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## Foreign Remittances, Private Sector Investment and Banking Sector Development

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### Abstract

*In the last three decades, foreign remittances flowing to Sub-Saharan Africa have grown more rapidly than the average for developing countries forming a significant component of external capital flows. Simultaneously, there has been an increase in the number of studies investigating the impact of these transfers on consumption and the general welfare of the receiving household. However, very few studies have examined the impact of foreign remittances on private sector investment in Sub-Saharan Africa, which is considered as having an inefficient banking sector. From this background, this study aims to investigate the impact foreign remittances on private sector investment and the moderating role of banking sector development. The study uses a sample of 15 Sub-Saharan African countries with data for the years 1986-2017. The findings of this study indicate that foreign remittances and banking sector development has a positive and statistically significant impact on private investment Sub-Saharan Africa. Moreover, the banking sector development has a moderating effect. These results suggest that foreign remittances are important sources of capital for private investment and it can efficiently fill the financing gaps of inefficient financial markets.*

**Keywords:** Foreign Remittance; Private Sector Investment; Banking Sector Development.

**JEL Classification:** F24, F41, F63, F68.

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## 1. Introduction

Remittances are compensatory transfers to households by members who have relocated to foreign countries for reasons ranging from seeking employment, food shortage and civil hostilities. In Africa, unemployment, low wages and the threat of political instability and violent remain the key reasons for migration to developed countries (Poppe et al., 2016; Mberu & Pongou, 2016; Khosa & Kalitanyi, 2015). Further, cross-border migrations have been accelerated by advancements in transport and communication and regional integrations aimed at a facilitating the smooth flow of people and goods across national frontiers. It is estimated that by 2015 the number of documented migrants from Sub-Saharan Africa was 23.2 million which is likely to lead to loss of productivity; especially the flight of locally trained professional whose expertise is vital for economic development<sup>1</sup>. However, human capital flight is accompanied by an inflow of remittances which are perceived as incentives with compensatory effect to both the migrants' households, communities and the home countries at the macro-economic front (Randazzo & Piracha, 2019; Inoue & Hamori, 2016; Williams, 2018).

There has been unprecedented growth in migrant remittances in the last three decades, 1990-2019, where the money remitted globally through official channels increased from \$ 68.6 bn in 1990 to \$ 689 billion in 2018 with \$ 529 billion being transfers to low- and middle-income countries. According to Ratha et al., (2016), remittances sent to developing countries translate to approximately 1.9% of their Gross Domestic Product (GDP). Escriba-Folch et al (2018) and Meyer and Shera (2017) argue that remittances are the second largest source of external development finance, after foreign direct investment, for developing economies. Moreover, in several countries such as Tonga, Albania, Jordan and Lesotho, remittances surpass all other forms of external capital inflows (Buch et al., 2002). Moreover, studies contend that remittances is an important external capital, compared to official development assistance and foreign direct investment, due to its stability (Sinha et al., 2018; Azam et al., 2016). Studies show that the amount of documented remittances is twice as large as official aid and nearly two-thirds of foreign direct investment (FDI) flows to developing countries (Meyer & Shera, 2017; Maiga et al., 2016).

In view of the importance attached to remittances, scholars have expended considerable effort to investigate the socioeconomic impact of these external

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<sup>1</sup> World Bank. <https://www.worldbank.org/en/news/press-release/2019/04/08/record-high-remittances-sent-globally-in-2018>

capital flows. Extant literature demonstrates that remittances are mainly spent on consumption and unproductive investments, such as jewelry, which have no substantial impact on economic development (Petraçou et al., 2017; Kuntsevych, 2016; Chami et al., 2018). This assertion is corroborated by study of Adams et al (2008), on a sample of 3,884 remittances receiving households in Ghana, which found that there were no significant differences between the consumption and investment behaviors of the remittances receiving households and non-receiving ones. Despite the predominant view that remittances are mainly meant for consumption, some studies show that remittances have an impact on both social and economic dimension: education (Edward & Ureta, 2003; Yang, 2005; Gyimah-Brempong & Asiedu, 2015), housing (Osili, 2004), entrepreneurship (Ahmed, 2000; Mishra, 2005; Sofranko & Idris, 1999), investment (Manic, 2017; Jena, 2018; Nzima et al., 2016; Castelhana et al., 2016) and poverty alleviation (Cuecuecha & Adams, 2016; Azam et al., 2016; Akobeng, 2016). The importance of foreign remittances is in twofold. First, from the recipient household perspective, remittances inflows are seen as an additional source of income intended to boost ordinary consumption besides promoting the family's general welfare. Second, at the macroeconomic level, remittances are expected to stimulate private sector investment particularly in developing countries that are characterized by inefficient financial markets and credit constraints (Wang, 2016; Leon, 2015) bearing in mind that they receive biggest share of these capital flow. However, since the bulk of remittances are sent through informal channels, banking sector development is viewed as an important link between remittances and private sector investment. It is on this background this study investigates whether banking sector development moderates the relationship between remittances and private sector investment in Sub-Saharan Africa.

