



## THESIS / THÈSE

### SPECIALISED MASTER IN INTERNATIONAL AND DEVELOPMENT ECONOMICS

#### Impact of Remittances at Macro Level: Evidence from Sub-Saharan Africa

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**Impact of Remittances at Macro Level: Evidence from Sub-Saharan Africa**

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## **Abstract**

*The flows of remittances to developing countries are rapidly increasing in size and growth rate over the last two decades, reached \$421 billion in 2016. This large volume of external finance could play an important role in the economic development both at macro and micro level. As a result, this study was conducted to examine macroeconomic impact of remittances mainly in context of Sub-Saharan Africa. Various empirical evidences and our simple correlation result show that remittances will boost economic growth through enhancing investment growth, as they raising saving, filling resource gaps, and easing financial constraint of investors, which in turn increases both physical and human capital (through raising health and education outcome), raising consumption spending on durable and non-durable goods.*

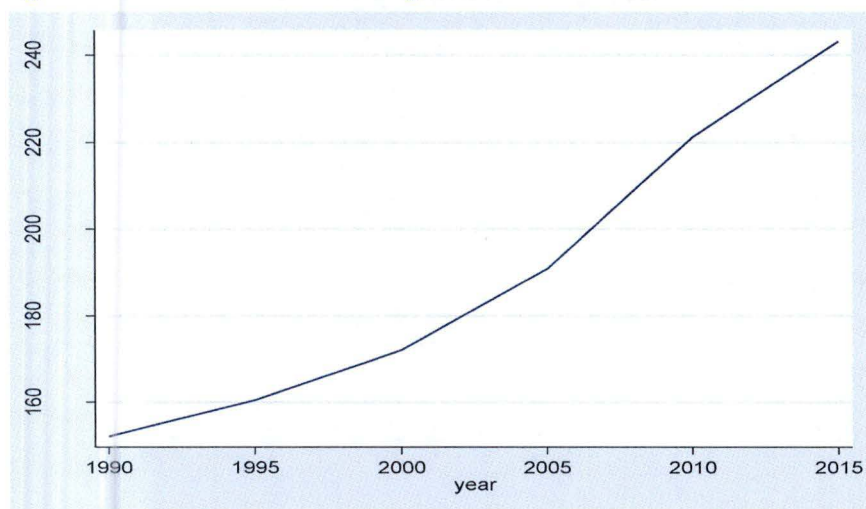
*The flow of remittances to sub-Saharan Africa could also help countries to overcome shortage of foreign exchange reserve. Adequacy foreign exchange reserve is one of important indicator of macroeconomic stability. Hence, this study examined how and to what extent inflow of remittances affect reserve accumulation in selected sub-Saharan Africa using dynamic panel data over the period of 1995-2015. Our finding shows that remittances have statistically significant and positive net effect on foreign exchange reserve accumulation. Beside remittance, government policies also play an important role in reserve accumulation through affecting economic growth, exchange rate and net export.*

*Therefore, sub-Saharan African countries can improve their economic growth performance and foreign exchange reserve accumulation by strategically harnessing the contributions of remittances through ensuring their efficient and reliable transfers and minimizing the cost of transfers by improving their governance performance.*

## 1. Introduction

Over long period of time people move from their origin place to another place in temporary or permanent due to various reasons like political instability, wage differential, poverty, education, etc. In recent years migration flows have been rising rapidly and become one of hot issues in the world. Over last few decades the total stock of international migration is increasing at worldwide level. As shown in figure 1 the number of international migrants worldwide has reached 244 million in 2015, which is huge increment compared to only about 152 million in 1991 and 172 million in 2000. As share of total world population, there is a slight increase. The organization for Economic Co-operation and Development report (2017) shows that in 2015 about 3.3% of the world's population people were living outside their country of birth as compared to 2.7% in 1995.

Figure1: Flow of international Migration in the world, 1990-2015



Source: Own Computation based on data from WDI (2017)

When we look at growth rate of international migrant, between 1995 and 2000, on average the international migrant stock grew by 1.4 percent per year. The average growth rate reached 3 percent between 2005 and 2010. Since global financial crisis it has slowed, plummeted to around 1.9 percent per year during the period of 2010-2015 (see table 1). However, there are still positive growth rate which implies the total stocks of international migrants continue to grow.



Further, World Bank projection also shows that the migrants will continue to grow in medium to long term.

Table 1: Growth of International migration at worldwide level, 1995-2015

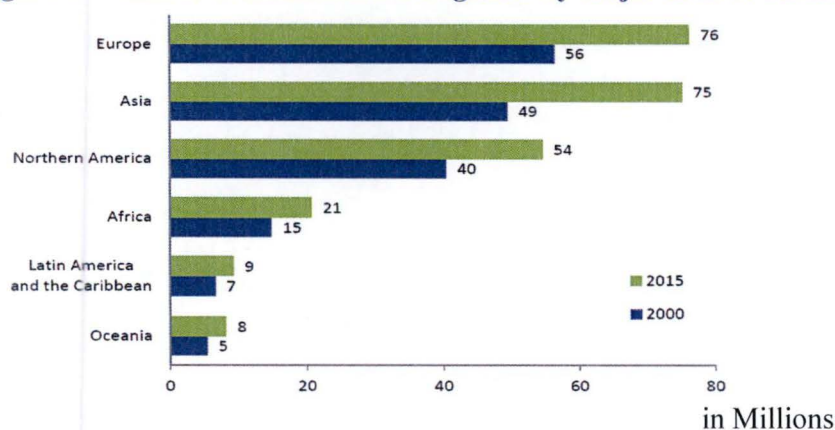
| Year                                          | 1995 | 2000 | 2005 | 2010 | 2015 |
|-----------------------------------------------|------|------|------|------|------|
| Growth rate of International Migrants         | 1.0  | 1.4  | 2.0  | 3.0  | 1.9  |
| International migrant stock (% of population) | 2.8  | 2.8  | 2.9  | 3.2  | 3.3  |

Source: Own Computation based on WDI (2017)

The other importance dimension of migration is migrants’ destination countries. The United Nation report (2016) shows that 71 percent of all international migrants worldwide, 173 million international migrants, lived in high-income countries like USA, Europe in 2015. Of high income countries 71.6 percent were living in OECD countries where as the remaining 29.4 percent, 49 million migrants, were hosted in non-OECD high income countries. This shows that only 29 percent of the world’s migrants lived in middle- or low-income countries, of this majority (87 percent) were living in middle income countries.

As shown in figure 2, nearly two thirds of all international migrants worldwide live in Europe or Asia. In 2015, 76 million international migrants were living in Europe, whereas 75 million migrants were residing in Asia. Next to Europe and Asia, Northern American hosted the largest portion of international migrants (54 million) followed by Africa (21 million), Latin America and the Caribbean (9 million), and Oceania (8 million).

Figure 2: Number of international migrants by major area of destination, 2000 and 2015

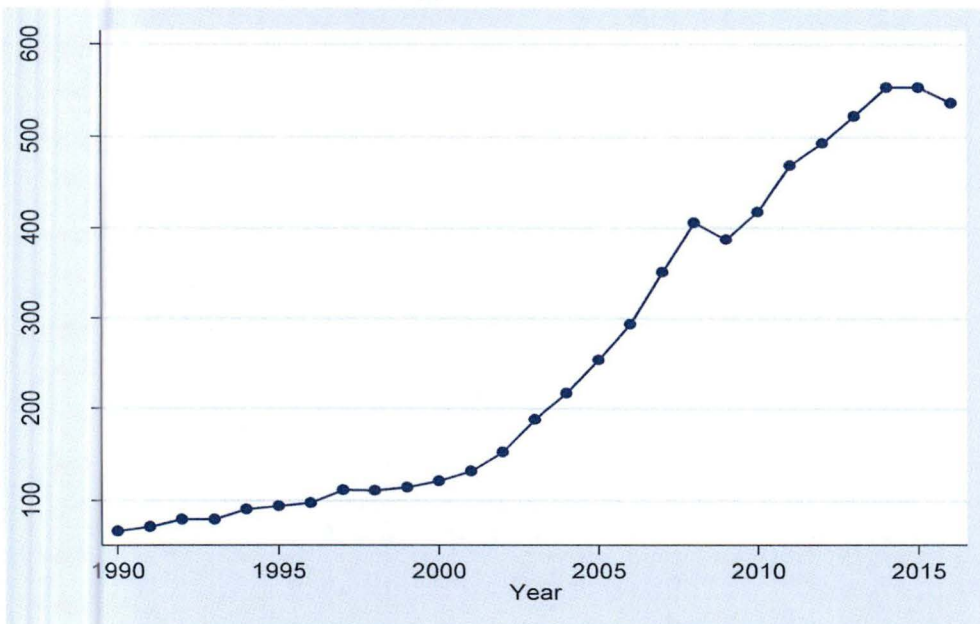


Source: UN, 2016 Report

This large flow of migration across the world has political, economic, social and cultural consequences. It affects the economy of migrants' origin and destination through various channels. Remittances are the main channels through which migration affect economy of migrants' origin countries.

