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Remittances and Financial Development in Africa

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Remittances and Financial Development in Africa

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Abstract

Despite the magnitude of remittances as an alternative source of investment financing in Africa, the financial sector in Africa has significantly remained underdeveloped and unstable. Finding a solution to Africa's financial deregulation problems has proved tenacious partly because of inadequate literature that explain the nature of Africa capital and financial markets which has shown to be unorganised, spatially fragmented, highly segmented and invariably externally dependent. We examine the structural linkages between remittances and financial sector development in Africa. Panel data on indices of remittances was regressed on indices of financial sector development in fifty-three (53) African countries from 1986 through 2017 using the Pooled Mean Group (PMG) estimation procedure. We accounted for cross-sectional dependence inherent in ordinary panel estimation and found a basis for the strict orthogonal relationship among the variables. Findings revealed a positive long-run relationship between remittances and financial development with a significant (positive) short-run relationship. It is suggested that, while attracting migrants' transfers which can have significant short-run poverty-alleviating advantages, in the long run, it might be more beneficial for African governments to foster financial sector development using alternative financial development strategies.

1.0 Introduction

Africa ranked among the worst poverty hit continent around the world. Policymakers and the society at large want to ensure policy measures and implementations are synonymous to the growth agenda within the continent. Despite a surge in the growth of African migrant around the world, experimental proof of how remittances inflow to Africa induces changes in financial development in Africa remains dimly discerned. This study leaned empirical credence to the role of remittances in financial development in Africa to come up with findings that can redefine policy and research on the subject matter.

The magnitude of remittances inflow to African countries is large enough to be categorised an essential and alternative source of investment financing (Adekunle, Williams, Omokanmi &Onayemi, 2020). After foreign direct investment (FDI), migrants' remittances to recipient countries have become the second-largest source of external finance for African countries. It represents about twice the amount of official aid received and portfolio investment, both in absolute terms and as a proportion of GDP (Fig. 1). The volume, magnitude and unprecendented stability of remittances inflow to Africa and other developing nation as seen prominent researachers, policymakers, institutions and the society at large analysed their development impact along various dimensions, including poverty (Acosta, Calderón, Fajnzylber, & Lopez, 2008; Adams, 2011; Adams & Cuecuecha, 2013; Adams & Page, 2005; Bertoli & Marchetta, 2014; Gupta, Pattillo, & Wagh, 2009); inequality (Akobeng, 2016; Barham & Boucher, 1998; Howell, 2017; Jones, 2006; Jr, Cuecuecha, & Page, 2008; Wouterse, 2010); growth outcomes (Gapen, Chami, Montiel, Barajas, & Fullenkamp, 2009; Giuliano & Ruiz-Arranz, 2009; Le, 2009; Meyer & Shera, 2017); education (Dustmann & Glitz, 2011; Gyimah-Brempong & Asiedu, 2015; Zhunio, Vishwasrao, & Chiang, 2012); infant mortality (Chauvet, Gubert, & Mesplé-Somps, 2009; Kanaiaupuni & Donato, 1999; Terrelonge, 2014), and entrepreneurship (Amuedo-Dorantes & Pozo, 2006; Finkelstein Shapiro & Mandelman, 2016; Naudé, Siegel, & Marchand, 2017). However, little attention has been paid to the remittances-financial development relationship in Africa.

Remittances are usually voluminous; as such recipient countries require financial intermediation process that allows for safekeeping of their monetary inflows in the form of bank deposits regardless of whether this fund came through formal means (banks and not through families and friends). For remittances inflows that went through the conventional banking system, the potential to learn and demand other associative bank services are

substantial. Engaging in remittances transfer service also increases the possibilities of financial intermediaries (banks and credit outlets) to reach out to unbanked recipients with limited financial intermediation needs. Although remittances can help relax individuals' financing constraints at some time, they might also lead to reduced motives for credit holdings which induce a stagnated credit market growth(Adekunle, Elekeokwuri&Onanyemi, 2020). Succinate rise in remittances inflow to Africa does not translate to increase in nominal credit to the private sector when the funds are used to finance state or government activities (Tanzi, 2008). Also, remittances injection does not lead to financial development when banks refused to lend out either for hedging purposes or arbitrage motives. Consumption remittances, recipient distrust in financial institutions are other forms of scenarios where remittances inflow does not translate to financial development. How all these works in practice and literature has not been studied. It will be interesting to know whether and how remittances predict variations in financial development in Africa.

Despite the growing literature on the remittances discourse, it is surprising to know that there are not enough studies that explain the structural changes in financial development in Africa as induced by the volume and magnitude of remittances inflow to Africa. Only a few studies by Coulibaly (2015); Karikari, Mensah, and Harvey (2016); Williams (2016) Olayungbo and Quadri (2019) and Tah (2019) has documented empirical evidence on the remittances-financial development relationship in Africa. However, most of those studies except Karikari, Mensah, and Harvey (2016) were conducted in Sub-Saharan Africa (SSA), leaving out North African countries (Egypt, Algeria, Tunisia, Morroco and Libya). It is interesting to know that Egypt ranked the highest remittance recipient Africa country with an estimated $29Billion as of 2018 (The World Bank, 2011). It becomes apt to include Egypt and other North African neighbours in an estimate that exemplifies the remittance induced financial development in Africa. In this study, we contributed to the literature of remittances and financial development by including North African countries (Egypt, Algeria, Tunisia, Morroco and Libya) which previous studies omitted in the discussion of remittances inflow in Africa. Egypt ranked the largest recipient of remittances in Africa, while other North Africa countries receive a significant proportion of remittances inflow to Africa. To omit these North African nations in a discussion of remittances inflow in Africa are the major oversight of the previous discourse of how remittances predict variations in financial development in Africa.

In this paper, we estimated a balance data on remittance inflows to fifty-three (53) African countries over the period 1986 through 2017 to examine the underlying latent factors of

variations in financial sector development in Africa as induced by remittances inflow. Whether and how remittances might predict variations in financial development remainsambiguous. We also address the concerns of endogeneity biases, emanating from error in measurement of variables, reverse causation, and problems of omission of critical explanatory variables which has made previous empirical shreds of evidence on the remittances-financial development argument mostly anecdotal.

[Figure 1 near here]

As noted by Chin and Wilcox (2010), there is a significant complication in empirically studying the impact of remittances on financial development. The potential for endogeneity biases (problems of cross-sectional dependence inherent in the ordinary panel data estimation) emanating from error in measurement of variables, reverse causation, and problems of omission of critical explanatory variables have made empirical shreds of evidence on the remittances-financial development argument mostly anecdotal. Data on remittances are known to be measured with error because of the dynamic nature of remittances inflow, particularly those that do not go through the formal banking system (Chin, Karkoviata, & Wilcox, 2011). The balance of payments data on remittances lean towards a more accurate record of workers remittances sent through financial institutions and, in most cases, ignore those sent through non-financial institutions and informal channels (e.g., family and friends). Evaluations of unrecorded transfers range from 50 to 250% of official statistics on remittances (Ratha, Mohapatra, & Silwal, 2011). Problems of reverse causation are huge and call for critical examination in the remittances-financial development discourse since more significant financial development might lead to more substantial remittances inflow either because financial development enables remittance flows or because a more significant percentage of remittances are measured when those remittances are sent through registered financial institutions. Besides, financial development might lower the cost of transmitting remittances, leading to an increase in such flows (Makina, 2013). To conclude, key omitted factors can be essential in explaining both the evolutionary nature of remittances and financial development, and this could lead to biases in the estimated impact of remittances on financial development if not adequately addressed.