### **1.1. Statement of the Problem**

Foreign remittances are progressively becoming an important external source of development finance, after foreign direct investment, for the developing and emerging economies (Moniruzzaman, 2016; Williams, 2016; Sobiech, 2019). Conversely, extant literature shows that remittances are predominantly used for consumption, purchase of land and other ordinary household spending which have little impact, if any, on the economic development of the receiving country (Gebregziabher, 2016; Quartey, 2019; Kassa, 2017). The argument underlying this traditional perspective is that households have no incentive to save and remittances are meant to cushion household against adverse economic situations (Jahjah et al., 2003; Connel & Conway, 2000). However, recent studies have established that foreign remittances support entrepreneurial undertakings (McCormick & Wahba 2001;

Dustmann & Kirchkamp, 2002; Woodruff & Zenteno, 2007) and economic growth (Fayissa & Nsiah, 2008; Catrinescu et al., 2009) which suggests that these capital flows could stimulate private sector investment if leveraged through financial intermediation. Moreover, studies have also established that foreign remittances substitute for or complement inefficient financial markets as they are informal, less volatile and that household can use future receipts collaterals (Inoue, 2018; Chen & Jayaraman, 2016; Sobiech, 2019). Nevertheless, the relationship between foreign remittances, private sector investment and banking sector development is unclear. Thus, the purpose of this study is to investigate the effect of foreign remittances on private sector investment and the moderating role of the banking sector development in Sub-Saharan Africa.

## **2. Literature review and theoretical perspective**

### **2.1. Foreign Remittances**

Foreign denote certain transactions that are instigated by individuals living and working outside their countries of birth as transfers for their migration.

According to the World Bank's Africa Development Indicator (2008), workers' comprise current transfers by migrant workers and wages and salaries earned by non-resident workers. Workers' remittances are classified as current private transfers from migrant workers who are residents in the host country to recipients in their country of origin. They include only transfers made by workers who have been living in the host country for more than a year, irrespective of their immigration status. Compensation of employees is the income of migrants who have lived in the host country for less than a year.

Remittances can be split into three major components; first, the migrants' salaries and wages or other benefits earned by the migrant in the host countries. The second component is the current transfers by migrants who are employed in new economies and are considered residents there. Third, capital transfers that result from the correspondence between the migrants and their households that include; the flow of goods (personal effects) accompanying the migrant, his flow of financial assets and the change in the stock positions due to the change in his residence status.

Studies show that foreign remittances have an enormous effect on the various macro-economic factors of the receiving countries. A study by Aggarwal et al (2010), which uses a sample of 109 emergent economies and panel data for 1975-2003, finds that 1% growth in remittances initiated a 0.35-0.37% increase in bank deposits, and a 0.29% increase in domestic credit to private sector. Brown et al (2013) focus on Azerbaijan and Kyrgyzstan

and reveal that \$1,000 growth in remittances increases the probability of receiving household opening a bank account by 0.1%, which further stresses the importance of remittances to financial inclusion.

Various factors have been cited in extant literature as influencing the direction and the volume of foreign remittances flow: household income, age, gender, education, home country GDP, exchange rate, inflation and marital status (Simpson & Sparber, 2019; Biyase & Tregenna, 2016; Panda & Trivedi, 2015; Tabit & Moussir, 2016). It is argued that remittances are intended to supplement the receiving households' income and smooth their consumption, in the event of large and temporary fluctuations in the economy (Apergis & Cooray, 2018; Musah-Surugu et al., 2018). Macro-economic studies show that remittances have a long run impact on the receiving country macro-economic factors. Though, the validity of this assertion depends on whether these transfers are allocated to consumption or private investment (Docquier & Rapoport, 2005). Durand et al (1996) claim that remittances influence a country's economy directly either through investment or indirectly from the multiplier effect of consumption which elicits investments in production of goods and services to meet the increased demand. Yet, studies claim that remittances support entrepreneurship and new venture creation (Yang, 2004, Amuedo-Dorantes & Pozo, 2006). Besides, remittances have been cited as a source of seed capital to approximately 2/3 of new startups (Kapur, 2005; Hansing & Orozco, 2014; Vaaler, 2011). Further, researchers claim that migrant's savings sent back home during his/her stay in the host country would ignite the urge for self-employment upon return (Dustmann, 2001; Ilahi, 1999; Mesnard, 2004).

