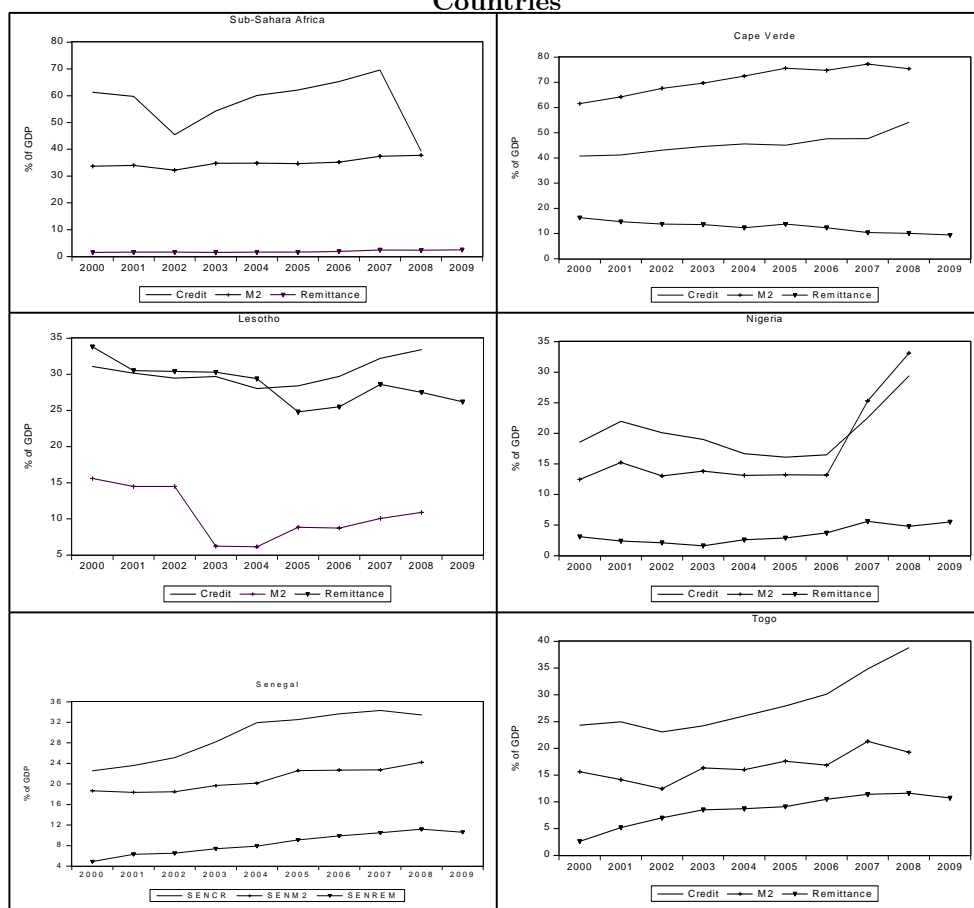


Source: Authors compilations from World Bank Development Indicators Database (Online), International Financial statistics (IMF) Database, and IMF World Economic Outlook Database.

The prospects of remittances in mitigating the lackluster state of the financial sector, especially for SSA can be appreciated against the backdrop of the fact that the financial systems of most countries in the sub-region are dominated by banks, with other financial structures largely underdeveloped or almost non-existent (Kablan, 2010). Remittances foster the expansion of the banking sector since most remittances are intermediated through the banking sector, while households are expected to accumulate excess of remittances over consumption in banks.

Figures 1 and 2 respectively present trends in money and quasi-money (M2) and Domestic credit to private sector as a percentage of GDP) in SSA and the selected countries. These are standard indicators of financial depth in the finance growth literature; countries with higher levels of these indicators have been shown to grow faster and experience faster rates of poverty reduction.

**Figure 3: Remittances and Financial Development Indices in Selected SSA Countries**



Source: Authors compilations from World Bank Development Indicators Database (Online), International Financial statistics (IMF) Database, and IMF World Economic Outlook Database.

As indicated in Figure 1, broad money indicator of financial development shows only Cape Verde exhibiting some impressive record over the period of 2000 to 2009 with an index of 75% in 2008 which compares fairly favorably with global average of 95%, and far exceeds an average of 35% for the sub-region. Lesotho, Nigeria, Senegal and Togo grossly lagged behind on this indicator when compared with Sub-Saharan African averages over the period. Figure 2 indicates measure of financial depth with the domestic credit to the private sector indicator. This indicator further confirmed the extent of underdevelopment of the financial sector in the region in general and more precariously in the selected countries. In 2008 for instance, the

index for SSA was 36 %, compared with a global average of 134% and 102% for the East Asia and Pacific region in the same period.

Figure 3 shows the plots of remittances and indicators of financial development in the region and the selected countries for the period 2000 and 2009. For some of the countries, particularly for Cape Verde, Lesotho, Senegal and Togo, an increasing pattern of co-movements is indicated, while it is difficult to discern a clear pattern for SSA and especially for Nigeria after 2006.

### 3. REMITTANCES AND FINANCIAL DEVELOPMENT: SYNOPSIS OF PRIOR LITERATURE

The literature on remittances can be divided into two segments, one focusing on the causes and uses of remittances at the level of the household, and the other on the macroeconomic impact of remittances. The former treats remittances as a household issue, consequently, overwhelming proportion of literature on remittances explained their patterns, motivation and impacts on the household consumption by using household data<sup>4</sup>. Regarding the macroeconomic impact of remittances, the literature tends to emphasize the point that remittances not only increase household consumption, but are also invested in productive assets, producing the Keynesian multiplier effects on the economy. Following this line of thought, substantial amount of literature had explained the effects of remittances inflows on economic growth performance.