Over last two decades the follow of worldwide remittances have increased substantially. Worldwide flow of remittances reached \$537 billion in 2016 with majority of them flowed to developing countries (see figure 3). Especially from 2000- 2008, there was sharp rose of remittance at worldwide level, an average growth rate of 15 percent per year, which is highly related with growth of international migrants stock and better economic performance of migrants hosting countries. Following 2008 global financial crisis the worldwide flow of international remittance was reduced, plummeted by around 4.5 percent in 2009. However, it didn't take long time to recover, as remittance started to rise in 2010. The recent oil price reduction in Gulf of council countries and Russia contributed for slight reduction of remittance at the world level, which become \$537 billion in 2016 compared to 553 billion in 2015. Out of this majority of flows goes to developing countries, which become \$421.9 billion in 2016.

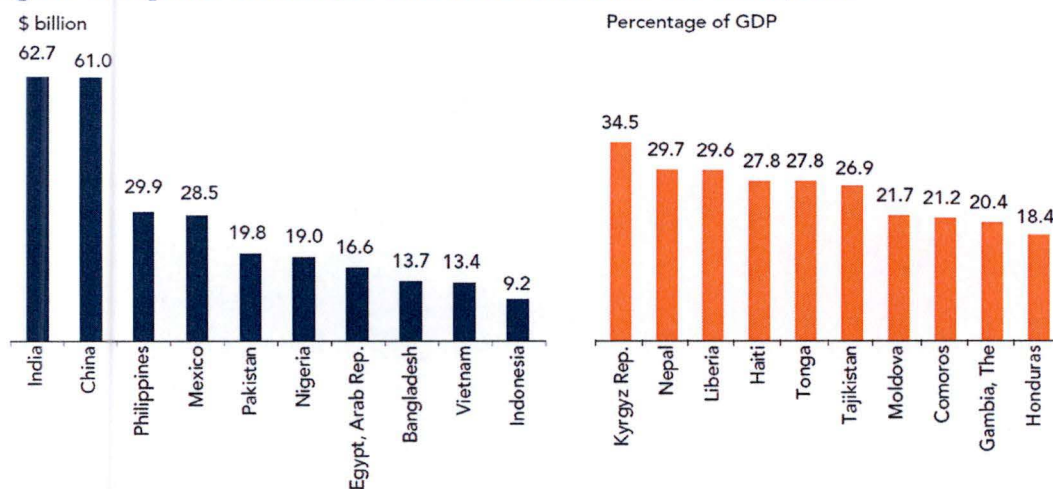
**Figure 3: Worldwide flow of Remittance, 1990-2016**



Source: Own Computation based on WDI data (2017)

When we look at top receivers of remittance in absolute level, South and East Asian countries are main destination. The WB report (2017) shows that India is top receiver of international remittance in the world in terms of absolute level (\$62) followed by china and Philippines (WB, 2017). However, as share of GDP, Kyrgyzstan (34.5 % of GDP) is the first in the world followed by Nepal (29.7 percent) and Liberia (29.6 percent).

**Figure 4: Top Ten Remittance Receiver countries in the world, 2016**



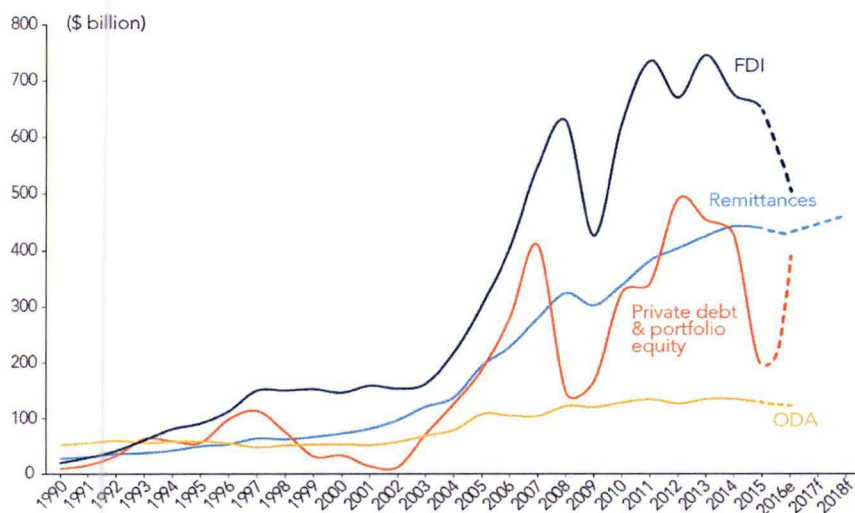
Source: WB (2017)

In many developing countries remittance become the important source of foreign exchange earnings. It is almost three times of official development assistance and about half of foreign direct investment (Ratha, 2013). As shown in figure 5, remittance is almost the second important source of foreign exchange earnings for developing countries, next to foreign direct investment. Moreover, as compared to other external financial source remittance is relatively more stable and counter cyclical. Hence it plays a great role in stabilization of economy. For instance, both FDI and private portfolio investment sharply reduced due to global financial crisis whereas the flows of remittance almost remain stable with only small and short lived diminution.

Remittance provides alternative insurance for families and communities to shocks like climate, conflicts, etc (ibid). The actual amount of remittances can be much higher than reported figure since there are a lot of informal money transfers which are not recorded, especially to sub-Saharan Africa.



**Figure 5: Resource flows to developing countries**



Source: Adapted from WB (2017)

This large inflow of remittances can affect economy of migrants' origin countries both at macro and micro level through different channels. Various literatures show that international remittance affect economy of migrants' origin countries through its effect on consumption, investment, trade balance, foreign reserve and exchange rate.

## 2. Motivation of the Project

Overseas remittance earnings have become a major source of external financial resources for the many developing economies in recent years. Though Remittance earnings in absolute level and as share of Gross Domestic Product (GDP) have been rising in many developing countries, there is a lot of variation across countries.

The flows of international migration, which in turn affect remittance, are influenced by different factors. According to Mohapatra and Ratha (2010) the economic situation of migrants' destination countries, level of diversification of migration destinations, change in exchange rate, and immigrants' policies of hosting countries can determine remittances flow. They stated that the 2008-09 global financial crises estimated to reduce remittance flows to developing countries by 6.1 percent in 2009 as a result of weak job markets in major destination countries though the reduction is not for all regions and also the extent is not the same. Moreover, they concluded that the impact of the crisis has been more severe in corridors with fewer restrictions on labor



mobility. On the other hand, the stocks of international migration continue to grow though the growth rate of new migration has fallen. This could make remittances remained resilient especially in the case of more diverse the migration destinations. According to Ncube and Brixiova (2013), remittance inflow can also highly depend on growth and stable macroeconomic environment of receiver countries.

Many studies and reports show that unlike other external financial resources, the flows of remittances to developing countries didn't take more time to recover from crisis. They have been continued to grow. This large inflow can affect economy of receiving countries in different aspects. There are abundant literatures regarding microeconomic and macroeconomic impact of international remittances on economic growth and poverty reduction in developing countries. Most of evidences have shown that remittance plays an important role in poverty reduction through increasing income of receiver and hence raising consumption. However the effect on growth is ambiguous though many studies wrap up positive effect of remittances. For instance, Matuzeviciute and Butkus (2016), Tahir et al (2015) and Feeny et al. (2014) found positive and significant impact of remittances on economic growth.

The economic impact of remittances could depend on countries level of development and abundance of remittances the countries received (Matuzeviciute and Butkus, 2016). If remittances are growth enhancing relatively more in less developed countries, this implies they fill the gap of foreign currency shortage, provide alternative way to finance investment, and help overcome liquidity constraints in those countries. However, the impact of remittances could highly depend on public policy, economic and political stability which creates a favorable environment for the use of remittances in productive investment. In such case the positive impact of remittance could be observed in relatively developed countries. Their finding provides strong evidence that the marginal impact of remittances on long-run economic growth increases with the level of economic development. This implies in countries with limited capabilities along with market imperfections, remittances do not contribute to financial investment and are more likely to be devoted to consumption which is not that much growth generating activities, particularly when expenditure is made on imported goods. Moreover, the study concluded that the marginal impact of remittances on long-run growth is diminishing with the abundance of remittances

(higher remittance to GDP ratios) as they could reduce labor supply in remittance abundant countries.

Other studies find either insignificant or negative effect of remittances on economic growth. Guha (2013) tried to examine macroeconomic effect of international remittances in developing countries. He found that inflow of remittance can lead to Dutch disease problems through appreciation of exchange rate that can reduce tradable goods competitiveness and contract economic growth. Most of studies have tried to examine impact of remittance mainly through consumption and/or investment channels.

However, remittances affect recipient economy not only through consumption and investment channels. The third important channels through which remittance affect macroeconomic stability is through its impact on foreign exchange reserve. The foreign reserve position of country is one important indicator of economic stability. The strong position in international reserve reduces the impact of fluctuation in capital flows which in turn allow less BOP fluctuation and country economy in general (Diego and Ruby, 2014). One of the factors that can affect foreign reserve position of a given economy is the inflow of remittance. The inflow of foreign currency from remittances improves the foreign exchange position of receipt economies and hence enhances the solvency of the country. Therefore, it is important to understand how remittances affect the accumulation of international reserves because reserves are a measure of foreign exchange liquidity and are commonly used to gauge the creditworthiness of a particular country.