We address the concerns using several different empirical approaches. First, we conduct estimations, including country and time fixed effects to account for unobserved country characteristics and frequent shocks and trends across African countries. Second, to mitigate

the concern that the link between remittances and financial development might be tautological because data of balance of payment on remittances primarily capture intermediated by banks, we estimated our model on a larger sample of African countries based on a survey from the World Bank (Irving *et al.*, 2010). We estimated the model lagging the regressors in their one period time value and then conduct the pooled mean group (PMG) estimation as in Pesaran, Shin, and Smith (2006); Onanuga, Odusanya and Adekunle (2020), with the, accommodated lagged regressors as instruments to address the concern of reverse causality. The instrumental variable introduced in the model addresses the concern of potential endogeneity biases, and subsequently, we test for common factor restriction.Having introduced the study, the rest of the paper is organised as follows. Section 2 discusses the literature review in terms of theoretical underpinning and empirical evidence in a chronological order to show the historical progression on the subject matter. Section 3discusses the data used and the methodology pursued to study the link between remittances and financial development. Section 4 presents the empirical results and discusses the findings, while Section 5 concludes.

2.0   Literature Review

Theoretical Review

Ample theoretical underpinning on remittances-financial development is presented in chronological order. Such theories range from the optimistic view, pessimistic argument, two-gap model and the endogenous growth model. The remittances optimist include but not limited to; Kindleberger (1959), Todaro (1969), and Beijer (1970). The optimist views garnered momentum since the 1950s and 1960s, argued that returning migrants were seen as central agents of change and innovation. People migrate with the motive of sending home money and innovative ideas, knowledge and entrepreneurship skills that could be used to jump-start development processes. (de Haas, 2014). These altruistic motives of remittances inflow are categorised as central to the solution of household maximisation problem, which involves utility maximisation as a result of the change in households' income level, capital injection for investment purposes and the introduction of the knowledge economy as in the technological change model (Kindleberger, 1959).

Contrastingly, the non-altruistic argument of the pessimistic view began to surface late in the 1970s and 1980s. They argued that migration and subsequently, workers remittances create a

vacuum of underdevelopment in recipient countries of origin (Fayissa & Nsiah, 2010). Problems of brain drain, moral hazards, dumping grounds, overdependence on foreign capital flow makes recipient countries largely underdeveloped (Lartey, 2013). It is important to note that remittances inflow to African countries and has resulted in the underdevelopment of African nations. Most of the remittances inflow are politically inclined and subsequently leads to problems of rent-seeking (Klein & Rodney, 1974). African primary resources to develop are exported to Europe and exchange for secondary products which worsen the BoP on the international market. To develop the financial sector in Africa, African countries must look inward to create an enabling environment that foreign inflow of funds can leverage upon. Experimental proof of the inward solution to the challenges of African development becomes expedient and the focus of this paper.

Harrod-Domar propounded the two-gap model as in Easterly (1999). The two-gap model argued that shortage of domestic saving to match investment opportunities or inadequate foreign exchange to finance required import of capital and intermediate goods are the first problems facing the most developing nation (Todaro and Smith, 2012). This assertion is at the peak in African countries because of the low level of income, credit insecurity, problems of insurgency, insecurity and illicit flow of funds. The two-gap implications of foreign exchange imply that external finance which could be in the forms of external borrowing, official development assistance or remittances inflow can play a crucial role in supplementing inadequate domestic resources required to grow the financial sector in Africa. This study leans empirical credence to the remittances-financial development relationship in Africa. It remains to be established if remittances induce financial development in Africa.

Empirical Review

As important as financial development to the realisations of the growth and development objectives in Africa, few empirical studies have leaned credence to the structural dynamics in the remittances-financial development nexus in the continent. This study observes conflicting and anecdotal empirical evidence in the remittances-financial development literature in Africa. We build upon this anomaly and provide theory and policy consistent estimates on the remittances-financial development relations in Africa.

In the submission of Giuliano and Ruiz-Arranz (2009)who studied the links between remittances and growth, remittances induce growth in less developed countries. Further evidence revealed that there could be an investment channel through which remittances

promote growth. In other climes,Esteves and Khoudour-Castras (2011) address whether financial flows received by emigration countries contributed to domestic financial development in Europe before 1914 using Pooled Ordinary Least Square Regression (Pooled OLS). Findings revealed a positive influence of remittances on domestic financial development. For Fayissa and Nsiah (2010)who explored the aggregate impact of remittances on the economic growth of 18 Latin American countries and found that remittances positively and significantly affect the growth of Latin American countries where the development of the financial systems are inadequately met. In the work of Cooray (2012)who carried out an empirical investigation on the influence of migrant remittances on size and efficiency of the financial sector, in ninety-four (94) non-OECD economies using pooled OLS and system GMM estimation procedure,results revealed that migrant remittances contribute to increasing the size and efficiency of the financial sector. In a similar but distinct study, Yaseen (2012) observe the impacts of remittances on economic growth in MENA countries (Algeria, Egypt, Jordan, Libya, Morocco, Oman, Syria, Lebanon and Tunisia) from 2000 to 2010, and found a significant increase in remittance inflows to induce growth outcome in the sampled countries. Imai *et al*. (2014) analysed the effects of remittances on the growth of GDP per capita for 24 Asian and Pacific countries from 1980 to 2009 and found that the volatility of capital inflows contributes to economic performance.

Within the South Asian context, Cooray (2012), investigated the impact of migrant remittances on economic growth and found remittances to affect economic growth positively. In Nigeria, Akonji and Wakili (2013) investigated the impact of net migrant remittance on economic growth and found a significant long-run relationship between net remittance and economic growth.Keong Choong and Yin Koay (2013) investigated the nexus between remittance and economic growth in Malaysia from 1975 to 2009 and found that remittances and financial development are statistically significant in affecting the economic growth in both short-run and long-run. Gazdar and Kratou (2012) studied the effect of remittances on economic growth in 24 African countries from 1998 to 2011 and found complementarity between financial development and remittances for economic growth. Kibet and Agbelenko (2015) understudied the relationship between financial development and economic growth in the West African Economic and Monetary Union (WAEMU) from 1981 to 2010. The result shows a positive and statistically significant effect of financial development on economic growth. Karikari*et al.* (2016) explored the causality between remittances and financial

developments in some countries in Africa and found remittances to positively and significantly influence financial development.