## **2.2. Foreign Remittances and Private Sector Investment**

Private sector investment is the key engine for economic growth, job creation and complements public sector investment (Santandrea et al., 2015; Ade et al., 2017; Park et al., 2016). Extant literature shows divergent views on what private sector investment is actually is. According to Di Bella et al (2013), private sector investment refers to *"the activities traditionally supported by development cooperation actors, national and local governments, and the private sector itself."* McEwan et al (2017) defined private sector investment as *"activities carried out by governments and development organizations geared toward creating an enabling environment for business to flourish."* This includes activities by development cooperation actors aimed at increasing private sector investment in developing countries.

Studies have linked private sector investment with high level of employment, increased foreign direct investment; economic growth, poverty alleviation and high per capita income (Nwakoby & Bernard, 2016; Obayori et al., 2018). Owing to its significance in stimulating economic growth and the wellbeing of the populace

researchers have engrossed their work on the most important determinants of private investment. Wang et al (2019a), Wang et al (2019b) and Szczygielski et al (2017) argue that public sector investment is an important ingredient for private sector investment. Nevertheless, public investment on none infrastructural would crowd out the level of private sector involvement in economic development (Geddes et al., 2018; Idris & Bakar, 2017). Studies by Valadkhani (2004) and Khan and Rinluhart (1990) single out factor such as GDP growth rate, household level of income, balance of payment and inflation rate as key determinants of private sector investment. However, financial constraint stand out as the key hindrance to private sector investment in developing and emerging economies (Park et al., 2016; Obafemi et al., 2016; Ugwu et al., 2017)

Previous studies have examined how household allocate remittances between consumption and investment. However, most of the existing studies favour the single model usage of remittances; remittances are either used for consumption or investment. A study by Rempel and Lobdell (1978) finds that households allocated only a small portion, if any, of the transfers to investment. Stark (1980) observes that migrants' households tended to invest more on capital intensive agriculture citing examples of Uganda and Pakistani. Correspondingly, a study by Oberai, and Singh (1980) in Punjab, finds that the receiving households spend approximately 75% of the foreign remittances on consumption and only 6.1% spent on productive investment. To add, Glytsos (1986) study in Greece revealed that rural household who happen to be the major recipients of remittances maintain that the households tend to spend the remittances on luxuries and durable goods to catch up with their urban counterparts. Arguably, it is undeniable fact that a fair share of foreign remittances is apportioned to consumption.

Durand et al (1996) investigates the relationship between remittances and investment in Mexico. He finds that only 10% of remittances were spent on productive investments where out of its 14% is spent on housing, and the rest of 76% is spent on consumption. The author further observes that lack of access to financial markets prompted rural households to invest remittances in locally available opportunities such as land, housing and educations. Durand's findings are replicated by Adams (1991) and Adam (1998) study in Egypt and Pakistani. The study claims that the households spent much of their receipts on land and housing and that these households have a higher marginal propensity to save than the non-receiving counterparts. From a different perspective, Acharya and Leon-Gonzalez (2018), Azam and Raza (2016) and Bouoiyour and Miftah (2016) contend that household may opt to spend foreign remittances on human capital and related opportunity with a greater potential for future income. Several studies link

foreign remittances to higher school retention rate (Pilarova & Kandakov, 2017; Kumar, 2019; Edward & Ureta, 2003).