Theoretical literature argue that central bank hold foreign exchange reserve for different motives which includes precautionary (self-insurance against external shock especially for country not have easy access to external finance), mercantilist (mechanism of controlling exchange rate, that means support monetary authority intervention in foreign exchange with objective of stabilization), and facilitate international transaction including external debt servicing (Delatte and Fouquau, 2012; Diego and Ruby, 2014). Given such importance for a given economy, it is important to look into contribution of external financial flows mainly remittances to reserve accumulation.

There are few studies that conducted regarding the impact of remittances on foreign exchange reserve position of country. For instance, Diego and Ruby (2014) conducted study on



remittances, international reserve and exchange rate regime in nine Latin American countries using dynamic panel data. The study found that remittances have positive and statistically significant effect on international reserve. Moreover, they showed that the extent of effect depending on regional characteristics and their relative importance in the economy. The effect is bigger for countries in which remittances share of GDP is large and operate under a more fixed exchange rate system. Chowdhury et al (2014) also analysis determinants of Foreign Exchange Reserves in Bangladesh using time series data (1972-2011) by incorporating remittances as one of explanatory variables. Their finding shows that remittances are positively and significantly contribute to international reserve.

The IMF report shows that relatively there is low level of international reserves in many SSA countries, especially in those countries with fixed exchange rate regimes. Moreover, in recent years many countries experiencing mount of public debt. Therefore, given this scarce literature regarding relationship between remittance and foreign reserve accumulation, it is important to examine the impact of huge inflow of remittances on foreign exchange reserve of developing countries in context of sub-Saharan Africa. In doing so, this study will contribute to the existing knowledge gap regarding the effect of remittances on reserve accumulation. Our finding will provide empirical evidence how and to what extent inflow of remittance affect reserve position of a country which can provide important information for concerned body.

Moreover, this study also attempted to analysis trend of remittance flows to sub-Saharan Africa especially after global financial crisis and comparing with flows to others region as well as with foreign finance sources like foreign direct investment, official development assistance and private portfolio investment.

### **3. Objectives of study**

The main objective of this project is to investigate impact of remittances at macro level, mainly on foreign exchange reserve. Specifically, the study aimed to

- Examine trends of remittances flow in sub-Saharan Africa comparing with other developing countries and other external financial resources like FDI, ODA.
- Analysis role of remittances for economic growth in sub-Saharan Africa

- Scrutinize impact of remittances on foreign exchange reserve in sub-Saharan Africa.

#### **4. Literature Review**

##### **4.1. Theoretical Literature**

An international migrant is a person who is living in a country other than his or her country of birth (UN, 1998). Based on duration migration can be classified into two: short-term and long-term migration. The United Nations defined long-term migrant as a person who moves to a country other than that of his/her usual residence for a period of at least one year. On the other hand, short-term migrants are persons who move to a country other than that of their usual residence for a period of at least three months but less than one year.

According to IMF (2009) definition in the balance of payment account, personal remittances are the sum of two main components: compensation of employees, and personal transfers. It also consists of a third item called capital transfers between households, however data on this item are difficult to obtain and hence reported as missing for almost all countries. According to this IMF definition, Compensation of employees is remuneration in return for the labor input to the production process contributed by an individual in an employer-employee relationship with the enterprise. On the other hand, personal transfers are broader than “worker’s remittances” as it comprises all current transfers in cash or in kind made or received by resident households to or from nonresident households. It thus includes all current transfers between resident and nonresident individuals, regardless of the source of income of the sender (irrespective of whether the sender receives income from labor, entrepreneurial or property income, social benefits, and any other types of transfers; or disposes assets) or the relationship between the households (irrespective of whether they are related or unrelated individuals).

There are multiple paths through which remittances influence an economy at macro and micro level in the migrants’ origin country. Remittances are non-wage income sources of households. Therefore, large inflow of remittances will raise income of recipient households which in turn increases household’s consumption of goods and services (Guha 2013; Matuzeviciute and Butkus, 2016). If the increase of income due to remittance is spent on domestic products, this will boost production activities and hence enhance economic growth of the country.

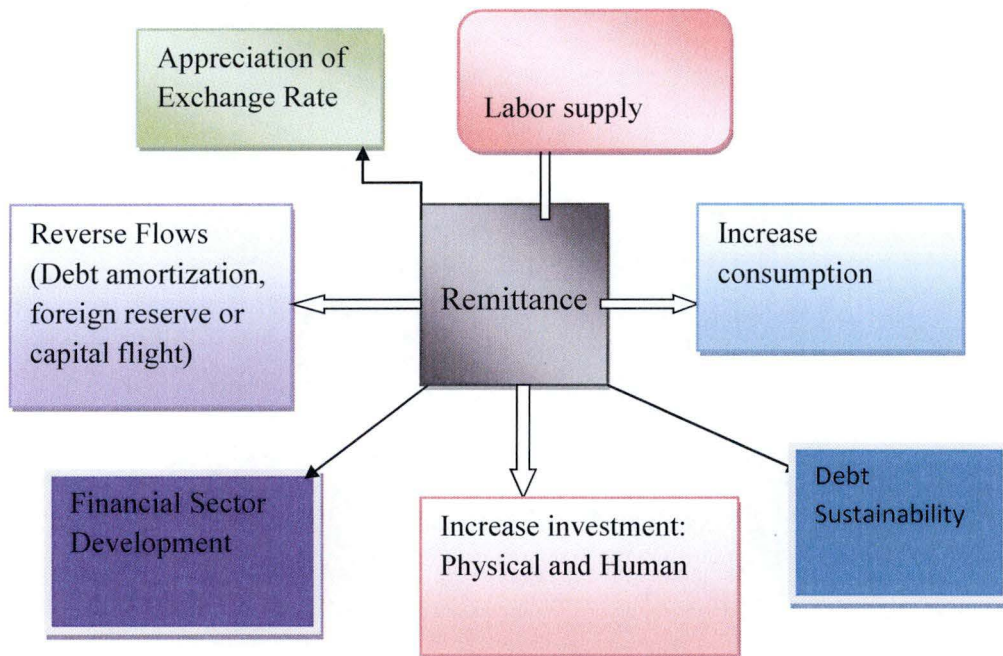


Remittance can reduce school dropout, and improve health status of families including children with better weight at birth as families disproportionately spend income from remittances on education and health (Ratha, 2013). Moreover, inflow of remittance can fill resource gap (saving-investment) through improving domestic saving and financial intermediation that lead to increase of investment (Ncube and Brixiova, 2013; Das and Serieux, 2010). It also eases debt sustainability pressure. Hence, remittance can ensure sustainable economic growth through improving investment in physical and human capital.

According to Barajas et.al (2009) remittances inflow can affect economic growth of receipt nations through three different channels: capital accumulation, labor supply and total factor productivity. Firstly, remittance can improve capital accumulation either through ease financial constraint of households, improve the creditworthiness of domestic investors which may lower the cost of capital in the domestic economy as remittance may effectively augment household collateral, or make domestic economy less volatile which makes investment more attractive. The improvement in capital accumulation due to remittance can lead to positive economic growth. However, inflow of remittance may not necessarily direct towards investment especially in poor economies with large marginal propensity to consume. Secondly, remittance may have negative effect on the labor force participation since it is income transfer households may rationally substitute non-labor income for labor income or by creating moral hazards as distance separating remitter and recipient. As a result of this, the inflow of remittance can have negative impact on economic growth. Thirdly, it may affect total factor productivity through effects on the efficiency of domestic investment as well as through effects on the size of domestic productive sectors that generate dynamic production externalities.

According to Jidoud (2015) remittance has stabilization impact mainly through two channels: labor supply and financial frictions. Remittance may lead to reduce labor supply which lowering output and increasing its response to shocks. Moreover, remittances are more stabilizing in countries with a shallow financial and banking sector and when remittances induce financial sector development by providing a greater access to financial markets to their recipients (which can improve their creditworthiness scores).

Chart 1: Main Channels through which Remittances Affect Economy



Source: Own framework based on Existing Literature

The flow of external resources to developing countries can also contribute to financial sector development. The development of financial sector, which can be measured in terms of depth, efficiency, stability and accessibility of financial institutions and market, can play an important role in the development of economy through resource mobilization and transferring of funds from unproductive to productive sectors,. This implies that in economy with efficient financial system there is credit flowing from the financial system to the real economy through the pooling of savings and allocation of capital to productive investments. Remittance is one of important source of savings and bank deposit to the financial sector in recipient countries. That means this flows to developing countries provide a potential gain for a country’s financial development: a stream of earnings to be tapped for saving and for leveraging through formal credit and other products. Thus, leveraging up’ remittances through formal financial institutions is important since, by themselves, remittance flows do not solve the structural financial constraints faced by many developing countries (Gupta et al, 2007). However, the leveraging up’ of the flow of remittances through formal channel could also require development of financial institutions.