Current literature has not provided a consistent theoretical framework for establishing a causal link between remittances and financial deepening; however, the idea that remittances might affect financial development, especially in a developing countries setting is suggested by Fajnzylber and López (2008). This is based on the notion that money transferred through financial institutions paves the way for recipients to demand and gain access to other financial products and services, which they otherwise might not have. At the same time, when remittance payments are made through financial institutions, the receiving banks can reach out to recipients without bank accounts to offer them financial products and services thus reaching out to “unbanked” recipients. Orozco and Fedewa (2005) provide accounts of financial institutions’ attempts to “bank” remittance recipients, by lowering remittance fees and by offering specially designed products, suggesting that financial institutions perceive the likely impact of remittances on financial development to be positive. Moreover, even if higher bank lending to remittance recipients does not materialize, overall credit in the economy might increase if banks’ loanable funds surge as a result of deposits linked to remittance flows.

On the other hand, because remittances can help relax individuals’ financing constraints, they might lead to a lower demand for credit and have a dampening effect on credit market development. Also, a rise in remittances might not translate itself into an increase in credit to the private sector, especially where remittances are instead channeled to finance the government. Finally, remittances might not increase bank deposits if they are immediately consumed or if remittance recipients distrust financial institutions and prefer other ways to save these flows.

Few but growing studies have recently begun to directly address the relationship between remittances and the development of the domestic financial sector, with outcomes that suggest a consensus on financial development role of remittances. Gupta et al (2009) was the first and yet the only study that looks at the financial deepening effects of remittances in sub-Saharan African region. The study utilized an unbalanced panel of 44 sub-Saharan African countries and six time periods, composed of five-year averages from 1975 – 2004. The paper finds that remittances have a positive impact on financial development, providing opportunity for small savers to gain a foothold in the formal financial sector.

Aggrawal et al (2010) utilized aggregate Balance of Payments (BOP) data for a large sample of developing countries for the period 1975 – 2007 to investigate the link between remittances and financial development, focusing on the ratio of bank deposits and credit to GDP. The study established a positive and significant association between remittances and financial development. Shahbaz et al (2007) similarly investigates whether remittances promote financial

---

<sup>4</sup>see Rapoport and Docquier (2005) for a detailed review.

sector's performance in the case of Pakistan. The study utilized both the ARDL bounds testing and Johansen Co-integration approaches to establish long run relationships between the variables. The results indicate that remittances promote financial sector development in the long run.

Fajnzylber and López (2007) model the relationship between remittances and financial development using a large panel of developing countries. The results from the econometric exercise indicate that remittances have a positive and significant impact on both bank deposits and bank credit. Using county-level data for Mexico on the percentage of households that receive remittances and the number of branches, the number of deposit accounts, and the volume of deposit and credit across counties, Demirgüç-Kunt et al (2010) investigate the impact of remittances on financial depth and breadth; the study documented that remittances are strongly associated with greater banking breadth and depth and the amount of deposit to GDP.

However, other strand of studies has examined the role of financial depth in the growth promoting effects of remittances, with contrasting results. Notable among these are Giuliano et al. (2009) and Mundaca (2005). Mundaca finds that in Central America, Mexico, and the Dominican Republic the impact of remittances on growth is stronger when the indirect effect on growth via an extension of domestic credit is also taken into account. In other words, remittances have a stronger effect on growth in those countries where a functioning banking system exists. Giuliano et al. (2009) arrive at opposite empirical results in a cross-country study of about 100 countries. The authors established that remittances boost growth in countries with less developed financial systems by providing an alternative way to finance investment and helping overcome liquidity constraints.

While consensus of evidence reviewed above suggests that remittances are positively related to financial development, the findings are obtained mostly from studies of large cross-section of countries or specific countries that exhibit wide and diverging differences with the structure and level of development of the financial sectors of most African countries. The question remains if these results are applicable to specific situations in selected countries, given the above caveats. This is an empirical issue which this study attempts to explore.

#### 4. METHODOLOGY

**4.1. Data and data sources.** The study is carried out for five sub-Saharan African countries for the period 1985–2009. The five African countries covered in the study are Cape-Verde, Lesotho, Nigeria, Senegal and Togo. The choice of countries was determined primarily by the preponderance of remittances flows to these countries as indicated in section 2, while availability of consistent data series on variables of interest was given consideration in determining estimation period.

To achieve our objective of establishing a link between financial development and remittances, we follow Aggrawal et al (2010) by estimating forms of equation 4.1:

$$FD_t = \alpha + \gamma FD_{t-1} + \beta_1 Rem_t + \beta' X_t + \mu_t \quad (4.1)$$

where the dependent variable  $FD$  is financial development;  $Rem$  is remittances;  $\mathbf{X}$  is a set of conditioning information that controls for other factors associated with financial development<sup>5</sup> and  $\mu$  is the error term.

Financial development (FD) is proxy by two varieties of measures of financial development commonly found in finance-growth literature. These are liquid liabilities of the financial system to GDP, and the ratio of credit to the private sector to GDP. Liquid liabilities to GDP are a traditional indicator of financial depth. It is the ratio of currency plus demand and interest-bearing liabilities of banks and other financial intermediaries to GDP. This is the broadest

---

<sup>5</sup>Other variables have been confirmed to have impact on financial development. The omission of these variables could bias the estimation of causal relations between financial development and remittances flows (see Gujarati, 1995)



available indicator of financial intermediation, as it includes all banks and bank-like and non-bank financial institutions. Some authors have criticized the use of the M2/GDP ratio as an indicator of financial deepening. For example, Pill and Pradhan (1995) assert that it overlooks important factors, such as openness of the country to capital flows, the extent of public borrowing from the domestic financial system, the development of non-bank financial intermediation, and the competitiveness of the banking sector. The ratio of credit to the private sector to GDP has been considered as a more appropriate indicator of financial development. This is the ratio of claims on the private sector by deposit money banks and other financial institutions to GDP. It is a measure of the extent to which the private sector relies on banks to finance consumption, working capital, and investment (Kablan, 2010).