Taking a more narrow perspective and beyond growth and development reactions to remittances inflow, Motelle (2011) studied the effect of remittance on financial development in Lesotho and found that remittances have a long-run relationship with financial development. Although the analysis was based on the vector error correction mechanism (VECM), which is a short-run estimation procedure, this study provided other dimensions to estimate long-run cross-country variances in the remittances-financial development literature to offer robust and widepolicy-consistent outcomes. Coulibaly (2015) investigates the causal relationship between remittances and financial sector development in SSA using the Panel Granger Causality testing approach that is based on seemingly unrelated regressions (SUR) multivariate systems and Wald tests with country-specific bootstrap critical values to estimate annual data from 1980 to 2010 for nineteen (19) SSA countries. Results revealed that remittances positively influence financial development in Niger, Senegal, Sierra Leone and Sudan. Financial development positively impacts remittances only in the Gambia. Results also show that remittances positively affect financial development in Sudan and no substantial evidence supporting the view that remittances promote financial development in SSA countries and vice-versa. Akobeng (2016) appraise remittances effectiveness in Africa. By controlling for time-invariant country-specific effects and endogeneity, the study found that remittances reduce poverty. Additionally, remittances have income-equalising effects. A well-functioning financial sector enhances remittances effectiveness in Sub-Saharan Africa. The study adopts various measures of poverty which are likely to be correlated and thus violating the assumptions of the classical linear regression model. Williams (2016) examined the effect of remittances on financial development in Sub-Saharan Africa (SSA). The study further examines whether and how democratic institutions mediate the effect of remittances on financial development. Findings revealed that remittances are significantly positively associated with financial development. The 5-year overlapping data estimates are questionable and make the results emanating from the study, mostly unfounded. The study used the dynamic system GMM to generate the parameter estimates of the model using a time series of forty-three (43) years in forty-five (45) SSA countries. However, system GMM is well built to function in a short term panel analysis with more significant cross-section and smaller time series characteristics that does not exceed 25 (see Blundell & Bond, 2000; Roodman, 2009 for an extensive review). Olayungbo and Quadri (2019) examined the

relationship between remittances, financial development and economic growth in SSA. They adopt the Pooled Mean Group and Mean Group/ARDL estimations to estimate panel data of key indices from twenty (20) Sub-Saharan Africa countries from 2000 and 2015. They argued that remittances and financial development are positively related to economic growth both in the short-term and the long-run. They also reported a unidirectional causal relationship from GDP to remittances and from financial development to GDP. The focus of their study was at variant to the current study as it does not explain the determinant of financial development in Africa. Instead, they have explained growth outcomes in Africa using depth of financial development as an explanatory factor in their growth model. It should be noted that a sample frame of 2000 to 2015 can not be estimated using the Pool Mean Group (PMG) estimation procedure as it will run into problems relating to degree of freedom. The Pool Mean Group (PMG) procedure is a variant of the panel Auto-Regressive Distributed Lag models (Panel ARDL), and they are used to estimate long term panel with broad observation (Pesaran *et al.*, 1999). This present study builds upon inadequacies of the previous study to present crystal clear output elasticities in the remittances-financial development model developed. The dynamic heterogenous panel model adopted in this study takes a lead approach in estimating cross-country variances in a large panel data framework.

3.0 Methodology

Theoretical Framework and Model Specification

In estimating the baseline relationship between remittances and financial development, the study follows the dual gap theoretical model. It argued that developing countries could use foreign inflow of funds to achieve equilibrium in their saving-investment gap. The equilibrium position of the two-gap model gives saving equals investment at all time as:

$$S_t = I_t \qquad \textbf{(1)}$$

African countries are characterised by low saving with high investment objectives causing a vacuum (saving gap); thus creating a function for the foreign inflow of fund (remittances) to bridge the investment deficit:

$$S_{it} + REM_{it} = I_{it} \qquad \textbf{(2)}$$

Invariably, we re-evaluate our capital stock function to include remittances inflow to Africa:

$$K_{it} = S_{it} + REM_{it} + (1 - \delta)K_{it-1} = I_{it} \quad \textbf{(3)}$$

Expressing the capital stock equation in a Cobb-Douglas production function, we have:

$$Y_t = AL_{it}^{1-\propto}K_t^{\propto} \qquad \textbf{(4)}$$

Where Y_t is the financial sector development measured with the growth of nominal credit to the private sector; L_t is labour proxied with labour participation rate and K_t is the capital stock proxied with gross fixed capital formation. An extension of the dual gap theory to include the predictive capacity of remittances inflow as it induces changes in financial development in Africato have the functional form of the model to be;

$$FD_{it} = A + \sum_{i=1...54}^{n=1} \gamma_n AL_{it} + \sum_{i=1...54}^{n=1} \pi_n K_{it} + \sum_{i=1...54}^{n=1} \omega_n REM_{it} + \sum_{i=1...54}^{n=1} \beta_n EXC_{it} + \mu_{it}$$

$$\textbf{(5)}$$

Where

where γ, π, ω and β, are the elasticities of human capital (L), physical capital (K), remittances inflow and control variable (exchange rate) respectively. FD_{it} is financial development in Africa countries, A is the efficiency of the productive economy, AL is labour force or the working population, k_t is domestic capital stock, REM is remittances inflow, i is cross-sectional characteristics, and t is the time series characteristics of the data set (1986-2017). Given the purpose of this study which is to examine the effect of remittances on financial development in Africa, we take the semi-logarithms and time derivatives of equation **(5)** to generate the following dynamic function:

$$lnFD_{it} = A + \sum_{i=1...54}^{n=1} \gamma_n AL_{it} + \sum_{i=1...54}^{n=1} \pi_n lnK_{it} + \sum_{i=1...54}^{n=1} \omega_n RlnEM_{it} + \sum_{i=1...54}^{n=1} \beta_n EXC_{it} + \mu_{it}$$

$$\textbf{(6)}$$

In drawing inferences from the model specified, this study attempts to validate or refute the following hypotheses, *ceteris paribus*

H$_{01}$: remittances have no significant relationship with financial development in Africa

3.2   Data Sources and Measurements

Our study used panel data for fifty-three (53) African countries from 1986 through 2017. The choice of countries is guided by the desire to limit attention to Africa countries, and by the availability of reliable data on aggregates of financial development and remittances inflow. Financial development was measured using nominal credit to the private sector as used in the work of De Gregorio and Guidotti (1995); Giuliano and Ruiz-Arranz (2009); Levine (1997). Remittances inflow was measured with the net inflow of remittances to the recipient country as used in the work of Chowdhury (2011); labour was measured using labour participation rate as in the work of Mehrotra and Parida (2017); the capital stock was measured using gross fixed capital formation as used in the work of Wurgler (2000), and exchange rate was measured using the nominal exchange rate as used in the work of Oseni, Adekunle and Alabi (2019). The data are mainly obtained from the World Bank Database (World Bank, 2017). The variables of the study and their respective descriptions and sources are contained in Table 1.

[Table 1 near here]

Estimation Technique

In accounting for the dynamics of remittances and financial development in Africa, the study first conducted the pre-estimation tests (descriptive statistics, correlation matrix) and the panel unit root test was conducted to ascertain the characteristics of the variables.