Reverse flows are another important channel through which remittance affect economy. Remittances allow developing countries to maintain adequate foreign reserves, to finance interest and principal payments on foreign debt and finance capital flight (Das and Scheux, 2010). According to them the greater the amount of remittance-based foreign exchange used for financing reverse flows, the smaller will be the effect that they can have on consumption and investment rates for the macroeconomic. Thus, the diversion of remittances towards the financing of reverse flows affects the degree to which these flows can generate growth by directly boosting investment and consumption rates.

An adequate and stable foreign exchange reserve is one of key factor of well-managed economy. It provides a cushion against economic shocks, domestic or external (Keatinge, 2014). By boosting foreign exchange receipts, remittances have allowed low income countries to maintain adequate foreign reserves and service debt. Therefore, remittances contribute to the reduction of current account deficits as private transfer in many developing countries. In low income countries, the current account deficit as a percentage of GDP would have more than doubled in the absence of remittances in recent years. For some south Asian countries like Philippines, Bangladesh, Nepal, remittance flows have offset large trade deficits and enabled these countries to maintain a current account surplus (Mohapatra et al., 2010). Moreover, remittances can also improve creditworthiness of countries, mainly for middle income countries. At a moment it also factored into sovereign ratings in middle income countries and in the debt sustainability analysis for low income countries.

The inflow of remittances can also help to ensure debt sustainability. They can lead to reduced country risk and improve the sustainability of government debt (Chami et al, 2008). The substance flow of remittance to Sub-Saharan Africa can directly or indirectly increase the government's revenue base, thereby reducing the marginal cost of raising revenue.

#### **4.2. Empirical Evidence**

There has been a growing literature examining how migrant remittances can affect economy in general. Among these studies, some have documented how migrants have



contributed to economic growth, poverty reduction, and development in their country of origin.

Many Studies suggest that remittances may help economic growth and hence lead to reduction of poverty though the result is not conclusive. Wadood and Hossain (2017) examine microeconomic impact of remittances on household welfare in case of Bangladesh using propensity score matching approach. The approach will reduce the selection bias associated with migration. The study found that remittances have significant impact on reducing poverty through increasing consumption expenditure of households. However, its impact on households' expenditure on education and health is significant. Adams and Page (2005) using counterfactual methodology based on a household survey of 71 developing countries examined impact of international remittances on poverty reduction. After controlling for difference in income level, income inequality, and geographical region of countries, they find that remittances have a significant positive effect on reducing poverty in the developing countries.

Batu (2017) examine International worker remittances and economic growth in a Real Business Cycle framework in 81 developing countries. The finding of study predicts that temporary inflow of worker remittances positively affect GDP per capita while a permanent increase of remittances does not. In his argument, a permanent change in worker remittances produces a positive income effect; this lead to hours worked falls assuming leisure is normal good. As a result output will fall in the long run. On the other hand, a temporary change in worker remittances produces a positive effect to output in the short run. The receiver of remittance may partly save it to smooth his/her consumption which in turn lead to an increase in investment and output.

Guha (2013) also investigate macroeconomic effects of international remittances in developing countries using dynamic stochastic general equilibrium model. He found that inflow of remittance can lead to Dutch disease problems through appreciation of exchange rate that reduce tradable goods competitiveness and contract economic growth.

Regarding effect of remittances on international reserve there is little empirical evidence. Most of researchers tried to look at optimal level of reserve than its determinants. Diego and Ruby (2014) are one of few studies conducted research on the role that remittances play in the

accumulation of reserves using a dynamic panel model for a group of 9 Latin American countries over the period of 1997-2010. The paper used General method of Moments, particularly Arellano-Bond estimator so as to overcome problem of endogeneity aroused from dynamic nature of reserve as it depend on its previous value. According to their study the accumulation of international reserve affected by government policies mainly through their economic stabilization channels and the growth prospects that can serve to attract capital flows, trade and exchange rate policies. Moreover, external foreign resources, like remittances, foreign direct investment, portfolio private investment, and official development assistance, are also play an important role in the accumulation of foreign exchange reserve. Their finding shows that remittances as % of GDP have statistically significant and positive effect on the total reserve as % of GDP. The current flows of remittances have positive effect whereas previous year flows have negative and statistically significant effect on reserve accumulation. However, the net effect of remittances is positive. Moreover, the studies found that exchange rate, lagged net export and interest rate differential are significant determinants of level of reserve.

Shuaibu and Mohammed (2014) tried to investigate determinants and sustainability of international reserve accumulation in Nigeria using autoregressive distributed lag model on the time span from 1970-2010. They found that international variability of export earning, lagged value of international reserve, oil price, GDP per capita, and environmental measure (CO<sub>2</sub> emission) are significant determinants of reserve accumulation in the long run. Chowdhury et al. (2014) using time series data spanning from 1972-2011 also examined determinants of foreign exchange reserve in Bangladeshi. According to this study, level of reserve depend on remittance, domestic interest rate, GDP per capita, level of broad money, exchange rate, import and export price index. The result shows that flow of remittances positively affect the reserve accumulation.

In general, from the existing literatures we can conclude that the substantial flow of remittances to sub-Saharan Africa can play an important role to achieve sustainable economic development in the region. They could foster economic growth through enhancing investment which in turn increases both physical and human capital (through raising health and education outcome), raising consumption spending on durable and non-durable goods, raising saving and improving financial sector. As a result of these, they could tend to reduce poverty and inequality in recipient countries, as well as increase aggregate investment and growth.



Further, remittance can also contribute to macroeconomic stabilization. They enable economy to maintain adequate level of foreign exchange reserve which in turn helps to minimize external sector fluctuation and overall economy. Given their countercyclical behavior, remittances can significantly reduce growth volatility and help countries adjust to external and macroeconomic policy shocks. Remittance services have provided lifeline for the majority of poor households as they mitigate vulnerability and sustain livelihoods among the population, through timely cash payments.

However, remittances are not necessarily associated with economic growth. They may not necessarily increase domestic investment or a more efficient allocation of domestic investment. Recipients' households may rationally substitute unearned remittance income for labor income and, hence reduce labor supply which in turn reduce production given labor and capital complementarities in production. That means remittance could reduce households' incentive to work by creating culture of dependency. Moreover, they may lead to appreciating of domestic currency which in turn reduce the trade competitiveness of country and hence contract economic growth. Additionally, remittances may not necessarily reduce poverty and inequality. In some cases they may flow to better-off households as migration is costly for poor households. This distributional profile will clearly lower the potential poverty-reducing impact of remittances.

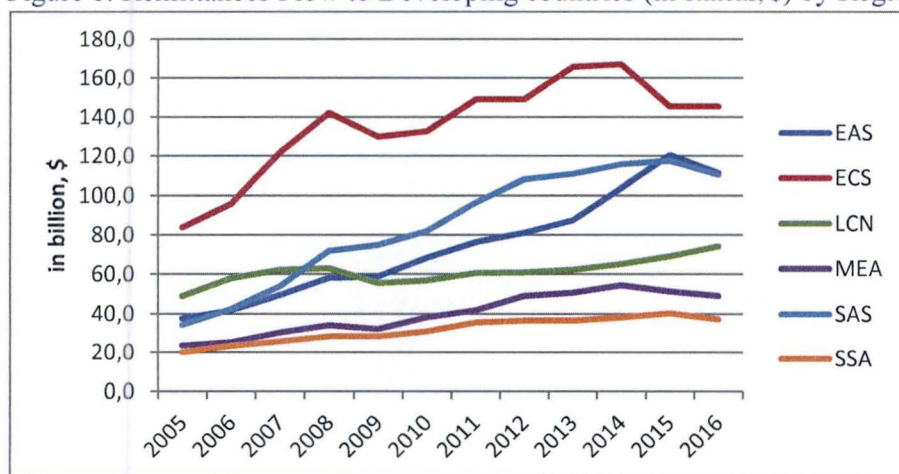
Regarding the impact of remittance on foreign exchange reserve, there is only a little empirical evidence conducted so far as per our knowledge. Therefore, this study tried to fill this knowledge gap by examining impact of remittance on foreign reserve in context of selected Sub-Saharan Africa countries.

## **5. Remittance Flows to Sub-Saharan Africa**

It is hard to estimate the exact size of remittance flows to developing countries in general and sub-Saharan Africa in particular because many transfers take place through unofficial channels. The flows of remittances to developing countries have increased substantially in recent years. The flows to developing countries reached \$421.9 billion in 2016. Remittance is one of a major source of foreign exchange and income for several sub-Saharan African countries. Like other developing economies, the flows to sub-Saharan Africa have increased rapidly over one and half last decade. In fact the volume of remittance to region reached \$37.2 billion in 2016

compared to only \$23.3 billion in 2006 (see figure 6). However, there is great variation in size, growth rate and GDP share of remittance among various region of world. As shown in figure 6 majority part of remittance flows to Europe and central Asia followed by East Asia, south Asia and Latin America. In 2016, the Europe and central Asia received around \$145 billion amount of remittance which is more than three times of sub-Saharan Africa. The flows of remittance to East Asia and south Asia reached \$111.3 and \$110.4 billion in the same period of time respectively. As compared to other developing countries the flow to sub-Saharan Africa is low. World Bank report (2017) shows that the informal flow of remittances are significantly higher in SSA than in other regions. Moreover, intraregional migration is very common in SSA; hence the balance of payments very likely underreports intraregional remittances. For instance there a lot of migrants flow to Botswana and South Africa from neighboring countries, and strong socio-cultural ties in West Africa encourage labor mobility in that sub-region.