Remittances (Rem) are measured by the ratio of remittances to GDP. Workers' remittances are as defined by the International Monetary Fund (IMF) in the *Balance of Payments Statistics*. A common problem with studies on remittances, to which this study is subject, is appropriate measurements of remittance variable. The IMF's Balance of Payment Statistics Yearbook (BOPSY) constructs total remittances as the sum of three items: "Workers' Remittances", "Compensation of Employees" and "Migrant Transfers". Giuliano and Ruiz-Arranz (2009) observed that the use of this definition entails the risk of including flows, such as earnings of locals working for foreign embassies and international organizations, which do not conform with the view that remittances typically refer to transfers of money by foreign workers to their home countries. Another problem is that other countries do not classify remittances separately from other current transfers in the balance of payments (BOP). In such cases, the standard definition understates the true flows. A related problem in remittance data is estimating informal flows such as remittances in kind, or money carried by friends or family members, or through informal systems of money transfer. Unrecorded (informal) remittances are reputed to be close to 50% of total flows in economies with less developed financial markets such as in our sample, (AITE 2005).

Variables that are included in the conditioning information set are those prior literature that are confirmed robust in financial development regressions (See Levine (2005) and Beck (2009)). Mostly captured dimensions of determinants of financial development are the level of economic development, indicators of economic volatility and extent of financial globalization often captured by indicators of trade openness. To this end, the study utilized growth rate of per capita GDP, inflation volatility, extracted from the estimated volatilities of a GARCH (1,1) model (see Bollerslev, 1986) of GDP deflator variable, and total trade as a ratio of GDP to respectively capture these dimensions.

Following from the foregoing, Eq (4.1) can be specified in its explicit form as follows:

$$FD_{nt} = \alpha + \gamma FD_{nt-1} + \beta_1 Rem_t + \beta_2 Y_t^k + \beta_3 \pi_t^v + \beta_4 T_t^o + \mu_t \quad (4.2)$$

where:

$FD_{nt}$  (n = 1,2) = the financial development indicators with FD1 and FD2 denoting liquid liabilities of the financial system (LLf) and credit to the private sector (CRf) respectively

$Rem_t$  = the ratio of remittances to GDP

$Y_t^k$  = the growth rate of per capita GDP to proxy the level of economic development

$\pi_t^v$  = inflation volatility to proxy macroeconomic instability

$T_t^o$  = total trade as a ratio of GDP to proxy financial globalization

$\mu_t$  = white noise error term

Migrant remittances sent to the recipients through banking or other formal financial intermediary channels are expected to have a positive impact on financial development. McKinnon-Shaw's type models and the endogenous growth literature predict a positive relationship between financial development and real income. Boyd, Levine, and Smith (2001) show that countries with long experience of inflationary surges tend to have less monetary depth, while trade openness has also been found to have a positive effect on financial development (see Chinn and Ito,

2002). We therefore expect these outcomes of the respective variables *on* financial development indicators in the model.

Annual data on liquid liabilities of the financial system to GDP, and the ratio of credit to the private sector to GDP were obtained from Beck et al's (2010) *Financial Structure Dataset*. Remittances, Growth and Openness variables were obtained from World Bank Development Indicators Database (Online), while inflation variable was obtained from International Financial statistics (IMF) Database, (Online). All variables were modeled in their logarithmic transformations, except GDP growth rate and inflation volatility variables due to negative values in the series.

#### 4.2. Autoregressive distributed Lags Bounds Test

The study adopts the autoregressive distributed lag (ARDL) framework espoused in Pesaran and Shin (1995, 1999), Pesaran et al (1996) and Pesaran and Pesaran (1997) to establish the co-integration relationship between financial development and remittance inflows in selected countries.

The ARDL procedure has been popularized due to the following benefits over other multivariate co-integration techniques. One, as the name suggests, "Autoregressive, distributed lags" respectively refers to the lags of dependent and independent variables. The approach thus allows both the dependent and independent variables to enter the model with lags, thereby allowing the past values of variables to determine its present values. This flexibility in terms of the structure of lags of the regressors is particularly plausible because reactions to a change in each variable may be different depending on various factors and in some cases they may respond to the changes in underlying factors with a lag; thus there is usually no reason to assume that all regressors should have the same lags as suggested by the co-integration VAR models, where different lags for different variables are not permitted (Pesaran et al, 2001).

The second advantage of the procedure is its applicability irrespective of whether the regressors in the model are  $I(0)$ ,  $I(1)$  or mutually co-integrated. Thus unlike other approaches, the bounds testing procedure allows making inferences in the absence of any *a priori* information about the order of integration of the series under investigation. Strictly speaking however, if the explanatory variables are integrated of order two,  $I(2)$ , and/or the dependent variable is not  $I(1)$  process, then the bounds testing approach cannot be used to determine the existence of co-integrating relations as the F-test would be spurious in the presence of  $I(2)$  because both the critical values of the F-statistics computed by Pesaran et al (2001) and Narayan (2005) are based on the assumption that the variables are  $I(0)$  or  $I(1)$ <sup>6</sup>.

The third advantage is the small sample property of the bounds testing approach as argued in Narayan (2005). The ARDL is a more statistically significant approach for determining co-integrating relationships in small samples (Ghatak and Siddiki, 2001), while the Johansen co-integration techniques require large data.