The existence of social ties between the migrant and the household dispel the notion of pure investment motive in remittances (Mahapatro, 2017; Coon & Neumann, 2015; Azizi, 2017). A striking feature of diaspora investment is commonality of stimulants with other external capital flows; foreign direct and official development assistance. Though, Olubiyi and Olarinde (2015) state that *“remittances act as 'illicit grease money' used to lubricate the wheels of bad governance and allows poor and perhaps inefficient government policy to thrive”* implying the quality of their home country’s governance and legal structure may not influence their decision to remit or influence, which is not the case with other external capital flows. From the foregoing literature it’s evident that the relationship between foreign remittances and private sector investment is unclear and requires further investigation. Thus, this study hypothesis:

**H<sub>1</sub>:** *Foreign remittance has no significant effect on private sector investment*

### **2.3. Banking Sector Development, Foreign Remittances and Private Sector Investment**

Banking sector development is the process of improving the quality and quantity of financial product and efficiency in providing financial services to the banking industry in the financial system (Qamruzzaman & Jianguo, 2018). The banking sector plays a crucial role in economic development by availing requisite credit for private sector investment. Commercial banks accept deposits from depositors, part of the deposit are maintained as liquid reserves for precautionary purposes, and then advance the deposits to investors for a return. Also, banks act as investment agents and advisers to prospective investors. Thus, the state of a country’s banking sector influences its private sector investment. Conversely, the banking sector of developing and emerging economies are largely considered inefficient owing to the huge variation between the interest on deposits and the lending rate leading to a wide financing gap (Yiheyis & Woldemariam, 2016).

Despite, their inefficient banking sector, developing countries continue to receive the biggest share of foreign remittances, which if tapped and leveraged through the banking sector, can bridge the financing gap ultimately boost private sector investment (Hamdar & Nouayhid, 2017; Stojanov et al., 2019). Moreover, foreign remittances are believed to have a more pronounced impact in countries characterized by under-developed financial markets (Ramirez & Sharma, 2008;

Adams & Klobodu, 2016). Therefore, it is also arguable that remittances substitute for underdeveloped financial markets through easing credit constraint.

In addition, an efficient banking sector attract foreign remittances by providing incentives such as agent banking in the host country, using future remittances receipt as collaterals, lowering transaction costs and investment advice that will allow the formal channeling of these funds into productive use (Freud & Spatafora, 2008). Some researchers also claim that foreign remittances support banking sector development. A study by Demirguc-Kunt et al (2011), in Mexico finds that that 1% increase in the number of remittance receiving household lead to a 0.16% change in the number of bank branches, a 25% increase in the number of bank accounts and a 2.5% points in the deposit/GDP ratio. Similar conclusion is made by Olaniyan (2019), Ambrosius and Cuecuecha (2016) and Fowowe and Ibrahim (2016). Deductively, this viewpoint suggests that foreign remittances are strongly associated with the growth of the banking sector implying thathouseholds can spend these transfersin the acquisitions of durable goods or other long-term investments. Therefore, the study postulates that:

**H<sub>2</sub>:** *Banking sector development does not significantly moderate the relationship between foreign remittance and private sector investment*

#### **2.4. Theoretical Perspective**

This study is grounded on the modern portfolio and financial intermediation theories. The relationship between foreign remittances and private sector investment is best explained by the portfolio theory advanced by Harry Markowitz (1952) in his seminal paper "*Portfolio Selection*". The Modern Portfolio Theory (MPT) is a generally a framework used for generating and choosing a list of feasible portfolios of financial assets grounded on the expected returns on prospective investments opportunities and the investor risk orientation. This framework is commonly christened as mean-variance analysis which is currently an important principle in the field of investment and securities analysis. Conservative wisdom has continually warned not putting all your eggs in one basket; this maxim emphasizes the importance of risk diversification. This theory maintains that assets whose returns are highly correlated may all collapse concomitantly because if one single investment gets ruined the same could happen to the other bunch of investments due to their high degree of association. Portfolio theory cautions that allocating all your monies in investments is imprudent no matter how inconsequential the chance is that any one single investment will fail to materialize.

The major postulation of this theory is that migrants acquire assets and save their income for reasons similar to those of the non-migrants. However, the migrant's investment decisions are comparatively different from those of the non-migrants in the sense that migrants have the advantage of acquiring assets in two countries, i.e. the host country where he resides and back in his home countries. A study by Amuedo-Dorantes and Pozo (2010), asserts that migrants' decisions to remit are not solely driven by altruism, as argued by many scholars, but also a self-driven motive of investing savings and other gains back home as a strategy to diversify risks and in preparation of their return. The study further maintains that remittances will vary in response to movements in portfolio variables such as exchange rate, per capita income, interest rate differentials and political risk, signifying that migrants fine-tune their portfolio of assets at home and in the host country to take advantage of changing economic opportunities in the two countries.