Figure 6: Remittances Flow to Developing countries (in billions, \$) by Region, 2005-2016



Source: Own Computation based on WDI data (2017)

Note: EAS represent East Asia and Pacific, ECS: stand for Europe and Central Asia

LCN: stand for Latin America and Caribbean, MEA: Middle East and North Africa

SAS: Represent South Asia, SSA: stand for Sub-Saharan Africa

Regarding the growth rate, before financial crisis all regions registered positive and high growth rate of remittance flows. However due to global financial crisis, in 2009 almost all region recorded negative growth rate with largest reduction registered in Latin America (12 percent) mainly because of crisis in USA as USA are main destination of migrants from this region and



Central Asia (which can partly explained by depreciation of the Russian ruble relative to the U.S. dollar) (see table 2). As a result, there was reduction of remittance flows to developing countries, which reduced by 4.5 percent in 2009.

Table 2: Remittance flows to Developing Countries (Growth Rate), 2006-2016

| Region                     | Year |      |       |      |      |      |      |      |       |      |
|----------------------------|------|------|-------|------|------|------|------|------|-------|------|
|                            | 2007 | 2008 | 2009  | 2010 | 2011 | 2012 | 2013 | 2014 | 2015  | 2016 |
| East Asia & Pacific        | 18.5 | 17.3 | 1.2   | 16.3 | 11.5 | 6.4  | 7.7  | 18.6 | 16.4  | -7.7 |
| Europe & Central Asia      | 27.1 | 16.7 | -8.6  | 2.1  | 12.4 | 0.0  | 11.3 | 0.7  | -12.9 | 0.0  |
| Latin America & Caribbean  | 7.3  | 1.7  | -12.2 | 2.5  | 6.7  | 0.6  | 2.1  | 4.7  | 6.0   | 7.3  |
| Middle East & North Africa | 19.9 | 12.6 | -6.1  | 19.1 | 9.3  | 17.4 | 3.1  | 7.5  | -5.5  | -4.7 |
| South Asia                 | 27.1 | 33.1 | 4.2   | 9.4  | 17.6 | 12.0 | 2.6  | 4.5  | 1.5   | -6.1 |
| Sub-Saharan Africa         | 10.7 | 10.1 | 0.0   | 9.7  | 14.6 | 2.3  | 0.0  | 4.8  | 5.5   | -7.9 |

Source: Own Computation based on WDI data (2017)

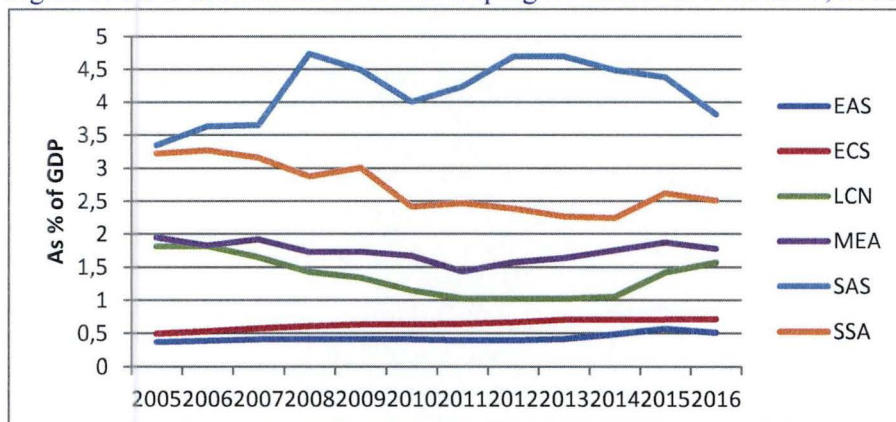
Remittance flows to South Asia, East Asia and Pacific and Sub-Saharan Africa appear to have been less affected by global financial crisis because the remittance sources are more diversified in these regions. Overall, the flow of remittance to developing countries is more resilient to economic shock. Unlike other financial resources, the reduction is only temporary as they have recovered in short period of time, in 2010 all regions registered positive growth of remittance.

Remittance flows to developing countries once again shows slight decline in 2015/16. The 2015 reduction registered for Middle East and North Africa and Central Asia region. Moreover, flows to South Asia, Middle East and Sub-Saharan Africa in 2016 were also reduced. According to World Bank report (2017), current reduction in remittance flows to developing were impacted by low oil prices and weak economic growth in Russia and the GCC countries. In addition to this, weak growth in Europe also affected flows to North Africa and Sub-Saharan Africa. The report shows that weakening of the euro, the British pound and the ruble against the U.S. dollar further highlighted the decline in remittances in U.S. dollar terms. Moreover, exchange controls, burdensome regulations, and anti-migrant policies in many countries also contribute for current reduction of flows of remittances. On the contrary of other regions, Latin America and the

Caribbean region registered an increase in remittance flows mainly because of improving US economic performance which strengthening employment levels for migrants.

The projection of World Bank shows the inflow of remittance to the sub-Saharan Africa expected to increase in 2017, mainly led by Nigeria, largely due to the devaluation of the naira. Compared to other region, remittances as share of GDP in Sub-Saharan Africa is the second largest, next to south Asia. As we can observe from below figure 7, in 2016 remittance as share of GDP was 3.8 percent for south Asia which followed by sub-Saharan Africa (2.5 percent) and Middle East & North Africa (1.8 percent). Though in absolute level the flows to region have increased, there is slight reduction of remittances as % of GDP mainly due to recent economic growth registered in the region.

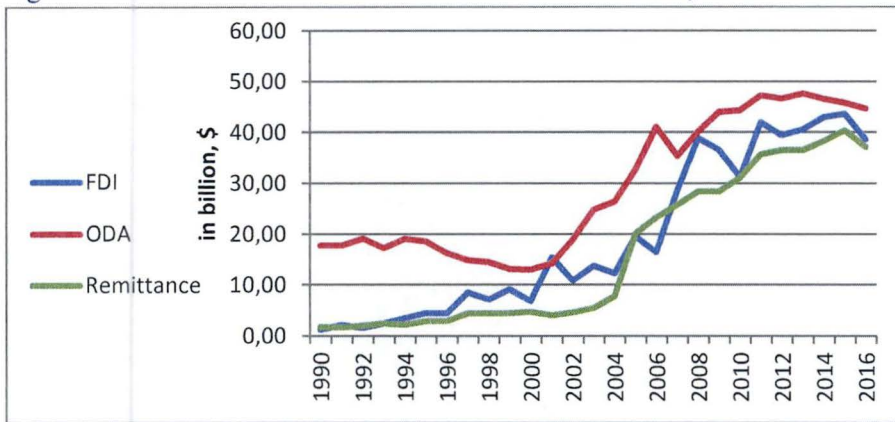
Figure 7: Flow of Remittance to Developing Countries as % of GDP, 2006-2016



Source: Own Computation based on WDI data (2017)

Figure 8 depict flow of remittances to sub-Saharan Africa compared to other external financial sources. The volume of external flows (foreign direct investment, official development assistance and remittances) to the region increased (\$20 billion in 1990 to above \$120 billion in 2016). Most of this increase in external flows to sub-Saharan Africa can be attributed to the increase in foreign direct investment and the growth of remittances. Before 2000 the main external sources for many sub-Saharan African countries is ODA. However, in recent years there is significant increase of role of FDI and remittances, especially since 2005. The remittance flows to sub-Saharan African countries not only increasing in volume, but also less volatile (more resilient to economic shocks) than other external financial sources.