Conventionally, the ARDL approach proceeds in three steps as espoused in Pesaran and Shin (1995, 1999). The first step involves establishing the existence of long-run relationship between the variables. This is implemented by testing for the significance of lagged variables in an error correction mechanism regression of Equation 4.2 augmented with the first lags of the levels of each variable. The corresponding error correction version of the ARDL model for this study then becomes:

---

<sup>6</sup>This is well documented in the empirical articles that used the bounds testing approach. (see Pesaran & Pesaran, (1997) for a review of this issue.

$$\begin{aligned}
\Delta \ln FD_{n,t} = & \alpha + \sum_{i=1}^j \beta_{1i} \Delta \ln FD_{n,t-i} + \sum_{i=0}^j \beta_{2i} \Delta \ln Rem_{t-i} + \\
& \sum_{i=0}^j \beta_{3i} \Delta \ln Y_{t-i}^k + \sum_{i=0}^j \beta_{4i} \Delta \ln \pi_{t-i}^v + \sum_{i=0}^j \Delta \ln \beta_{5i} T_{t-i}^o + \\
& + \delta_1 Rem_{t-1} + \delta_2 Y_{t-1}^k + \delta_3 \pi_{t-1}^v + \delta_4 T_{t-1}^o + \mu_t \tag{4.3}
\end{aligned}$$

Where  $\Delta$  indicates first-difference operator,  $j$  is the optimal lag length,  $\delta_i$  are the long-run multipliers, and  $\ln$  is the natural logarithmic transformation of variables. Other notations remained as defined heretofore. A Wald-test for the joint significance of the coefficients of the lagged levels of the variables is conducted to test the existence of long-run relationship, i.e., a test of the null hypothesis  $H_0 : \delta_1 = \delta_2 = \delta_3 = \delta_4 = 0$  against the alternate  $H_1 : \delta_1 \neq 0, \delta_2 \neq 0, \delta_3 \neq 0, \delta_4 \neq 0$ . The  $F$  test is used for testing the existence of long-run relationship. The  $F$ -test has a non-standard distribution which depends on whether variables included in the model are  $I(0)$  or  $I(1)$ . One set of critical values assumes that all variables included in the ARDL model are  $I(0)$ , while the other is calculated on the assumption that the variables are  $I(1)$ . If the  $F$  test statistics exceeds their respective upper critical values, we can conclude that there is evidence of a long-run relationship between the variables regardless of the order of integration of the variables. If the test statistics is below the upper critical value, we cannot reject the null hypothesis of no co-integration and if it lies between the bounds, the result is inconclusive without knowing the order of integration of the underlying regressors.

The second step is to obtain the long-run dynamic parameters of the model by solving the restricted version of the equation for long-run solution once co-integration is established in the first step. The conditional ARDL ( $\tau, \eta_1, \eta_2, \eta_3, \eta_4$ ) long-run model for  $FD_{n,t}$  is estimated as follows:

$$\begin{aligned}
\ln FD_{n,t} = & \alpha + \sum_{i=1}^{\tau} \delta_1 \ln FD_{n,t-i} + \sum_{i=0}^{\eta_1} \delta_2 Rem_{t-i} + \\
& \sum_{i=0}^{\eta_2} \delta_3 Y_{t-i}^k + \sum_{i=0}^{\eta_3} \delta_4 \pi_{t-i}^v + \sum_{i=0}^{\eta_4} \delta_5 T_{t-i}^o + \mu_t \tag{4.4}
\end{aligned}$$

where the orders or the optimal lag length of the ARDL ( $\tau, \eta_1, \eta_2, \eta_3, \eta_4$ ) model in the variables were selected using Akaike information criteria (AIC). Finally, we obtain the short-run parameters by estimating the error correction equation using the differences of the variables and the lagged long-run solution, and determine the speed of adjustment of financial development indicator to equilibrium as below:

$$\begin{aligned}
\Delta \ln FD_{n,t} = & \alpha + \sum_{i=1}^{\tau} \varphi_i \Delta \ln FD_{n,t-i} + \sum_{j=0}^{\eta} \phi_j \Delta Rem_{t-j} + \\
& \sum_{l=0}^{\eta} \gamma_l \Delta Y_{t-l}^k + \sum_{m=0}^{\eta} \varpi_m \Delta \pi_{t-m}^v + \sum_{s=0}^{\eta} \vartheta_s \Delta T_{t-s}^o + \psi ecm_{t-1} + \mu_t \tag{4.5}
\end{aligned}$$

where  $\psi$  is the speed of adjustment, and  $\varphi, \phi, \gamma, \varpi, \vartheta$  are the short-run dynamic coefficients of the model's convergence to equilibrium.

## 5. EMPIRICAL RESULTS

While drawing inferences in the bounds testing procedure is not predicated on *prior* information about the order of integration of the series under investigation, the computed F-statistics

for bounds testing are based on the assumption that the variables are level or first-differenced stationary. To preclude possibility of spurious regressions, the tests for unit roots is still necessary to be sure that the dependent variables are  $I(1)$  and that none of the regressors are  $I(2)$  or beyond. For this purpose we employed the DF-GLS test for auto-regressive unit roots advanced by Elliott, Rothenberg and Stock (ERS), (1996). This method proposes a simple modification of the ADF tests in which the data are detrended so that explanatory variables are “taken out” of the data prior to running the test regression. As documented in ERS (1996), this approach is preferred to the conventional ADF tests in that it has the best overall performance in terms of sample size and power, and especially when an unknown mean or trend is present.

**Table 2: Summary of Unit roots tests<sup>7</sup>**

Log Levels (Zt)	Cape-Verde	Lesotho	Nigeria	Senegal	Togo
$LL^f$	I(1)	I(1)	I(1)	I(2)	I(1)
$CR^f$	I(1)	I(2)	I(1)	I(1)	I(1)
$Rem_t$	I(1)	I(1)	I(1)	I(1)	I(1)
$T_t^o$	I(1)	I(1)	I(1)	I(1)	I(1)
$Y_t^k$	I(0)	I(0)	I(1)	I(1)	I(0)
$\pi_t^v$	I(1)	I(0)	I(1)	I(1)	I(1)

The DF-GLS statistics are compared to the 95% simulated critical value using 23 obs. and 1000 replications computed by stochastic simulations from Microfit 4.0 for the test for each order of augmentation. The test regression included a constant and trend for the log-levels and only a constant for the first differences of the variables.

The summarized DF-GLS unit test results for all variables and across selected countries are reported in Table 2. The results in Table 2 justify pre-testing the series for unit roots as liquid liabilities of the financial system ( $LL^f$ ) series for Senegal was confirmed to be  $I(2)$ <sup>8</sup>. Other variables as indicated in the table were confirmed to be mostly  $I(1)$ . Subsequent estimations excluded the  $I(2)$  series in order to validly apply the ARDL approach to co-integration.