Studies show that portfolio variables seem to influence the remittances investment behavior of the immigrants originating from the poorer countries much more than those from the developed countries. This observation suggest that investing in assets is a risk diversification and consumption smoothing strategy available for the migrants whose home country is characterized by a low cost of living compared with the host country. In most cases the migrants are in a better position to assist their families back home during harsh economic periods through remittances and other transfers; however the migrants' families residing in the home country are likely to be limited in their financial capability to cater for the living expenses of the migrant in the foreign country. Therefore, as a way to caution them against this uncertainty, the migrants will device saving schemes that shield them against possible income risks. The immigrants can use a number of strategies such as accumulation of physical assets and securities in the two countries while trading off his portfolio holding in response to prevailing macro-economic conditions in the two countries.

Financial intermediation theories are built around the assumptions of efficient capital markets; intermediaries serve to reduce transaction costs and informational asymmetries (Scholtens & Van, 2003). Presently theories on investment are modeled around the role of financial and non-financial institutions as catalysts of investment. The earliest proponent of financial intermediation was Schumpeter (1932) who point out the role of financial institutions in promoting technology advancement. Later on Keynes conjectured that the state of credit in an economy determines the level of investment. Moreover, a study by Gurley and Shaw (1973) finds that the absence of financial intermediation affected self-financing and economic growth Financial institutions are the pillars for channeling

resources needed for investment by aggregating resources, diversifying risks, availing information and reducing transaction and monitoring costs. In the context of remittances flow, migrants may elect to invest in portfolio and securities due to the circumstances that these flows take place in the context of information asymmetry. There are several plausible reasons for this. First, altruism is one motive for sending remittances, nevertheless, information imperfection between the migrant and the household on the household level of income and the appropriate amount of remittances sufficient for the household back home. Second, in absence of philanthropy the migrant is guided by self-interest and is predisposed to investing back home. After a decision has been made to invest back home, the migrant can elect to use his family member as his investment agents and advisers or buy securities. However due to the distances between him and his agents in the home countries agency problem may develop prompting him to invest in stock markets where the cost of monitoring is minimal.

Third, remittances are normally received in lump sum and the household may decide to keep in a bank for future use. One of the operational strategies of commercial banks is to receive deposits in short term and lend in long-term and this making it a risky venture. This would therefore force the remittances receiving household to save part of the remittances in saving accounts, which are more liquid, for precautionary purpose.

### **3. Data and Methodology**

The paper samples all Sub-Saharan Africa countries; however, due to lack of the data only fifteen (15) countries qualified for the final sample. Data is obtained from the Africa Development Indicator Database, published and maintained by the World Bank, for the years 1986-2017 which totaled to 480 year observations.

The dependent variable of the research is private sector investment. It is the share of a country's capital formation attributed to private citizens or the value of a country's total assets owned by its citizens. The proxy for private sector investment is gross fixed capital formation private sector % of GDP as defined by World Bank. This measure was used in previous studies (Nwakoby & Bernard, 2016; Maranga et al., 2018; Pickson & Ofori-Abebrese, 2016).

We regress this independent variable with five dependent variables such as remittances (predictor variable), banking sector development (moderator) and four control variables (GDP growth rate, FDI inflow, exchange rate and trade openness) in a hierarchical way as shown below.

**Step 1:** Testing the effect of the control variables on the dependent variable. At this stage, private sector investment is regressed on GDP growth, FDI inflow, exchange rate and trade openness.

$$PSI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 FDI_{it} + \beta_3 EXR_{it} + \beta_4 TO_{it} + \varepsilon_1 \quad (1)$$

**Step 2:** Testing the effect of the predictor variable on the dependent variable. The equation is show below.

$$PSI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 FDI_{it} + \beta_3 EXR_{it} + \beta_4 TO_{it} + \beta_5 FREM_{it} + \varepsilon_2 \quad (2)$$

**Step 3:** Testing the effect of the predictor variable and the moderator on the dependent variable. The regression model is depicted as;

$$PSI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 FDI_{it} + \beta_3 EXR_{it} + \beta_4 TO_{it} + \beta_5 FREM_{it} + \beta_6 BSD_{it} + \varepsilon_3 \quad (3)$$