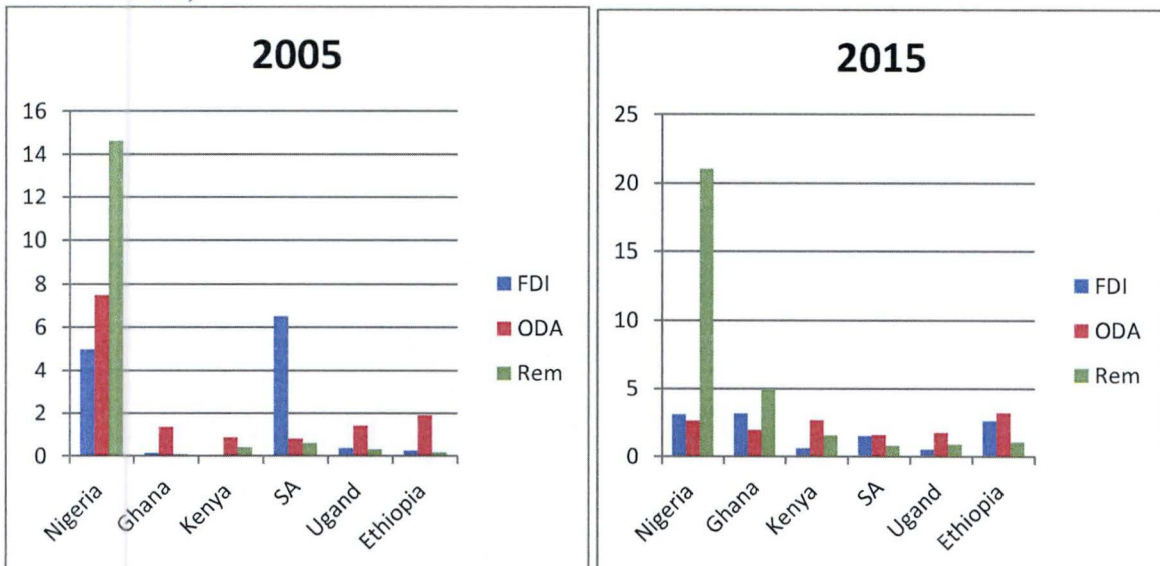
Figure 8: External Resource flows to Sub-Saharan Africa, 1990-2016



Source: Own Computation based on WDI data (2017)

There are variation in composition and importance of external financial sources among sub-Saharan African countries. As we can see from below figure the volume of remittance is significantly increased between 2005 and 2015 for selected SSA countries.

Figure 8: External Resource flows to selected Sub-Saharan African Countries (as % of GDP)



Source: Own Computation based on WDI data (2017)

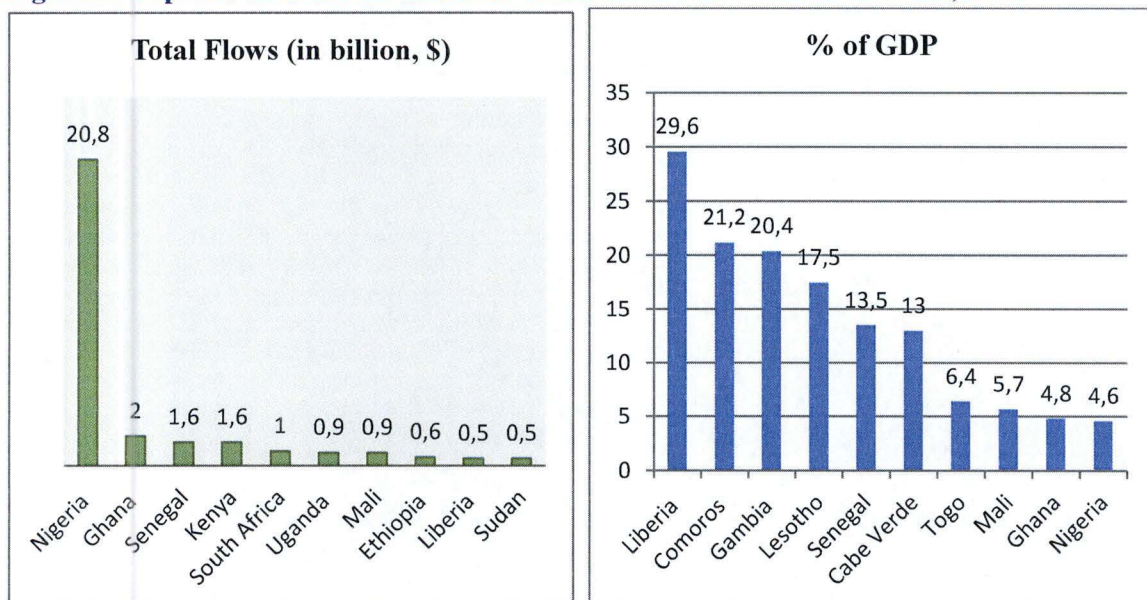
Remittance is the main source of foreign exchange earning in Nigeria and Ghana. For instance in 2015, remittances becomes more than 6 times of FDI and more than 8 times of ODA in Nigeria,



biggest remittance receiver in Africa. Like Nigeria, remittance is the main source of foreign exchange earnings for Ghana, more than twice of official development assistance received by the country in the same period of time.

For a number of small African countries such as Liberia, Comoros, Lesotho, Gambia, Cape Verde, Togo, remittances represent an even larger source of external financing, for some economies accounting up to 20 to 30% of their GDP (figure 9). For instance, the economy of Liberia is highly dependent on remittances. With remittances accounting for 29.6% of their GDP in 2016, and become apparently ranks 3<sup>rd</sup> worldwide

**Figure 9: Top Ten Remittance Receiver countries in Sub-Saharan African, 2016**

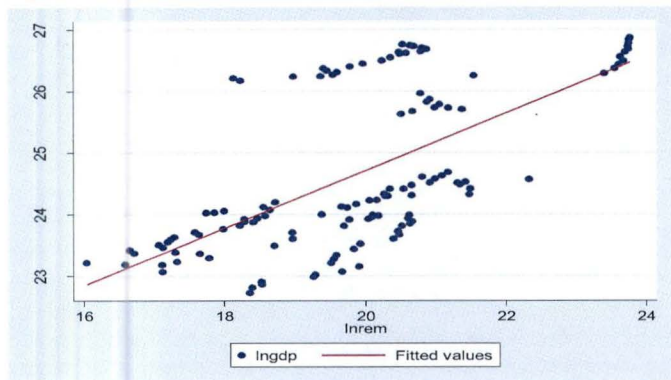


Source: WB (2017)

## 6. Impact of Remittances on Economic growth in Sub-Saharan Africa

In this section we will explore the association between remittance and economic growth in sub-Saharan Africa. Figure 10 below depict the correlation between economic growth (measures by logarithmic of real GDP) and remittance (logarithmic of volume of remittances) for six selected sub-Saharan Africa over the period of 1995-2015 (see below, section 7, for explanation why we selected those six countries).

Figure 10: Scatter Plot of GDP and Remittances, 1995-2015



**Pairwise correlation**

|              |                |
|--------------|----------------|
|              | <b>LnGDP</b>   |
| <b>LnRem</b> | <b>0.6408*</b> |

Source: Own Computation based on WDI data (2017)

As we can see from above graph, there is strong association between economic growth and remittances in the region. The pairwise correlation coefficient is strong (0.65) and statistically significant at 1percent significance level. This implies that inflow of remittances to region could boost economic growth as they could ease constraint of access to finance, and improve human capital (through improving education and health situation in the region). But, this is simply correlation, hence doesn't show necessarily causality. There are empirical evidences that have been conducted and confirmed the positive impact of remittances on economic growth in sub-Saharan Africa. Konte (2017) conducted study the impact of remittance on economic growth in 128 developing countries over the period of 1970–2010 using a finite mixture-of-regressions approach, correcting for unobserved heterogeneity and difference in the growth process of country. By taking into account difference in financial development, geographical location, and institutions of sampled countries, He identified two growth regimes: one in which remittances have a positive and significant marginal impact on growth; and another in which the impact of remittances is insignificant. Their finding illustrate that being sub-Saharan African countries significantly increases the probability of a country to be classified in the remittances growth enhancing regime. This implies that remittances have positive impact in the region. Since there is weak financial sector development in the region, the inflow of remittances could be an important source of investment and funding for good and talented entrepreneurs who do not have the much-needed access and use of finance in order to fully realize their economic potential.



Feeny et al. (2014) also examined impact of remittances on economic growth in small islands developing states using panel data for 136 countries spanning from the period 1971-2010. Their finding proves that there is positive impact of remittances on economic growth in those states. Unlike other developing countries, remittances are less likely to have adverse effect on labor supply since most of these states have high levels of unemployment. However, there is variation in results among different groups. They found positive impact for those in the Pacific and sub-Saharan Africa but not for those located in Latin America and the Caribbean.

Another study by Fayissa and Nsiah (2008), who examined Economic Growth and Development impact of remittances in Africa using unbalanced panel data for 37 African countries over the period of 1980 to 2004, confirm that in addition to investment in human and physical capital, remittances have positive and statistically significant impact on economic growth. A 10 percent increase in remittances could lead to an average 0.4 percentage increases in growth rate of per capita income. In their argument remittances enhance growth in countries where the financial systems are less developed by providing an alternative way to finance investment and helping them to overcome liquidity constraints.

## **7. Remittance and Foreign Exchange Reserve: Case of Selected Sub-Saharan African Countries**

### **7.1. Methodology**

The study used data from different international institutions like IMF, WB (mainly World Development Indicators) to examine impact of international remittances on foreign exchange reserve. The data is panel in nature which span from period of 1995-2015. The study focused on selected Sub-Saharan African countries that consist of six countries: Nigeria, Ghana, Kenya, South Africa, Uganda and Ethiopia. Selection of sampled countries was based on the volume of remittance countries received and availability of data.