**Table 3: Results of the ARDL Bounds test for co-integration**

	Model	Cape-Verde	Lesotho	Nigeria	Senegal	Togo
Computed F-Statistics	$FD$	= 5.70027**	5.32**	2.64	-	2.53
	$LL^f$					
	$CR^f$	= 2.7824	4.52*	0.874	5.78**	4.07*
	Critical Values		Lower Bound			Upper bound
K=5; n = 25						
			10%			3.858
			5%			4.608
			1%			6.370

a<sup>9</sup>: Narayan (2005): Critical values for the bounds test: case III: unrestricted intercept and no trend. The asterisks indicated the level of significance: \*\*\*1%, \*\*5%, \*10%.

The results of the ADRL bounds co-integration tests are shown in Table 3. The computed  $F$ -statistics provided evidence to reject the null hypothesis of no co-integration at 5% significance level for the liquid liabilities model for both Cape-Verde and Lesotho. Similarly, the null hypothesis in the bank credit model is rejected at 5% significant level for Senegal, and at 10%

<sup>7</sup>Details of unit roots tests results available with authors.

<sup>8</sup>Alternative specifications of the DF-GLS tests as well as ADF and PP tests confirmed the robustness of the outcome.

<sup>9</sup>The critical values reported in Pesaran et al.(2001) are based on large sample sizes, thus, cannot be used for small sample sizes. Narayan (2004 a,b ) generates and reports new sets of critical values for small sample sizes ranging from 30 observations to 80 observations.

significant level for both Lesotho and Togo. As indicated in Table 3, the computed  $F$ -statistics for these models are above the upper critical value. There was no evidence to reject the null hypothesis of no co-integration in both models of financial development in Nigeria's case, in liquid liabilities model in Togo and bank credit model in Cape Verde, as indicated by the computed  $F$ -statistics below the lower critical bound even at 10% significant level. We can therefore, conclude from the foregoing findings from the ARDL bounds test that there is long-run relationship between remittances inflows and financial development and its other determinants in respective countries and models where the bounds tests rejected the null hypothesis of no co-integration. Given the mixed results, and to serve as robustness check of the ARDL results, we perform the Johansen's (1988, 1991) co-integration test for each country and each model of financial development. The results of the tests are presented in Table 4.

**Table 4: Johansen Maximum Likelihood Cointegration trace and eigenvalue test**<sup>10</sup>

A.							
		Model 1: $FD = LL^f$		Model 2: $FD = CR^f$		95% Critical Values	
Countries	H0	$\lambda_{trace}$	$\lambda_{max}$	$\lambda_{trace}$	$\lambda_{max}$	$\lambda_{trace}$	$\lambda_{max}$
Cape-Verde	$r = 0$	74.5619*	30.6568*	73.19*	28.6634	59.3300	29.9500
	$r \leq 1$	43.9051*	20.1727	44.52*	21.00	39.8100	23.9200
	$r \leq 2$	23.7324	16.5497	23.52	14.02	24.0500	17.6800
	$r \leq 3$	7.1827	5.7145	9.50	8.24	12.3600	11.0300
	$r \leq 4$	1.4682	1.4682	1.26	1.26	4.1600	4.1600
Lesotho	$r = 0$	86.42*	45.56*	73.01*	35.11*	59.3300	29.9500
	$r \leq 1$	40.86*	19.73	37.91	24.15*	39.8100	23.9200
	$r \leq 2$	21.12	14.45	13.75	9.86	24.0500	17.6800
	$r \leq 3$	6.67	6.62	3.89	3.81	12.3600	11.0300
	$r \leq 4$	0.05	0.05	0.08	0.08	4.1600	4.1600
Nigeria	$r = 0$	54.4809	26.8440	52.2103	22.9396	59.3300	29.9500
	$r \leq 1$	27.6369	13.3314	29.2707	14.7419	39.8100	23.9200
	$r \leq 2$	14.3054	9.4698	14.5288	10.3797	24.0500	17.6800
	$r \leq 3$	4.8357	4.5375	4.1490	3.5913	12.3600	11.0300
	$r \leq 4$	0.29817	.29817	.55778	0.55778	4.1600	4.1600
B.							
		Model 1: $FD = LL^f$		Model 2: $FD = CR^f$		95% Critical Values	
Countries	H0	$\lambda_{trace}$	$\lambda_{max}$	$\lambda_{trace}$	$\lambda_{max}$	$\lambda_{trace}$	$\lambda_{max}$
Senegal	$r = 0$	86.0662*	43.6362*	104.81*	60.7684*	59.3300	29.9500
	$r \leq 1$	42.4300*	24.1724*	44.0478*	25.5064*	39.8100	23.9200
	$r \leq 2$	18.2576	12.4762	18.5415	12.8251	24.0500	17.6800
	$r \leq 3$	5.7814	3.4709	5.7164	5.7028	12.3600	11.0300
	$r \leq 4$	2.3105	2.3105	0.013594	.013594	4.1600	4.1600
Togo	$r = 0$	72.4875*	36.1885*	78.6381*	47.6507*	59.3300	29.9500
	$r \leq 1$	36.2990	18.5724	30.9874	15.0207	39.8100	23.9200
	$r \leq 2$	17.7265	10.1100	15.9667	10.4036	24.0500	17.6800
	$r \leq 3$	7.6166	7.3184	5.5631	5.4894	12.3600	11.0300
	$r \leq 4$	.29823	0.29823	.073777	.073777	4.1600	4.1600

$r$  denotes the number of co-integrating equation ;  $\lambda_{trace}$  and  $\lambda_{max}$  respectively indicate Trace and Maximum Eigenvalue tests statistics; \* denotes rejection of the null hypothesis at the 0.05 level or below

As Table 4 indicates, the Johansen test corroborates the acceptance of the null hypothesis of no co-integration among remittances, financial development and its determinants in both models of financial development in Nigeria case. However, contrary to the bounds test result, Johansen co-integration test confirmed the existence of a long run relationship for both models

<sup>10</sup>Tests with no intercepts or trends in the VAR

of financial development for Cape-Verde, Lesotho, Senegal and Togo, all with differing co-integrating vectors in tests with no intercepts or trends in the VAR, and 1 lags selected by the Akaike Information Criteria (AIC).