Secondly, we estimated the Pool Mean Group estimation (PMG). The PMG model consists of averaging separate estimates for each group in the panel. According to Pesaran and Smith (1995), this estimator provides consistent estimates of the parameters' averages. Bangake and Eggoh (2012) also show that the mean group estimator provides efficient long-run estimators for a large sample size. Thereby permitting the parameter estimates to be freely independent across groups and does not consider potential homogeneity between groups. Unlike the random effects, fixed effects and GMM methods, which force the parameters to be identical across countries and thus, leads to inconsistent and misleading long-term coefficients, a possible problem that is exacerbated when the period is extended, the PMG allows for stability among group estimates (Pesaran et al., 1999).

Pesaran and Smith (1995) proposed a transitional estimator that allows for the short-term parameters to differ between groups while still imposing equality of the long-term

coefficients between countries. One advantage of the PMG is that it can allow the short-run dynamic specification to differ from country to country while making the long-run coefficients constrained to be the same. Furthermore, unlike the Dynamic Ordinary Least Square (DOLS) and Fully Modified Ordinary Least Square (FMOLS), the PMG estimator highlights the adjustment dynamic between the short-run and the long-run. The reasons for assuming that short-run dynamics and error variances should be the same tend to be less compelling. Not imposing equality of short-run slope coefficients allows the dynamic specification to differ across countries. Therefore, the long-run relationship between investment and savings is expected to be identical from country to country, but the short-run coefficients are expected to be country-specific. The null hypothesis of the homogeneity in the long-run coefficients can be verified with the Hausman test. Assuming that remittances and financial development are $I(1)$ and cointegrated, μ_{it} is supposed to be I(0) for all i and is independently distributed across t. The choice of the lag length is based on the literature on the relationship between remittances and financial development and confirmed by the Akaike Information Criterion (AIC).

4.0 Results

The summary statistics result in Table 2 shows the mean and median values of the variables in the panel dataset lie within the maximum and minimum values indicating a high tendency of the normal distribution. All the variables are positively skewed. The kurtosis statistics showed that all the variables were platykurtic, suggesting that their distributions were flat relative to a normal distribution (values are less than 3) except for physical capital having a value greater than 3, hence, leptokurtic. The Jarque-Bera statistics shows that the series is normally distributed since the p-values of all the series are not statistically significant at 5% level. Thus, we have to accept the alternate hypothesis that says each variable is normally distributed.

[Table 2 near here]

Levin–Lin–Chu (LLC) Test

The Levin, Lin, and Chu (2002) suggest the following hypotheses for testing stationarity in panel data. Under the null hypothesis, LLC test shows that each time series contains a unit root, i.e., $H_0 : \rho_i = 0 \ \forall \ i$, and for the alternative hypothesis, each time series is stationary, i.e., $H_A : \rho_i = \rho < 0 \ \forall \ i$. Like other unit root tests in the literature, by Levin, Lin, and Chu

(2002) assume that the individual processes in each cross-section are independent. The LLC test is based on the estimation of the following equation;

$$\Delta Y_{it} = \alpha_i + \delta_{it} + \theta_t + \rho_i y_{it-1} + \varsigma_{i,t} \tag{7}$$

Where i=1, 2 …. N, t=1, 2 …T

This test can be treated as a Pooled Dickey-Fuller or Augmented Dickey-Fuller test potentially with different time lags across the cross-section of the panel.

Im–Pesaran–Shin (IPS) test

The IPS test formulated by Im, Pesaran, and Shin (2003) is the extension of LLC test incorporating heterogeneity in the dataset under the alternative hypothesis. The null hypothesis is stated as $H_0 : \rho_i = 0 \; \forall \; i$ against the alternative hypothesis of $H_A: \rho_i < 0$ where i= 1, 2, 3, …, N_1; ρ_i= 0, i= $N_1 + 1$, $N_1 + 2$, …, N.

In the IPS test, it is presumed that all series is non-stationary under the null hypothesis and a fraction of the series is stationary under the alternative hypothesis. It is the difference with by Levin, Lin, and Chu (2002) test, in which all series are supposed to be stationary under the alternative hypothesis.

The outcomes of Levin-Lin (LL) and the Im-Pesaran-Shin (IPS) test are shown in Table 3. All tests confirmed that variables were non-stationary at levels and are stationary after first difference except government revenue. It is as a result of this inferred that variables are first differenced stationary. These empirical outcomes did not only uncover the non-stationary properties of all the variables but also established a solid foundation for panel cointegration analysis. This is indispensable in this research because applying regressions on non-stationary variables can give misleading parameter estimates in the economic relationship among variables.

[Table 3 near here]

Table 4 affirms that there is no co-integration relationship among the economic variables using Pedroni and Kao residual co-integration test. Therefore, it is concluded that the dynamic panel regression model reveals the no long-term relationship among economic variables. Hence, we proceed to the pool mean group estimator for consistent long-run averages.

[Table 4 near here]

Pool Mean Group Estimation

In analysing the impact of remittances on financial development in Africa, we rely on the work of Pesaran *et al.* (2006) which provided two essential techniques in estimating non-stationary dynamic panels in which the parameters are heterogeneous across groups. They include the Mean Group (MG) estimator and the Pooled Mean Group (PMG) estimator.

In this paper, we place more emphasis on the PMG estimator. The Pooled Mean Group (PMG) combines the pooling and averaging coefficients Pesaran *et al.* (2006). The PMG constrains the long-run elasticity to be equal across all panels, which yield efficient and consistent estimates only when homogeneity restriction is valid (Iwata, Okada, & Samreth, 2011). PMG also has the advantage of allowing for the heterogeneous short-run dynamics for each cross-section (Bangake & Eggoh, 2012). The short-run adjustment is allowed to be country-specific. This is due to the different impact of vulnerabilities to external shocks, monetary policy and others.

This is quite different from the Mean Group (MG) estimator which estimates separate regressions for each country while calculating the coefficients as unweighted means of the estimated coefficients for the individual cross-sections (Iheonu, Ihedimma&Omenihu, 2017). It allows for all coefficients to vary and be heterogeneous in the long run and short run. A precondition for the PMG technique lies on the result of the unit root test. This technique can be applied when all variables in the model are I(1) stationary, I(0) stationary or a mixture of I(1) and I(0) (Pesaran *et al.*, 1999). PMG being a variant of the ARDL model is sensitive to the choice of lag length, and hence we utilise the Akaike InformationCriteria to obtain our optimal lag length with a result indicating that ARDL (1,1,1,1,1,1) is optimal. The result in Table 5 shows the result of the PMG and MG dynamic heterogeneous panel procedure. The result exhibits notable variations subject to the method of estimation.

[Table 5 near here]

The PMG estimation result shows that in the long run, skilled labour participation rate drives financial development in Africa. This result is significant at 5% level of significance. One percentage increase in skilled labour participation rate leads to 11.1 percentage increase in financial development in Africa and capital stock, in the long run, induce financial development in Africa. A percentage increase in capital stock leads to 44.71 percentage

increase in financial development in Africa. At the five percent level of significance, the result shows that remittances inflow has a positive impact on financial development in Africa. A percentage increase in remittance inflow to Africa countries induces significant changes (78.71%) in financial development in Africa. However, at one percent level of significance, exchange rate inversely predicts financial development in Africa. A percentage increase in exchange rate induces 1.27 percentage decreases in financial development in Africa.