It is known that macroeconomic variables and their economic relations are dynamic in their nature. Foreign exchange reserve, like other macroeconomic variables, has a dynamic nature in which current level has likely been affected by the previous period(s). This dynamic relationship is characterized by the presence of lagged dependent variable among the determinants. Existing literature recommended that in this situation it is better to use Lagged Dependent Variables

(LDV) models often known as dynamic panel data model to capture this characteristic. It can be created by introducing the lagged dependent variables to either fixed or random effect models.

$$R_{it} = \alpha_1 + \alpha_2 R_{i,t-1} + \beta_2 X_{it} + U_i \dots \dots \dots 3.1$$

$$U_i = v_i + \varepsilon_{it}$$

In the above models, it is more likely to have endogeneity issues because of the variables which are used as regressors for the reserve may have common determinant with the dependant variable which may be omitted from the model. Moreover, the endogeneity problem also rises from the correlation between the lagged dependent variable and the fixed effect.

If we apply OLS, and/or GLS estimator to above equation (fixed effect model), it lead to dynamic panel bias and inconsistent estimates since dependent variable is a function of unobserved country specific characteristics so is lagged dependent variable (Roodman, 2009). The existence of correlation between regressor and the error violates an assumption necessary for the consistency of OLS. There are several alternative estimators which have been proposed to solve this problem. These estimators in literature mainly grouped in to class of instrumental estimators and the class of direct bias corrected estimator (*ibid*).

Anderson and Hsiao (1981) proposed instrumental variable estimation methods which recognize the presence of omitted variable (unobserved heterogeneity) which results endogeneity and gives consistent estimator with the existed problem. The method solves these problems by using first differencing so as to remove individual effect from the system. Moreover, appropriate instruments are also employed to eliminate the problem of endogeneity. AH IV estimators use further lagged values of the dependent variable as instruments. For the variable to use as an instrument must satisfies certain properties; instrument exogeneity and instrumental relevance.

Based on the work of Anderson and Hsiao, Arellano-Bond proposed within model instrument, using lagged value as instrument, which could overcome problem of weak instrument that can arise in the previous model. Therefore, this study employed econometric specification that is dynamic in nature known as Arellano-Bond first-differenced estimator. It captures unobservable time-invariant country-specific characteristics that determine international reserves

(Arellano and Bond, 1991). The specification of model is based previous empirical literatures (mainly followed econometric specification employed by Diego and Ruby, 2014) that helps us to identify important variables that determine reserve accumulation of a given economy and is given by:

$$R_{i,t} = \beta_1 R_{i,t-1} + \sum_{j=0}^1 \beta_{2j} Rem_{i,t-j} + \sum_{j=0}^1 \beta_{3j} FDI_{i,t-j} + \sum_{j=0}^1 \beta_{4j} ODA_{i,t-j} + \sum_{j=0}^1 \beta_{5j} NX_{i,t-j} + \sum_{j=0}^1 \beta_{6j} GDP_{i,t-j} + \sum_{j=0}^1 \beta_{7j} intdiff_{i,t-j} + \beta_{8j} Ex_{i,t} + \varepsilon_{i,t} \dots \dots 3.2$$

Where

- $R_{i,t}$  is total reserve (which includes foreign exchange holdings, the reserve position at the IMF, gold and special drawing rights) as % of GDP of country i at time t. It is our dependent variable.
- $R_{i,t-1}$  is total reserve as % of GDP of country i at time t-1 which measure previous year amount of reserve. Last year reserve expects to affect current level of reserve positively.
- $Rem_{i,t-j}$  : is the amount of remittance as % of GDP country i received at time t-j. We expect positive sign for the coefficient of remittances.
- $FDI_{i,t-j}$  : is the amount of net foreign direct investment as % of GDP country i received at time t-j. The inflow of FDI expects to contribute to official reserve positively.
- $ODA_{i,t-j}$  : is the amount of net official development assistance as % of GDP country i received at time t-j and is predicted to affect positively.
- $Ex_{i,t}$  : is the official nominal exchange rate (domestic currency in terms of foreign currency, US dollar) of country i at time t and expect to determine positively position of reserve.
- $NX_{i,t-j}$  : is the net export (difference between export and import of goods and service) as % of GDP of country i at time t-j.
- $GDP_{i,t-j}$  : is the growth rate of real gross domestic product of country i at time t.
- $intdiff_{i,t-j}$  : is interest rate differential (the difference between domestic deposit rate and US deposit rate)



## 7.2. Result and Discussion

Before we explore the econometric regression results of our model equation, we will analyze the correlation between certain economic variables and reserve position of sampled SSA countries. In doing so, special attention is given for the correlation and graphical association of inflow of remittance and total reserve of selected sample countries.

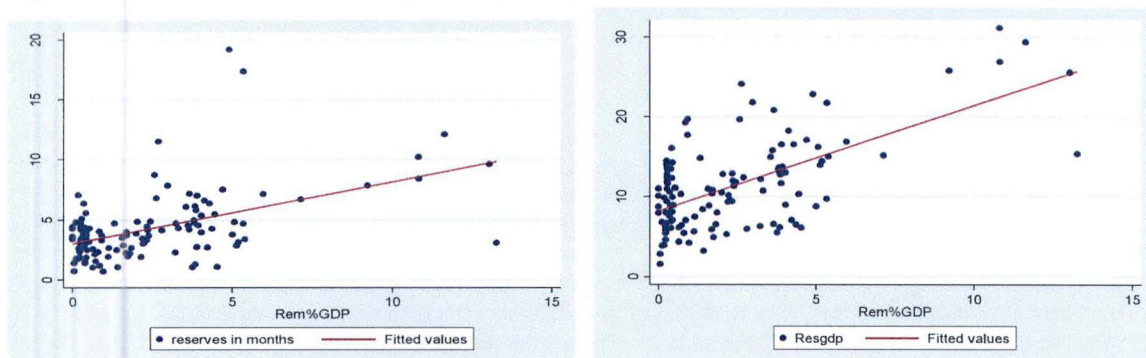
**Table 3: Pairwise correlation**

|          | remgdp | Fdigdp | odagdp | gdpgrowth | Nxgdp | Intdiff | Exchange |
|----------|--------|--------|--------|-----------|-------|---------|----------|
| LnResgdp | 0.65*  | 0.37*  | 0.07   | 0.15      | 0.25* | 0.02    | 0.26*    |

Source: Own Computation based on WDI data (2017)

In our sampled SSA countries there seems to exist very strong positive correlation between reserve position of countries (both as % of GDP and reserve in months of imports) and amount of remittance received, expressed as % of GDP compared to other determinants. The correlation is strong when reserve measured as % of GDP (see figure 11). This implies that as the inflow of remittance increases there will be more likely to improve reserve position of recipient countries given the remittances transferred through formal channel. They will provide foreign exchange liquidity for central bank. People who receive remittances so as to use for purpose of consumption or investment they should convert foreign currency in to domestic currency which in turn increases the accumulation of foreign currency in the central bank.

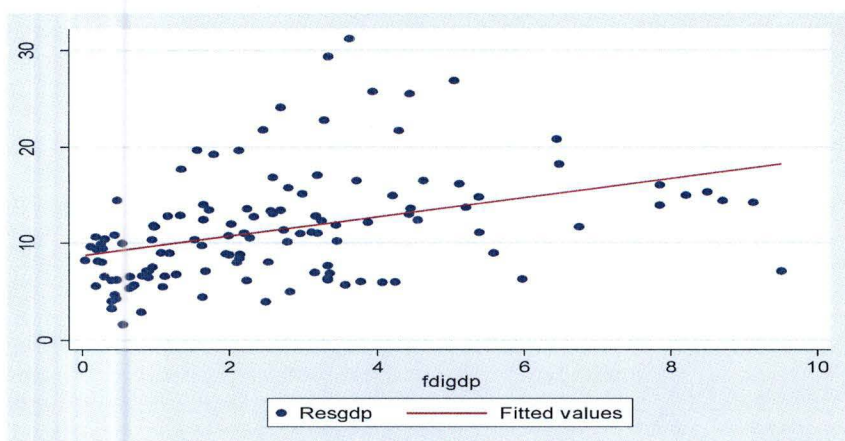
**Figure 11: Scatter Plot of Total Reserve and Remittance inflow, 1995-2015**



Source: Own Computation based on WDI data (2017)

Like remittances, others external resources such as foreign direct investment and official development assistance are expected to play an important role for stability of foreign exchange reserve of a given economy. As we can see from figure 12 and table 3, on average there is positive correlation between foreign direct investment, net inflow as % of GDP and total reserve as % of GDP. The financial resources flows to developing countries are in terms of foreign currency which should be exchanged for domestic currency which in turn helps the recipient countries improving position of their international reserve stock.