On the strength of evidences collated from both the bounds and Johansen tests for co-integration, we conclude that unique level relationships exist for four countries of Cape-Verde, Lesotho, Senegal and Togo, and thus proceed to obtain the long and short run dynamic parameters for models represented by these countries' data. The empirical results of the long-run model obtained by normalizing on the respective financial development index are presented in Table 5.

The estimated coefficients of the long-run relationship show that remittances mostly had a significantly positive impact on financial development across the selected countries. In Cape-Verde, the coefficients of remittances turned out positive in both the liquid liabilities and bank credit model, but significant in the latter and insignificant in the former. For Lesotho, the liquid liabilities model of financial development is wrongly signed and insignificant, while the bank credit model exhibits a positive and significant response to changes in remittances inflows. In Senegal, remittances positively and significantly influence finance development in both model of financial development, while for Togo the liquid liabilities model is significant, but wrongly signed, while the bank credit model has a significant positive response to remittances inflows.

**Table 5: The ARDL Estimated Long-run Coefficients**

Dependent Variable		Model 1: $LL^f$		Model 2: $CR^f$	
Countries	Regressors	Long-run Coefficients	t-ratio[Prop]	Long-run Coefficients	t-ratio[Prop]
<b>A.</b>					
Cape-Verde	$Rem_t$	0.653	0.069[.944]	0.541	3.094[.003]
	$T_t^o$	-0.003	-1.053[.191]	-0.211	-0.18[.856]
	$Y_t^k$	0.442	2.514[.009]	0.136	2.929[.004]
	$\pi_t^v$	-0.110	-1.388[.173]	-0.072	-0.274[.784]
Lesotho	$Rem_t$	-0.245	-1.429[.157]	0.445	5.33[.000]
	$T_t^o$	0.112	2.584[.016]	-0.255	-1.55[.124]
	$Y_t^k$	-0.062	-0.848[.411]	1.110	0.675[.501]
	$\pi_t^v$	0.002	1.996[.040]	-1.233	-3.681[.001]
<b>B.</b>					
Senegal	$Rem_t$	-	-	0.421	4.532[.000]
	$T_t^o$	-	-	0.781	0.675[.501]
	$Y_t^k$	-	-	0.017	2.207[.030]
	$\pi_t^v$	-	-	1.333	1.774[.079]
Togo	$Rem_t$	-0.050	-2.489[.025]	0.237	2.097[.055]
	$T_t^o$	0.148	2.178[.046]	0.913	1.569[.139]
	$Y_t^k$	0.013	3.504[.002]	0.038	2.170[.047]
	$\pi_t^v$	0.222	-1.232[.221]	-0.505	-3.210[.007]

a. selected based on Akaike information criteria

In terms of signs and significance of estimated coefficients, migrants' remittances explained financial development better in the bank credit model of financial development than it does in the liquid liabilities model across the selected countries. This suggests a tacit support for the insinuations that the flows of credit to the private sector provide a better gauge of financial depth than are liquid liabilities of the financial system, as posited by Pill and Pradhan (1995) and Kablan (2010). The aggregates of findings of the study support the mainstream of empirical literature of near consensus of opinion on positive and significant effect of remittances on financial development, particularly as documented by Gupta et al (2009) for aggregates of sub-Saharan Africa.

Contrary to theoretical and empirical postulates of financial development enhancing roles of trade openness, the variable largely turned out to be insignificant in explaining financial depth in the selected countries, except in the liquid liabilities model in Senegal and Togo that indicated a significant positive effect of trade openness. This finding however find a tacit support in Klein and Olivei (1999) that find little evidence of financial globalization promoting financial development outside members of the OECD, while Chinn and Ito (2006) suggest that openness contribute to financial development only when a threshold level of general development of legal systems and institutions has been attained. The outcomes could therefore find justification in the rudimentary legal and institutional structures in virtually all the countries in this study.

The results from the growth variable generally provide support for the 'demand following' strand of the finance-growth literature (see Robinson, 1952; Romer, 1990; Stem, 1989). Besides some exceptions, Table 3 indicates that the growth in the real sector of the economy facilitated development in the financial sector.

Inflation volatility variable, which serves to proxy economic instability, produced mixed effects on financial development across the models and countries of study. For Cape Verde, it turned out insignificant in explaining financial development in both models. It conformed to theoretical expectations of dampening financial depth by exercising significantly negative effects on financial development in both models for Lesotho, in the liquid liabilities model for Senegal and the bank credit model in Togo.

In the next step, we obtain the estimates of the error correction model associated with the reported long-run estimates, as reported in Table 6.

**Table 6: Error Correction Representation for the Selected ARDL Model**

Dependent Variable		Model 1: $FD = LL^f$		Model 2: $FD = CR^f$	
Countries	Regressors	Long-run Coefficients	t-ratio[Prop]	Long-run Coefficients	t-ratio[Prop]
Cape-Verde		ARDL (1,0,0,0,1)a		ARDL (1,0,0,0,0)a	
	$\Delta Rem_t$	0.843	2.854[.011]	1.399	2.115[.037]
	$ecm(-1)$	-0.121	-3.229[.001]	-0.391	-2.177[.032]
Lesotho		ARDL (0,0,0,0,1)a		ARDL (1,1,1,0,1)a	
	$\Delta Rem_t$	0.446	3.079[.002]	0.783	2.058[.054]
	$ecm(-1)$	-0.421	-2.486[.015]	-0.238	-2.820[.008]
Senegal		ARDL (1,0,1,1,0)a		ARDL (1,0,0,1,1)a	
	$Rem_t$	-	-	0.051	2.453[.163]
	$ecm(-1)$	-	-	-0.107	-1.972[.011]
Togo		ARDL (1,0,1,1,0)a		ARDL (1,1,0,0,1)a	
	$Rem_t$	-1.822	-4.031[.001]	0.432	2.321[.034]
	$ecm(-1)$	-0.198	-3.815[.002]	-0.32	-3.118[.003]