**Step 4:** Testing for moderation by introducing an interaction term, the product of the predictor variable (remittances) and the moderator (banking sector development), in the model.

$$PSI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 FDI_{it} + \beta_3 EXR_{it} + \beta_4 TO_{it} + \beta_5 FREM_{it} + \beta_6 BSD_{it} + \beta_7 REM * BSD_{it} + \varepsilon_3 \quad (4)$$

where,

*PSI*= Private Sector Investment

*FREM*= Foreign Remittances

*BSD*= Banking Sector Development

*GDP*=Gross Domestic Product Annual Growth

*TO*= Trade Openness

*FDI*=Foreign Direct Investment Inflow

*EXR*= Exchange Rate

$\varepsilon$  = error term

### **Foreign Remittances**

Foreign remittances will be taken as the figure given by the World Bank Indicator. World Bank defines remittances as *“Workers’ remittances and compensation of employees comprise current transfers by migrant workers and wages and salaries earned by non-resident workers. Workers’ remittances are classified as current private transfers from migrant workers who are residents of the host country to recipients in their country of origin. They include only transfers made by workers who have been living in the host countries for more than a year, irrespective of their immigration status. Compensation of employees is the income of migrants who have lived in the host country for less than a year. This may include the migrant’s salaries and wages or other benefits earned by the migrant in the host country”*. The variable is standardized as a ratio of GDP (Remittances/GDP) so as to take into consideration the variation in size of the countries under study.

### **Banking Sector Development**

Banking sector development is the moderator. The variable is measured as domestic credit to private sector which are claims on the private sectors by commercial banks inform of loan advances. Domestic credit is the aggregate of liquid liabilities of financial systems and other claims on the private sector by the banking sector as a percentage of GDP. This is a standard measure of banking sector development (Ahmed & Bashir, 2016; Low et al., 2018; Bayar et al., 2018; Habibullah et al., 2017). This data is available in the World Bank Development Indicator, international Financial Statistic and IMF databases.

### **Control variables**

The study controlled for a number of variables to insulate the effect of the independent variable and the moderator on the endogenous variable. The first of these is economic growth where it is hypothesized that the willingness of the diaspora to invest back home depends on the home country’s rate of economic growth. Admittedly, growth stimulates demand for products and the private sector responds to this demand by expanding their production which calls for additional investments in productive machinery into the economy. Accordingly this variable is controlled by Gross Domestic Product Growth (Bonga & Nyoni, 2017). Second, the exchange rate influences an investor’s preference for certain assets which could call for a reorganization of his portfolios (Binding & Dibiasi, 2017; Baltar et al., 2016). This may lead to increasing the level of investment in the home country by remitting more or holding more assets in the host country by remitting less. The proxy for this variable is the annual local currency/US\$ (LCU

US\$). Third, trade openness offers a platform for migrants to invest in the diaspora and back home and it's hypothesized to have a positive a significant effect on financial development. The study measured trade openness as the ratio of exports to GDP (Arif et al., 2017; Kaushal & Pathak, 2015; Hye & Lau, 2015). Fourth, credit constraint is a major hindrance to private sector investment, particularly in developing countries. This variable was measured as the country's annual average lending rate.

The data of these variables are examined under descriptive and inferential statistics. Specifically, we introduce data with their mean, minimum and maximum values and standard deviations. We also employ pairwise correlation analysis in order to check potential collinearity problems as well as in order to show nature of relationship between independent and explanatory variables. Then, we conduct hierarchical multiple regression to test our hypotheses (Hayes, 2017) in a panel framework. The choice between fixed effect and random effect regression analysis is based on the results of the Hausman test. The results for these tests are presented and discussed in next section.

## 4. Findings and Discussion

### 4.1. Panel Data Diagnostic Tests

Prior to subjecting the data to multiple regression analysis and other panel diagnostic tests, the data are transformed through first differencing,  $Y_t - Y_{t-1}$ , to ensure that it is stationary. Other diagnostic tests conducted included multicollinearity and autocorrelation. The results of the robustness tests, presented in Tables 1-3, allowed for further statistical analysis.