However, in the short run, the skilled labour participation rate is seen to hurt financial development in Africa, but this result proves insignificant. This finding is also true for capital stock but significant at one per cent, implying a unit increase in capital stock in the short run will lead to 22.26% percent decrease in financial development in Africa. Remittances inflow to Africa is large enough to instigate a positive short-run impact on financial development in Africa because it is significant at 5%. A per cent increase in remittances inflow will induce 45.42 percentage increases in financial development in Africa in the short run. The exchange rate is inversely related to financial development in Africa in the short run as it is significant at 5%. A percentage increase in the exchange rate will induce 63.98 percentage reduction in financial development in Africa in the short run.

The homogeneity of the long-run coefficient implied by the PMG technique cannot be assumed before estimation, and as such, a post estimation test is required. If the long-run homogeneity holds, the PMG estimate is said to be more efficient in comparison to the MG estimates, but when the long-run homogeneity fails to hold, the estimates of the PMG become inefficient compared to the MG technique. Hausman test (Table 5) result proves that there exists long-run homogeneity for the study sample, and hence the PMG technique is appropriate. The Hausman test result shows that we fail to reject the null hypothesis of long-run homogeneity at the one per cent level of significance which indicates that a long run homogeneous relationship exists amongst the countries in the model. The convergence coefficient was correctly signed and significant at five percent for our chosen PMG model. The result shows that the average value of the convergence coefficient is 0.0635, and thus, it takes about 13 years for long-run equilibrium to be achieved in Africa financial market.

Hypothesis Test Result

[Table 6 near here]

To validating or refuting the hypothesis raised in this study, we obtained inferences from the estimated model and the tabular form of our inferential statistical testing was reported in

Table 6. We rejected the nulls (**H$_{01}$**)because remittances have a significant relationship with financial development in Africa in the short run and long run.

5.0   Conclusion and Policy Relevance

In this paper, we used a comprehensive cross-country dataset of remittances inflow and financial development in Africa from 1986 through 2017. We rely on the Pooled Mean Group estimation procedure to study this relationship, which allows us to account for the short-run and long-run dynamics of remittances inflow and financial development in Africa. The long-run results show that skilled labour participation rate (human capital), capital stock, and remittances have a positive\ relationship with financial development in Africa while the exchange rate has a negative relationship with financial development in the long-run. The long-run results agree with the findings of Aggarwal *et al.* (2011); Anzoategui, Demirgüç-Kunt, and Martínez Pería (2014); Assefa and Mollick (2017); Giuliano and Ruiz-Arranz (2009). Short-run results show that skilled labour participation rate, capital stock and exchange rate have a negative relationship. Remittances show a positive relationship with financial development in the short run. The short-run results were in tandem with the findings of Chowdhury (2011); Coulibaly (2015); Mundaca (2009).

It is therefore recommended that attracting migrants' transfers have significant short-run poverty-alleviating advantages. In the long run, it might be more beneficial for African governments to foster financial sector development using alternative financial development strategies. However, improved financial services, financial instruments and the payment system are necessary for economic growth in African countries both in the short run and long run. The short and the long-term financial policies in African should be focused on improving the financial sector performance through the formulation and implementation of sound financial reforms to deepen the financial sector. There should be diversification of the banking services and increased financial inclusion such as the use of mobile banking, internet banking, automated Teller machines (ATM) and rural banking that will integrate more remittance-recipient households in Africa countries from the informal financial sectors into the formal financial system for inclusive growth.

References

Adekunle I.A., Elekeokwuri A.E.&Onayemi S.O.(2020). Stability in Stock Market Prices and Monetary Policy in Nigeria. What does the Empirics Say? *Ovidius University Annals, Economic Sciences Series*, 20(1), 2-13.

Adekunle I.A., Williams T.O., Omokanmi O.J. &OnayemiS.O. (2020). Mediating Roles of Institutions in the Remittance-Growth Relationship: Evidence from Nigeria. *Forthcoming in* Economic Annals.

Acosta, P., Calderón, C., Fajnzylber, P., & Lopez, H. (2008). What is the Impact of International Remittances on Poverty and Inequality in Latin America? *World Development*, *36*(1), 89–114. https://doi.org/10.1016/j.worlddev.2007.02.016

Adams, R. H. (2011). Evaluating the economic impact of international remittances on developing countries using household surveys: A literature review. *Journal of Development Studies*. *47*(6), 809-828. https://doi.org/10.1080/00220388.2011.563299

Adams, R. H., & Cuecuecha, A. (2013). The Impact of Remittances on Investment and Poverty in Ghana. *World Development*, *50*, 24–40.

https://doi.org/10.1016/j.worlddev.2013.04.009

Adams, R. H., & Page, J. (2005). Do international migration and remittances reduce poverty in developing countries? *World Development*, *33*(10), 1645–1669.

https://doi.org/10.1016/j.worlddev.2005.05.004

Adepoju, A. (1995). Emigration Dynamics in Sub-Saharan Africa. *International Migration*, *33*(3–4), 313–390. https://doi.org/10.1111/j.1468-2435.1995.tb00032.x

Aggarwal, R., Demirgüç-Kunt, A., & Pería, M. S. M. (2011). Do remittances promote financial development? *Journal of Development Economics*, *96*(2), 255–264.

https://doi.org/10.1016/j.jdeveco.2010.10.005

Akobeng, E. (2016). Out of inequality and poverty: Evidence for the effectiveness of remittances in Sub-Saharan Africa. *Quarterly Review of Economics and Finance*, *60*, 207–223. https://doi.org/10.1016/j.qref.2015.10.008

Amuedo-Dorantes, C., & Pozo, S. (2006). Remittance receipt and business ownership in the Dominican Republic. *World Economy*, *29*(7), 939–956. https://doi.org/10.1111/j.1467-9701.2006.00830.x

Anzoategui, D., Demirgüç-Kunt, A., & Martínez Pería, M. S. (2014). Remittances and Financial Inclusion: Evidence from El Salvador. *World Development*, *54*, 338–349. https://doi.org/10.1016/j.worlddev.2013.10.006

Assefa, T. A., & Mollick, A. V. (2017). Financial Development and Economic Growth in Africa. *Journal of African Business*, *18*(3), 320–339.

https://doi.org/10.1080/15228916.2017.1301162

Bandyopadhyay, S., Sandler, T., & Younas, J. (2014). Foreign direct investment, aid, and terrorism. *Oxford Economic Papers*, *66*(1), 25–50. https://doi.org/10.1093/oep/gpt026

Bangake, C., & Eggoh, J. C. (2012). Pooled Mean Group estimation on international capital mobility in African countries. *Research in Economics*, *66*(1), 7–17.

https://doi.org/10.1016/j.rie.2011.06.001

Barham, B., & Boucher, S. (1998). Migration, remittances, and inequality: estimating the net effects of migration on income distribution. *Journal of Development Economics*, *55*(2), 307–331. https://doi.org/10.1016/S0304-3878(98)90038-4

Bertoli, S., & Marchetta, F. (2014). Migration, Remittances and Poverty in Ecuador. *Journal of Development Studies*, *50*(8), 1067–1089.