With few exceptions, the coefficient estimates of the remittances variables are statistically significant and in line with the long-run estimates. In addition, the error correction terms have statistically significant coefficient and correctly signed. This, according to Bannerjee et al (1998) is a proof of the existence of stable long-term relationships, and thus confirms the existence of co-integration relationships among the models' variables. While deviations from the long-term measures of financial development are corrected as indicated by the sign and significance of the error correction terms, the size of the coefficients generally indicates slow speed of adjustment, ranging between 10.7 percent and 42.1 percent in the liquid liabilities model, and 14.8 percent and 49.2 percent in the bank credit model.

The models were examined and certified to have satisfied basic diagnostic tests for serial correlation, functional form, normality and heteroscedasticity. The plots of CUSUM statistics remain within the critical boundaries of the 5% significance level, confirming the stability of the estimated coefficients of the error correction model as indicated in Table 7<sup>11</sup>.

## 6. SUMMARY, CONCLUSION AND IMPLICATIONS FOR POLICY

The study provides the first attempt at examining the financial development prospects of the burgeoning growth of migrants' remittances to countries of sub-Saharan Africa, utilizing data at the country level, and particularly for Cape-Verde, Lesotho, Nigeria, Senegal and Togo, which had records of phenomenal profile of remittances inflows into their domestic economy. While the outcomes of the study is subject to the general caveats on quality of remittances data, the study documented the existence of long-run level relationships between remittances and financial development, and evidences in favor of the financial development promoting role of remittances for Cape Verde, Lesotho, Senegal and Togo, but not for Nigeria.

For policy, efforts directed at stimulating remittances flows particularly through the formal banking channels are advocated. To this end, reduction of transfer costs, and more liberal regulatory requirements that encourage and facilitate to the extent possible the uninterrupted flow of these private transfers are important in these countries. Financial institutions, especially banks, can activate the investment and growth channels of migrants' remittances in these countries by developing migrants' friendly financial products to enhance the proportion of remittance flows that find investment vehicles in the domestic financial system. Also important for overall health of the financial system in these countries are adequate institutions, regulatory strengthening and sound macroeconomic policies.

## REFERENCES

- [1] Adams, Jr, Richard. (1998). Remittances, Investment and Rural Asset Accumulation in Pakistan. *Economic Development and Cultural Change*, 47 (1): 155-173.
- [2] Adams, R.H. (2004). Remittances and poverty in Guatemala. World Bank Policy Research Working Paper No.3418. WorldBank, Washington.
- [3] Aggrawal, R., Demirguc-Kunt, A., and Martinez Peria, M.S. (2010). Do Remittances Promote Financial Development?" *Journal of Development Economics*. Doi:10.1016/j.jdeveco. 2010.10.00 (forthcoming).
- [4] AITE. 2005. Consumer Money Transfers: Powering Global Remittances.
- [5] Bannerjee, A., J. Dolado and R. Mestre. (1998). Error-correction mechanism tests for cointegration in single equation framework. *Journal of Time Series Analysis*, 19: 267-83.
- [6] Beck, T., Demirguc-Kunt, A and Levine, R. (2010). Financial Institutions and Markets Across Countries and over Time: The Updated Financial Development and Structure Database. *The World Bank Economic Review*, Vol. 24, No.1, pp. 77-92.
- [7] Beck, Thorsten. (2009). *The Econometrics of Finance and Growth*. In Terrence Mills and Kerry Patterson, eds., *Palgrave Handbook of Econometrics*. Vol.2.. Hampshire, U.K.: Palgrave Macmillan.
- [8] Bollerslev, T. (1986). Generalised Autoregressive Conditional Heteroskedasticity, *Journal of Econometrics* 31, 307—27.
- [9] Boyd, J., R. Levine, and B. Smith. (2001). The Impact of Inflation on Financial Sector Performance. *Journal of Monetary Economics* 47: 221-248.

---

<sup>11</sup>Details of diagnostics tests are available from authors.