**Table 1.** Unit root tests

Variable	Breitung	Fisher-ADF	Im-Pesaran-Shin
Private Sector Investment	-4.69***	45.28***	-3.64***
Foreign Remittances	-6.33***	45.27 ***	-3.51***
Banking Sector Development	-5.86 ***	40.07***	-2.24***
GDP Annual growth rate	-4.15***	84.91***	-5.26***
Exchange Rate	-8.45***	24.36***	-1.81***
FDI inflow	-5.77***	77.13***	-3.82***
Trade Openness	-5.81***	44.63***	3.69***

**Table 2.** Results of Multicollinearity Test

Variable	VIF	1/VIF
FDI Inflow	1.13	0.8863
Exchange Rate	1.11	0.9015
Trade Openness	1.05	0.9496
Foreign Remittances	1.03	0.9665
GDP Growth	1.03	0.9666
Banking Sector Development	1.01	0.9884
Mean VIF	1.06	

**Table 1.** Results of autocorrelation test

White's test for			
H <sub>0</sub> : homoskedasticity			
H <sub>1</sub> : unrestricted heteroskedasticity			
	chi2(5)		5.9
	Prob > chi2		0.3164
<b>Cameron &amp; Trivedi's decomposition of IM-test</b>			
Source	chi2	df	p
Heteroskedasticity	5.9	5	0.3164
Skewness	4.53	2	0.1036
Kurtosis	3	1	0.0832
TOTAL	13.43	8	0.0978

#### 4.2. Descriptive and Inferential Statistics

Table 4 presents the descriptive statistics of the research variables. The table shows that the mean private sector investment in Sub-Saharan Africa, for the period 1986-2017, was 13.666 % of GDP. Further, the average foreign remittance was 6.47% of GDP while the mean banking sector development was 28.34% of GDP. Additionally, the table shows that the average annual GDP growth rate in the region was 1.35% whereas the mean exchange rate (USD) was approximately 237.82. The average FDI inflow and trade openness in Sub-Saharan Africa was 2.56% and 33.84 % of GDP respectively.

**Table 4.** Summary of Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Private sector investment/GDP	480	13.6667	7.5648	0.0797	53.1892
Foreign Remittances/GDP	480	6.4708	16.0546	0.0004	106.4789
Banking Sector Development	480	28.3386	28.1453	1.5423	167.5360
GDP Annual growth rate	480	1.3520	4.4267	-18.5805	20.7216
Exchange Rate (USD)	480	237.8185	470.3499	0.0003	3978.0880
FDI inflow/GDP	480	2.5563	4.8452	-28.6242	35.2349
Trade Openness	480	33.9432	18.4765	3.2123	100.9490

The results of the pairwise correlation are shown in Table 5. Based on table, private sector investment has a positive and significant correlation with the following variables; foreign remittances (0.4730), banking sector development (0.0898), GDP growth (0.1305), FDI (0.3512), trade openness (0.1412), though its correlations with exchange rate is negative (-0.1587). Besides, the tables indicate that foreign remittance and banking sector development has a negative correlation. On the other hand, foreign remittances and FDI are positively correlated (0.1641), which suggests complementariness of these capital flows. In addition, the banking sector development has a negative correlation with foreign remittances (-0.1098), FDI (0.1103) and trade openness (0.0845), which confirms that external capital flow, thrive in weak and inefficient financial systems.

**Table 5.** Correlation Matrix

Variable	PSD	REM	BSD	GDP	EXCH	FDI	TO
Private Sector Investment	1.0000						
Foreign Remittances	0.4730***	1.0000					
Banking Sector Development	0.0898***	-0.1098*	1.0000				
GDP Growth	0.1305***	0.0741	-0.0023	1.0000			
Exchange Rate	-0.1587**	-0.1496*	-0.2792*	-0.0142	1.0000		
FDI Inflow	0.3512***	0.1641*	-0.1103*	0.1531*	0.0757	1.0000	
Trade Openness	0.1412***	-0.0432	-0.0845	0.1834*	-0.0218	0.3231*	1.0000

**Note:** The asterisk \*, \*\*, and \*\*\* indicate significance levels of 10%, 5%, and 1% respectively.

### 4.3. Regression Results and Hypothesis Testing

The research hypotheses, which are established in sections 2.3 and 2.4, are tested using the results of hierarchical multiple regression presented in Table 6.