https://doi.org/10.1080/00220388.2014.919382

Bezić, H., Galović, T., & Mišević, P. (2016). Utjecaj terorizma na izravna strana ulaganja (FDI) zemalja EU i EEA. *Zbornik Radova Ekonomskog Fakultet Au Rijeci*, *34*(2), 333–362. https://doi.org/10.18045/zbefri.2016.2.333

Blundell, R., & Bond, S. (2000). GMM Estimation with persistent panel data: an application to production functions. *Econometric Reviews*, *19*(3), 321–340.

https://doi.org/10.1080/07474930008800475

Brennan, M. J., & Xia, Y. (2006). International capital markets and foreign exchange risk. *Review of Financial Studies*, *19*(3), 753–795. https://doi.org/10.1093/rfs/hhj029

Calvo, G. A. (1998). CAPITAL FLOWS AND CAPITAL-MARKET CRISES: The Simple Economics of Sudden Stops. *Journal of Applied Economics*, *1*(1), 35–54. https://doi.org/10.1080/15140326.1998.12040516

Chauvet, L., Gubert, F., & Mesplé-Somps, S. (2009). Les transferts des migrants sont-ils plus efficaces que l'aide pour améliorer la santé des enfants? Une évaluation économétrique sur des données inter et intra-pays. *Revue d'Economie Du Developpement*, *23*(4), 41–80. https://doi.org/10.3917/edd.234.0041

Chin, A., Karkoviata, L., & Wilcox, N. (2011). Impact of Bank Accounts on Migrant Savings and Remittances: Evidence from a Field Experiment. Available at http://www.uh.edu/~achin/research/ckw_banking_june2011.pdf.

Chowdhury, M. B. (2011). Remittances flow and financial development in Bangladesh. *Economic Modelling*, *28*(6), 2600–2608. https://doi.org/10.1016/j.econmod.2011.07.013

Cooray, A. (2012). Migrant remittances, financial sector development and the government ownership of banks: Evidence from a group of non-OECD economies. *Journal of International Financial Markets, Institutions and Money*, *22*(4), 936–957. https://doi.org/10.1016/j.intfin.2012.05.006

Coulibaly, D. (2015). Remittances and financial development in Sub-Saharan African countries: A system approach. *Economic Modelling*, *45*, 249–258.

https://doi.org/10.1016/j.econmod.2014.12.005

De Gregorio, J., & Guidotti, P. E. (1995). Financial development and economic growth. *World Development*, *23*(3), 433-448. https://doi.org/10.1016/0305-750X(94)00132-I

de Haas, H. (2014). What Drives Human Migration? *From Migration: A COMPASS Anthology*, 1–2.

de la Fuente, A. (2010). Remittances and vulnerability to poverty in rural Mexico. *World Development*, *38*(6), 828–839. https://doi.org/10.1016/j.worlddev.2010.02.002

De Vita, G., & Kyaw, K. S. (2008). Determinants of capital flows to developing countries: A structural VAR analysis. *Journal of Economic Studies*, *35*(4), 304–322. https://doi.org/10.1108/01443580810895608

Dustmann, C., & Glitz, A. (2011). Migration and Education. In *Handbook of the Economics of Education,4*, 327–439. https://doi.org/10.1016/B978-0-444-53444-6.00004-3

Easterly, W. (1999). The ghost of financing gap: Testing the growth model used in the international financial institutions. *Journal of Development Economics*, *60*(2), 423–438. https://doi.org/10.1016/S0304-3878(99)00047-4

Edwards, S. (1990). Capital Flows, Foreign Direct Investment, and Debt-Equity Swaps in Developing Countries. *NBER Workng Paper*, (3497), 1–44. https://doi.org/10.3386/w3497

Esteves, R., & Khoudour-Castras, D. (2011). Remittances, capital flows and financial development during the mass migration period, 1870-1913. *European Review of Economic History*, *15*(3), 443–474. https://doi.org/10.1017/S1361491611000037

Fayissa, B., & Nsiah, C. (2010). The Impact of Remittances on Economic Growth and Development in Africa. *The American Economist*, *55*(2), 92–103. https://doi.org/10.1177/056943451005500210

Filer, R. K., & Stanišić, D. (2016). The Effect of Terrorist Incidents on Capital Flows. *Review of Development Economics*, *20*(2), 502–513. https://doi.org/10.1111/rode.12246

Finkelstein Shapiro, A., & Mandelman, F. S. (2016). Remittances, entrepreneurship, and employment dynamics over the business cycle. *Journal of International Economics*, *103*, 184–199. https://doi.org/10.1016/j.jinteco.2016.10.001

Gabaix, X., & Maggiori, M. (2015). International liquidity and exchange rate dynamics. *Quarterly Journal of Economics*, *130*(3), 1369–1420. https://doi.org/10.1093/qje/qjv016

Galović, T., Bezić, H., & Mišević, P. (2018). Terrorist activities and capital flows of developed countries. *Acta Oeconomica*, *68*(3), 337–352. https://doi.org/10.1556/032.2018.68.3.2

Gapen, M. T., Chami, R., Montiel, P., Barajas, A., & Fullenkamp, C. (2009). Do Workers' Remittances Promote Economic Growth? *IMF Working Papers*, *09*(153), 1. https://doi.org/10.5089/9781451873009.001

Giuliano, P., & Ruiz-Arranz, M. (2009). Remittances, financial development, and growth. *Journal of Development Economics*, *90*(1), 144–152.

https://doi.org/10.1016/j.jdeveco.2008.10.005

Gupta, S., Pattillo, C. A., & Wagh, S. (2009). Effect of Remittances on Poverty and Financial Development in Sub-Saharan Africa. *World Development*, *37*(1), 104–115. https://doi.org/10.1016/j.worlddev.2008.05.007

Gyimah-Brempong, K., & Asiedu, E. (2015). Remittances and investment in education: Evidence from Ghana. *Journal of International Trade and Economic Development*, *24*(2), 173–200. https://doi.org/10.1080/09638199.2014.881907

Howell, A. (2017). Impacts of Migration and Remittances on Ethnic Income Inequality in Rural China. *World Development*, *94*, 200–211.

https://doi.org/10.1016/j.worlddev.2017.01.005

Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics*, *115*(1), 53–74. https://doi.org/10.1016/S0304-4076(03)00092-7

Iwata, H., Okada, K., & Samreth, S. (2011). A note on the environmental Kuznets curve for CO2: A pooled mean group approach. *Applied Energy*, *88*(5), 1986–1996. https://doi.org/10.1016/j.apenergy.2010.11.005

Jones, R. C. (1998). Remittances and inequality: A question of migration stage and geographic scale. *Economic Geography*, *74*(1), 8–25. https://doi.org/10.2307/144341

Kanaiaupuni, S. M., & Donato, K. M. (1999). Migradollars and mortality: The effects of migration on infant survival in Mexico. *Demography*, *36*(3), 339–353. https://doi.org/10.2307/2648057

Karikari, N. K., Mensah, S., & Harvey, S. K. (2016). Do remittances promote financial development in Africa? *SpringerPlus*, *5*(1). https://doi.org/10.1186/s40064-016-2658-7

Kiiru, J. (2010). Remittances and Poverty in Kenya. *OIDA International Journal of Sustainable Development*, *1*(8), 33–41.