- [10] Chinn, Menzie D., Ito, Hiro, (2002). Capital Account Liberalization, Institutions, and Financial Development: Cross Country Evidence. NBER Working Paper, p. 8967.
- [11] Chinn, Menzie D., Ito, Hiro, (2006). What matters for financial development? Capital controls, institutions, and interactions. *Journal of Development Economics* 81, 163–192.
- [12] Conway, Dennis, and Jeffrey H. Cohen. (1998). Consequences of Return Migration and Remittances for Mexican Transnational Communities. *Economic Geography* 74(1):26-44.
- [13] Cox, E. A., Ureta, M. (2003). International migration, remittances, and schooling: evidence from El Salvador. *Journal of Development Economics* 72, 429–461.
- [14] Demirgüç-Kunt, A., Cordova, E.L, Peria, S.M and Woodruff, C. (2010). Remittances and banking sector breadth and depth: Evidence from Mexico”, *Journal of Development Economics*. doi:10.1016/j.jdeveco.2010.04.002.
- [15] Elliot, G., T.J. Rothenberg and J.H. Stock. (1996). Efficient tests for an autoregressive unit root. *Econometrica*, 64: 813-36.
- [16] Esquivel, Gerardo, and Huerta-Pineda, Alejandra. (2007). Remittances and poverty in Mexico: a propensity score matching approach. *Integration & Trade Journal*: 27, 45–71.
- [17] Fajnzylber, P., López, H. (2008). *Remittances and Development: Lessons from Latin America*. World Bank, Washington, DC.
- [18] Freund, C. L. and N. Spatafora, (2005) “Remittances: Costs, Determinants, and Informality,“ World Bank Policy Research Working Paper No. 3704, Washington, DC.
- [19] Ghatak S. and J. Siddiki. (2001). The use of ARDL approach in estimating virtual exchange rates in India. *Journal of Applied Statistics.*, 28: 573-583.
- [20] Giuliano, P, and Ruiz-Arranz, M. (2009). Remittances, financial development, and growth. *Journal of Development Economics* 90 (1), 141–152.
- [21] Gulde, A. M., Pattillo, C., Christensen, J., Carey, K., & Wagh, S. (2006). *Sub-Saharan Africa: Financial sector challenges*. Washington, DC: International Monetary Fund.
- [22] Gujarati, D. N. (1995) *Basic Econometric*, (3rd eds), New York: McGraw-Hill.
- [23] Gupta S, Pattillo C.A and Wagh S. (2009). Effect of Remittances on Poverty and Financial Development in Sub-Saharan Africa. *World Development*. Volume 37, No. 1, pp. 104 – 115.
- [24] Hildebrandt, N., McKenzie, D.J. (2005). The effects of migration on child health in Mexico. World Bank Policy Research Working Paper 3573. World Bank, Washington.
- [25] Kablan, S. (2010). Banking Efficiency and Financial Development in Sub-Saharan Africa. IMF Working Paper series WP/10/136 International Monetary Fund.
- [26] Ketkar, S., Ratha, D. (2001). Development financing during a crisis: securitization of future receivables. Policy Research Working Paper. vol. 2582. World Bank, Washington, DC.
- [27] Klein, M.W., Olivei, G. (1999). Capital account liberalization, financial depth and economic growth. NBER Working Paper No. 7384.
- [28] Levine, R. (2005). Finance and growth: Theory and evidence. in P. Aghion and S. N. Durlauf (eds.) *Handbook of Economic Growth North-Holland*.
- [29] López Córdova, Ernesto, 2005. Globalization, migration, and development: the role of Mexican migrant remittances. *Economía* 6, 217–245 (Fall).
- [30] Martínez Pería, M.S.; Y. Mascaró and F; Moizeszowicz. (2007). Do Remittances Affect Recipient Countries’ Financial Development?. In *Remittances and Development: Lessons from Latin America*. Fajnzylber, P. and H. López, eds. Washington DC: The World Bank: 171-215.
- [31] Massey, D., Parrado, E. (1998). International migration and business formation in Mexico. *Social Science Quarterly* 79, 1–20.
- [32] Mundaca, Gabriela B. (2005). Can Remittances Enhance Economic Growth? The Role of Financial Markets Development.” Mimeo. University of Oslo.
- [33] Narayan, P. K. (2004a). The saving and investment nexus for China: Evidence from cointegration test. *Applied economics*, 37,1979–1990.
- [34] Narayan, P. K. (2004b). The structure of tourist expenditure in Fiji: Evidence from unit root structural break tests. *Applied Economics*, 37, 1157–1161.
- [35] Narayan, P. K. (2005) Reformulating critical values for the bounds F-statistics approach to cointegration: an application to the tourism demand model for Fiji. Department of Economics Discussion Papers N0.02/04, Monash University, Melbourne, Australia.
- [36] Orozco, Manuel and Rachel Fedewa. (2005). *Leveraging Efforts on Remittances and Financial Intermediation*. Report Commissioned by the Inter-American Development Bank.
- [37] Pesaran, M.H., Shin, Y., (1995), “An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis”, DAE Working Paper no 9514. Department of Applied Economics, University of Cambridge.
- [38] Pesaran, M. H., & Pesaran, B. (1997). *Working with Microfit 4.0: Interactive econometric analysis*. Oxford: Oxford University Press.

- [39] Pesaran, M.H., and Y. Shin. (1999). An autoregressive distributed lag modelling approach to cointegration analysis". In S. Strom (ed), *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium*, Cambridge, Cambridge University Press.
- [40] Pesaran, M.H., Shin, Y., Smith, R.J. (1996). *Testing for the Existence of a Long Run Relationship*. University of Cambridge, Cambridge.
- [41] Pesaran, M. H., Shin, Y. C., & Smith, R. (2001). Bound testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16, 289–326.
- [42] Pill, H. R., and M. Pradhan. (1995). *Financial Indicators in Africa and Asia*. IMF Working Paper 95/123 (Washington: International Monetary Fund).
- [43] Rapoport, H. and Docquier, F. (2005). 'The economics of migrants' remittances', IZA Discussion Paper No. 1531, IZA, Bonn.
- [44] Robinson, J. (1952). *The generalization of the general theory, in the rate of interest and other essays*. London: Macmillan.
- [45] Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy*, 98, S71–S102.
- [46] Shahbaz, M., Qureshi, M.N., and Aamir, N. (2007). Remittances and Financial Sector's Performance: Under Two Alternative Approaches for Pakistan. *International Research Journal of Finance and Economics*. Issue 12. EuroJournals Publishing, Inc.
- [47] Stem, N. (1989). The economics of development: A survey. *The Economic Journal*, 100, 597–685.
- [48] Taylor, J.E. (1992). Remittances and Inequality Reconsidered: Direct, INDirect and Intertemporal Effects. *Journal of Policy Modelling*, vol. 14, no. 2. 187-208.
- [49] Woodruff, C. and R. Zenteno. (2001). Remittances and microenterprises in Mexico. UCSD Graduate School of International Relations and Pacific Studies Working Paper. San Diego, CA.
- [50] Woodruff, C. and R. Zenteno. (2007). Migration Networks and Microenterprises in Mexico. *Journal of Development Economics* 82, 509-528.
- [51] World Bank.(2009). *Migration and Remittances Factbook 2008* (Washington: World Bank).
- [52] World Bank. (2011). *Migration and Remittances Factbook 2011* (Washington: World Bank).
- [53] Yang, D. (2005). International migration, human capital, and entrepreneurship: evidence from Philippine migrants' exchange rate shocks. World Bank Policy Research Working Paper 3578. WorldBank, Washington.