	Model 1	Model 2	Model 3	Model 4
GDP Growth (%)	0.103*** (3.34)	0.098*** (3.22)	0.106*** (3.49)	0.106*** (3.49)
FDI Inflow/GDP	0.330*** (6.02)	0.308*** (5.71)	0.303*** (5.65)	0.300*** (5.59)
Trade Openness/GDP	0.094*** (3.53)	0.080*** (2.99)	0.080*** (3.02)	0.079*** (3.00)
Exchange Rate(USD)	-0.002** (-2.07)	-0.002*** (-2.97)	-0.002*** (-2.99)	-0.002*** (-3.00)
Foreign Rem/GDP		0.362*** (4.35)	0.354*** (4.28)	0.346*** (4.50)
Banking Sector Dev			0.098*** (2.79)	0.097*** (2.75)
ForeignRemxBSD				-0.017* (-1.65)
intercept	0.101 (1.05)	0.1330 (1.41)	0.093 (0.98)	0.094 (0.99)
Hausman test chi2	0.52 (0.9712)	0.99 (0.9632)	1.98 (0.9214)	2.14 (0.9516)
R squared	0.1654	0.1990	0.2143	0.2148
$\Delta$ R squared	-	0.0336	0.0153	0.0005
Chi square	92.78	115.29	124.76	124.99
Prob > chi2	0.0000	0.0000	0.0000	0.0000
No. of Obs	465	465	465	465
Number of countries	15	15	15	15

**Note:** The asterisk \*, \*\*, and \*\*\* indicate significance levels of 10%, 5%, and 1% respectively. The t-statistics values are presented in the paranthesis.

Based on the findings presented in model 1, GDP annual growth ( $\beta=0.103$ ), FDI ( $\beta=0.330$ ) and trade openness ( $\beta=0.094$ ) has a positive and significant effect on private sector investment implying that they are enabler. Conversely, exchange rate has a negative effect on private sector investment ( $\beta=-0.002$ ) inferring that exchange rate volatility reduces private sector investment. The findings shown in model 2 indicate that foreign remittances has a positive and significant effect on private sector investment ( $\beta=0.362$ ), thus the null hypothesis ( $H_1$ : Foreign remittances has no significant effect on private sector investment) is rejected. The model predicts that a unit change in foreign remittances leads to 0.362 units

change in private sector development. Similarly, model 3 shows that banking sector development has a positive and statistically significant effect on private sector development ( $\beta=0.098$ ). The second hypothesis ( $H_2$ : Banking sector development does not significantly moderate the relationship between foreign remittance and private sector investment) is tested based on the regression results presented in models 3 and 4 in table 6. In model 3, both foreign remittances ( $\beta=0.354$ ) and banking sector development ( $\beta=0.098$ ) have positive and significant effects on private sector investment. After introducing the interaction term in model 4, we note that R-square is slightly improving. In both models the effect of the predictor variable and the moderator on the outcome variable are positive and significant, while interaction term has a significant effect signifying that moderation has occurred, while the main effect also remains significant. Additionally, the significant negative interaction term indicates a “*buffering interaction*”, in which an improvement in banking sector development diminishes the effect of foreign remittances on private sector investment.

## 5. Concluding Remarks

In the last three decades, foreign remittances have grown rapidly to form a significant component of foreign capital inflows to developing countries. This is so particularly to Sub-Saharan African which has consistently received the lion share of these transfers despite being characterized by underdeveloped and inefficient banking sector. In response to the increased flow of remittances, scholars continue to investigate the effect of foreign remittances on household consumption and other socio-economic dimension. However, very limited work has been devoted to investigate the relationship between foreign remittances, private investment and banking sector development in Sub-Saharan Africa. From this background, this study sought to investigate the effect of foreign remittances of private sector investment and the moderating role of banking sector development in Sub-Saharan African. Based on data drawn from fifteen countries for the period between from 1986 to 2017, the study found that both foreign remittances and banking sector development had a positive and significant effect on private sector. Also, the findings confirmed that banking sector had a moderating effect.

Therefore, the study recommends that, besides allocating remittances to consumption, households should channel these foreign capital inflows to private which may ultimately lead to economic development. Further, governments should find ways of channeling foreign remittances to development to lessen overreliance on foreign aid and sovereign debts. Some of the policy interventions

may include issuance of diaspora bond to its citizens in foreign countries through private-public partnerships or the creation of mutual funds where migrants can invest by buying securities back home.

African governments can also appeal for direct investment by its citizens living abroad in sector such as; health care, education and other infrastructural development. Since foreign remittances flow in an environment of economic growth, favorable legal institution and trade openness, governments should ensure a favorable regulatory environment that attract and channel remittances into development.

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