Kindleberger, C. P. (1959). United States Economic Foreign Policy: Research Requirements for 1965. *World Politics*, *11*(4), 588–613. https://doi.org/10.2307/2009594

Klein, M. A., & Rodney, W. (1974). How Europe Underdeveloped Africa. *The International Journal of African Historical Studies*, *7*(2), 323. https://doi.org/10.2307/217137

Koechlin, V., & Leon, G. (2007). International remittances and income inequality: An empirical investigation. *Journal of Economic Policy Reform*, *10*(2), 123–141.

https://doi.org/10.1080/17487870701346514

Lartey, E. K. K. (2013). Remittances, investment and growth in sub-Saharan Africa. *Journal of International Trade and Economic Development*, *22*(7), 1038–1058. https://doi.org/10.1080/09638199.2011.632692

Le, T. (2009). Trade, remittances, institutions, and economic growth. *International Economic Journal*, *23*(3), 391–408. https://doi.org/10.1080/10168730903119443

Levin, A., Lin, C. F., & Chu, C. S. J. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*, *108*(1), 1–24.

https://doi.org/10.1016/S0304-4076(01)00098-7

Levine, R. (1997). Financial Development and Economic Growth: Views and Agenda. *Journal of Economic Literature*, *35*(2), 688-726. https://doi.org/10.1596/1813-9450-1678

Makina, D. (2013). Financial access for migrants and intermediation of remittances in South Africa. *International Migration*, *51*(1), 133-147. https://doi.org/10.1111/j.1468-2435.2012.00748.x

Mehrotra, S., & Parida, J. K. (2017). Why is the Labour Force Participation of Women Declining in India? *World Development*, *98*, 360-380. https://doi.org/10.1016/j.worlddev.2017.05.003

Meyer, D., & Shera, A. (2017). The impact of remittances on economic growth: An econometric model. *EconomiA*, *18*(2), 147–155.

https://doi.org/10.1016/j.econ.2016.06.001

Mundaca, B. G. (2009). Remittances, financial market development, and economic growth: The case of Latin America and the Caribbean. *Review of Development Economics*, *13*(2), 288–303. https://doi.org/10.1111/j.1467-9361.2008.00487.x

Naudé, W., Siegel, M., & Marchand, K. (2017). Migration, entrepreneurship and development: critical questions. *IZA Journal of Migration*, *6*(1). https://doi.org/10.1186/s40176-016-0077-8

Olayungbo, D. O., & Quadri, A. (2019). Remittances, financial development and economic growth in sub-Saharan African countries: evidence from a PMG-ARDL approach. *Financial Innovation*, *5*(1). https://doi.org/10.1186/s40854-019-0122-8

Onanuga A.T., Odusanya I.A. & Adekunle I.A. (2020). Terrorism and Financial Flows in Africa. *Behavioral Sciences of Terrorism and Political Aggression*. https://doi.org/10.1080/19434472.2020.1736128

Opperman, P., & Adjasi, C. K. D. (2017). The determinants of private capital flow volatility in Sub-Saharan African countries. *Research in International Business and Finance*. https://doi.org/10.1016/j.ribaf.2017.07.146

Oseni, I. O., Adekunle, I. A., & Alabi, M. O. (2019). Exchange rate volatility and industrial output growth in Nigeria. *Journal of Economics and Management*, *38*, 129–156. https://doi.org/10.22367/jem.2019.38.07

Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled Mean Group Estimation of Dynamic Heterogeneous Panels. *Journal of the American Statistical Association*, *94*(446), 621–634. https://doi.org/10.1080/01621459.1999.10474156

Pesaran, M. H., & Smith, R. (1995). Estimating long-run relationships from dynamic heterogeneous panels. *Journal of Econometrics*, *68*(1), 79–113.

https://doi.org/10.1016/0304-4076(94)01644-F

Ratha, D., Mohapatra, S., & Silwal, A. (2011). *Migration and Remittances Factbook: Mozambique*. *World Bank Publications*. https://doi.org/978-0-8213-8218-9

Reisen, H., & Soto, M. (2001). Which types of capital inflows foster developing-country growth? *International Finance*, *4*(1), 1–14. https://doi.org/10.1111/1468-2362.00063

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *Stata Journal*, *9*(1), 86–136. https://doi.org/10.1177/1536867x0900900106

Schneider, B. (2003). *Measuring capital flight: estimates and interpretations*. *Working Paper*.

Shen, I. L., Docquier, F., & Rapoport, H. (2010). Remittances and inequality: A dynamic migration model. *Journal of Economic Inequality*, *8*(2), 197–220. https://doi.org/10.1007/s10888-009-9110-y

Stark, O., Taylor, J. E., & Yitzhaki, S. (1986). Remittances and Inequality. *The Economic Journal*, *96*(383), 722. https://doi.org/10.2307/2232987

Tah, K. A. (2019). Remittances and financial access: Evidence from Sub-Saharan Africa. *Cogent Economics and Finance*, *7*(1), 1–10.

https://doi.org/10.1080/23322039.2019.1570581

Tanzi, V. (2008). The role of the state and public finance in the next generation. *OECD Journal on Budgeting*. *8*(2), 1-27 https://doi.org/10.1787/budget-v8-art6-en

Taylor, J. E., & Wyatt, T. J. (1996). The shadow value of migrant remittances, income and inequality in a household-farm economy. *Journal of Development Studies*, *32*(6), 899–912. https://doi.org/10.1080/00220389608422445

Terrelonge, S. C. (2014). For Health, Strength, and Daily Food: The Dual Impact of Remittances and Public Health Expenditure on Household Health Spending and Child Health Outcomes. *Journal of Development Studies*, *50*(10), 1397–1410.

https://doi.org/10.1080/00220388.2014.940911

The World Bank. (2011). *Migration and Remittances Factbook. Migration and Development Brief*.

Williams, K. (2016). Remittances and Financial Development: Evidence from Sub-Saharan Africa. *African Development Review*, *28*(3), 357–367. https://doi.org/10.1111/1467-8268.12202

Williamson, J., Hermes, N., Countries, I. S. A., Flight, C., & Debt, T. W. (1999). Capital flows to developing countries. *NBER Working Paper Series*, (13602), 99–125. https://doi.org/10.18356/352f52cc-en

World Development Indicators 2010. (2010). *World Development Indicators 2010*. https://doi.org/10.1596/978-0-8213-8232-5

Wouterse, F. (2010). Remittances, poverty, inequality and welfare: Evidence from the central plateau of Burkina Faso. *Journal of Development Studies*, *46*(4), 771–789. https://doi.org/10.1080/00220380903019461

Wurgler, J. (2000). Financial markets and the allocation of capital. *Journal of Financial Economics*. 58(1-2), 187-214. https://doi.org/10.1016/s0304-405x(00)00070-2

Yaseen, H. S. (2012). The Positive and Negative Impact of Remittances on Economic Growth in MENA Countries. *The Journal of International Management Studies*, *7*(1), 7–14.

Zhunio, M. C., Vishwasrao, S., & Chiang, E. P. (2012). The influence of remittances on education and health outcomes: A cross country study. *Applied Economics*, *44*(35), 4605–4616. https://doi.org/10.1080/00036846.2011.593499

Figure1: Capital Inflows to Africa (billions of USD), 1970–2017

Figure 1 shows the trend of Capital Inflow to African countries (measured in billion U.S. Dollars) from 1970 through 2017. After foreign direct investment inflow, remittances inflow to Africa is the largest alternative source of investment financing which doubled the amount of aids and portfolio investment in Africa. The magnitude of remittances inflows to Africa informs the need to seek empirical credence for a hypothetical financial development in Africa.

Figure1: Capital Inflows to Africa (billions of USD), 1970–2017.
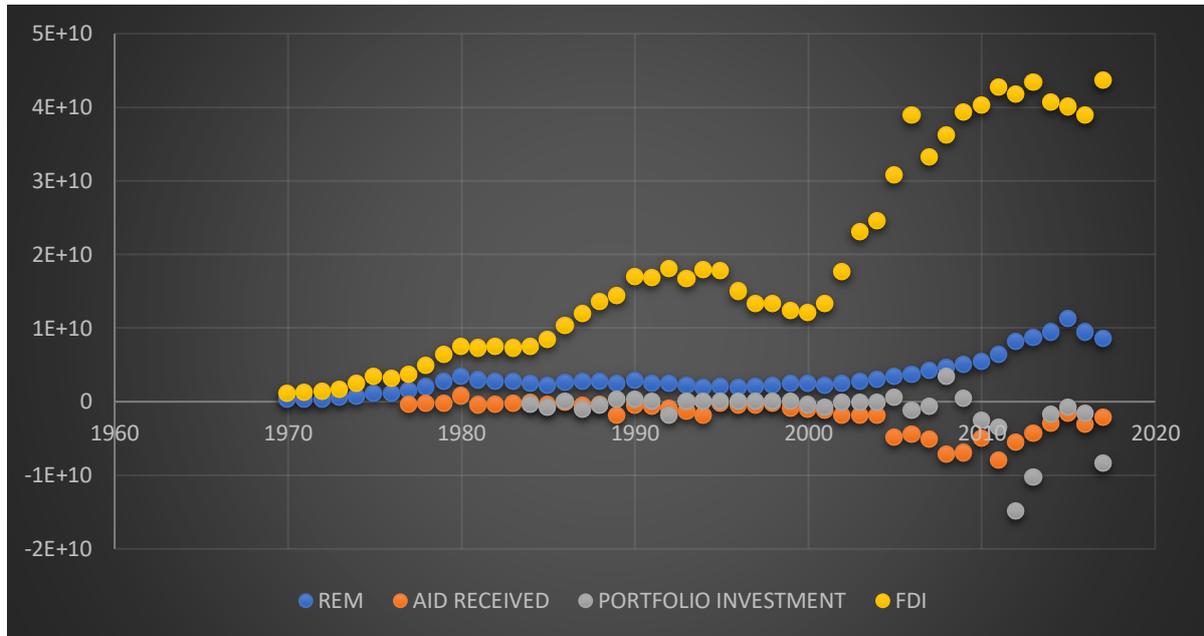
Table 1: Variable Description

Abbreviation	Description	Variable	Source
FD_{it}	Financial development	Nominal Credit to Private Sector	World Development Indicator (WDI), 2017
AL_{it}	Labor	Labor Participation Rate	World Development Indicator (WDI), 2017
K_{it}	Capital Stock	Gross Fixed Capital Formation	World Development Indicator (WDI), 2017
REM_{it}	Remittances	Remittances inflows	World Development Indicator (WDI), 2017
EXC_{it}	Exchange Rate	Nominal Exchange Rate	World Development Indicator (WDI), 2017

Table 2: *Summary Statistics*

	FD	*L*	*K*	*REM*	**EXC**
Mean	5.672	2.623	2.144	3.549	2.767
Median	4.655	2.905	1.494	2.438	3.222
Maximum	9.988	9.993	8.818	4.459	8.188
Minimum	-1.717	3.622	4.968	1.237	2.112
Std. Dev.	4.232	8.223	1.889	2.458	1.787
Skewness	3.371	-0.523	2.332	1.483	1.222
Kurtosis	1.643	2.116	7.939	1.744	1.228
Jarque-Bera	1886.010	17.575	267.762	432.359	353.637
Probability	0.281	0.1493	0.436	0.314	0.737
Observations	1696	1696	1696	1696	1696

Source: Author, 2019
Note: The summary statistics were computed before taking the natural logs

Table 3: *Panel Unit Root Test*

Variables	*FD*	*L*	*K*	*REM*	*EXC*
Levin–Lin–Chu (LLC)	1.16852*	2.81667*	0.40493**	2.85117**	1.65322**
Im–Pesaran–Shin (IPS)	-1.74269*	0.83097**	-0.77889*	-0.04328**	-0.526678**

*Significant at 1 %; ** significant at 5 %

Source: Author, 2019

Table 4

Panel Cointegration Test

Method		Statistics
Pedroni Residual Co-Integration Test	Within Dimension	
	Panel v-Statistics	-1.888
	Panel rho-Statistics	0.408
	Panel PP-Statistics	-2.188
	Panel ADF-Statistics	-1.973
	Within Dimension	
	Group rho-Statistics	1.597
	Group PP-Statistics	-3.802
	Group ADF-Statistics	-3.0312
Kao Residual Cointegration Test	ADF t-Statistics	-5.688

Source: Author, 2019

Table 5: Pool Mean Group Coefficient

Dependent Variable: FD	PMG	MG
Convergence coefficient	-0.0635	-0.3302
	(0.0311) **	(0.0603)
Long-run Coefficients		
L	0.1100	-0.0164
	(0.0047) **	(0.0209)
K	0.4471	0.0266
	(0.0092) **	(0.0548)
REM	0.7871	0.0093
	(0.0328) **	(0.0810)
EXC	-0.0127	0.2839
	(0.0016) *	(0.0703)
Short-Run Coefficients		
ΔL	-0.0016	-0.0017
	(0.5612)	(0.0014)
ΔK	-0.2226	-0.0016
	(0.0052) *	(0.0052)
ΔREM	0.4542	0.0040
	(0.0123) **	(0.0137)
ΔEXC	-0.6398	0.0072
	(0.0238) **	(0.0215)
AUXILLIARY PARAMETERS		
Hausman Test	7.98	
	{0.158} *	
Number of Countries	53	
Number of Observation	1696	

Source: Author, 2019

*Note: All equations include a constant country-specific term. Standard errors are in parenthesis. t-statistics is in square bracket. *, **, *** denotes significance at 1%, 5% and 10% respectively. The short-run result is the average derived from the short-run estimate for each different cross-section.*

Table 6: **Inferential Statistics Result**

S/N	Hypothesis	DECISION
H_{01}:	Remittances have no significant relationship with financial development in Africa	REJECT

Source: Authors, 2020