**Figure 12: Scatter Plot of Total Reserve and Net Inflow of Foreign Direct investment, 1995-2015**



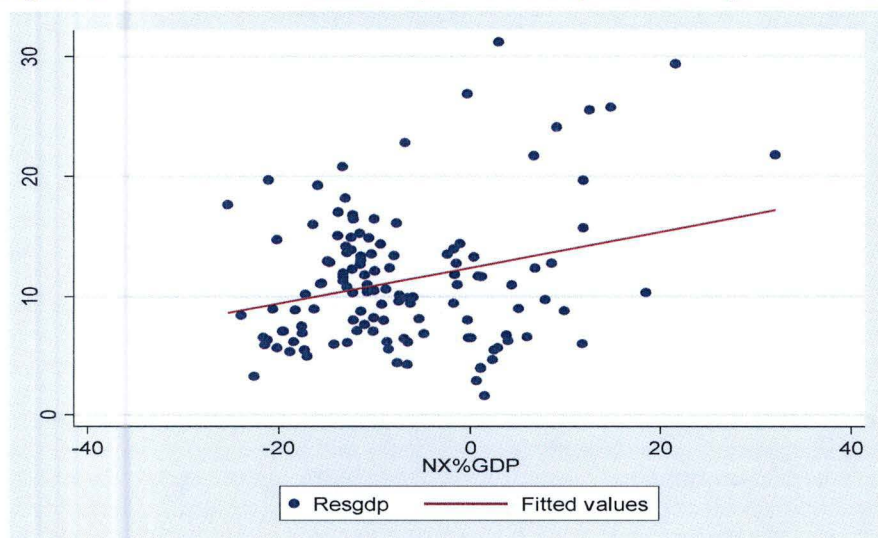
Source: Own Computation based on WDI data (2017)

The other important variable most likely affect reserve position of a given economy is external sector balance. As net export of economy improves (either because of increase of export and/or decrease of import) the reserve position of economy will improve. It is known that foreigners buy product of a given country in terms of that country currency. The higher net export implies more demand for domestic currency. Based on exchange rate policy of a country either central bank or market meet this discrepancy in foreign exchange market by buying excess of foreign currency in terms of domestic currency which in turn climbed the foreign reserve position of country.



As shown in the below figure (13) in our selected sampled countries on average there exist strong positive correlation between total reserve and net export. For instance country like Nigeria and South Africa, relatively better with external sector balance, have relatively health and stable

Figure 13: Scatter Plot of Reserve (as % of GDP) and Net export, 1995-2015



Source: Own Computation based on WDI data (2017)

reserve accumulation, they have reserve accumulation for more than four months of import which is above the minimum requirement (reserve should be at least 3 months of import) recommended by IMF. However, on the contrary country like Ethiopia with more worse external sector balance, have also more instable and low level of foreign exchange reserve (in 2015 total reserve in months of import was around two).

### Econometric Result

The descriptive analysis that we have seen so far explains only the correlation between foreign exchange reserve and macroeconomic variables, but doesn't show causality. Thus, it is better to undertake regression analysis. Before econometric analysis, we conducted test of second-order serial correlation which is crucial for Arellano-Bond first difference GMM estimator validity. The test result shows there is no second order serial autocorrelation problem.

The result of regression depicted in table 4 shows that external financial resources, economic growth, external sector balance and exchange rate are key determinants of international reserve. Moreover, our explanatory variables have expected sign and are consistent in the explaining the behavior of reserve position of selected sub-Saharan African countries.

**Table 4: Effect of macroeconomic variables on International Reserve**

| Dependent variable: Total Reserve as % of GDP                                                                                                                                                                                                    |                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
|                                                                                                                                                                                                                                                  | Estimated Coefficient    |
| Reserve as % of GDP                                                                                                                                                                                                                              |                          |
| L1.                                                                                                                                                                                                                                              | .5921611 *** (.0625391)  |
| FDI as % GDP                                                                                                                                                                                                                                     | .4826427 *** (.1813942)  |
| L1.                                                                                                                                                                                                                                              | .1873808 (.1753514)      |
| RGDP Growth                                                                                                                                                                                                                                      | .1502449 ** (.0592356)   |
| L1.                                                                                                                                                                                                                                              | -.0203009 (.0640008)     |
| Remittance as % GDP                                                                                                                                                                                                                              | .5061798*** (.1647537)   |
| L1.                                                                                                                                                                                                                                              | -.4619891 *** (.1759857) |
| ODA as % GDP                                                                                                                                                                                                                                     | .2904487 *** (.1108205)  |
| L1.                                                                                                                                                                                                                                              | .1700483 (.1288321)      |
| Net export as % GDP                                                                                                                                                                                                                              | .062785 (.0491158)       |
| L1.                                                                                                                                                                                                                                              | .1700185 *** (.049851)   |
| Interest rate differential                                                                                                                                                                                                                       | -.0233106 (.078401)      |
| L1.                                                                                                                                                                                                                                              | -.0761056 (.0787113)     |
| Exchange rate                                                                                                                                                                                                                                    | .003139** (.0012241)     |
| Cons                                                                                                                                                                                                                                             | .0738106 (1.248728)      |
| AR(1) Test                                                                                                                                                                                                                                       | -2.2561** (0.0241)       |
| AR(2) Test                                                                                                                                                                                                                                       | -1.012 (0.3116)          |
| Note:                                                                                                                                                                                                                                            |                          |
| <ul style="list-style-type: none"> <li>• values in the parenthesis represent standard errors</li> <li>• The symbol *** and ** represent statistically significance level of coefficient at 1% and 5% significance level respectively.</li> </ul> |                          |

Source: Own computation, 2018

Our result indicates that current net inflow of foreign direct investment has positive and statistically significant effect on the total volume of reserve as % of GDP. A one percentage point increases in net inflow of FDI as % of GDP lead to an average increase of contemporaneous reserves by approximately 0.59 percentages points. On the other hand, the last year FDI inflow will not have significant effect on current level of reserve, though the sign of



coefficient is positive. Like FDI, the inflow of official development assistance (ODA) positively contributes to the foreign exchange reserve accumulation. It is only current level of ODA that have significant effect, a one percentage point increase in ODA as % of GDP lead to an average 0.29 percentage point increase in total reserve as % of GDP.

The result also shows contemporaneous economic growth rate have a positive and statistically significant effect on total reserve of sampled economies, implying that a 1 percentage point increase in GDP results in an average 0.15 percentage point increase in international reserves. Better economic growth rate is one indicator of good macroeconomic policies in the given economy.

Another important variable that can affect total reserve is external sector balance of country. The output of regression implies that only lagged net export have significant effect on reserve. A one percentage point increase in last year net export as % of GDP resulted in around 0.17 percentage point average increase of current reserve as % of GDP. The possible reason why only lagged not current level of net export have significant effect is that delay in payment for international transaction. Coefficient of interest rate differential is not statistically significant and have unexpected sign. The theory tells us the higher domestic interest rate compared to foreign interest rate, the more domestic asset attracts foreigners which lead to more inflow of foreign currency. Hence, there could be more foreign portfolio investment which in turn increases reserve of the economy. However, in context of sub-Saharan Africa this may not be strong factor. The investment of foreigner in this region could highly depend on political stability, infrastructure development and macroeconomic stability.

The other factor that could determine the position of international official reserve is exchange rate policy of a given country. Our result indicate that the depreciation of exchange lead to statistically significant and positive effect on reserve accumulation though the effect is marginal. Exchange rate depreciation can affect reserve in two ways: either through increasing net export of a country because of improving competitiveness of country in international market or reduced capital outflow because more expensive of foreign currency.

Regarding our interest variable, the result shows that remittance as % of GDP has significant effect on international reserve. The current remittance has positive and significant effect on



reserve of a country. A one percentage point increases in current remittances leads to an average 0.50 percentage point increase of total reserve as % of GDP. Remittances are inflow of foreign currency which should be converted in to domestic currency so as to conduct economic activity. Hence, current inflows of remittances have direct impact on international reserve.

The lagged (previous year) inflows of remittances have statistically significant and negative effect on reserve. A one percentage point increase in previous year remittances led to an average 0.46 percentage plummeted of total reserve as % of GDP. This could be associated with the fact that remittances in most developing countries used for consumption purpose. In many developing countries significant portion of money spend on imported goods which paid in terms of foreign currency and hence reduce the reserve position of country. However, the net effect of remittances is positive since the current remittance effect (0.50 percentage point) is higher than lagged effect (0.46 percentage point). That means around an average of 0.04 percentage point net effect of remittances.

Table 5 – Effect on International Reserves as % of GDP, by relative importance of remittances (as % of GDP)

| Dependent variable: Total Reserve as % of GDP                                                                                                                                                                                                            |                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| Reserve as % of GDP                                                                                                                                                                                                                                      |                         |
| L1.                                                                                                                                                                                                                                                      | .6021275*** (.0603548)  |
| FDI as % GDP                                                                                                                                                                                                                                             | .4295275** (.1769714)   |
| L1.                                                                                                                                                                                                                                                      | .1822279 .1681104       |
| RGDP Growth                                                                                                                                                                                                                                              | .1459788*** (.0559735)  |
| L1.                                                                                                                                                                                                                                                      | -.1324415** (.0637577)  |
| Remittance as % GDP                                                                                                                                                                                                                                      | .9214961*** (.2130149)  |
| L1.                                                                                                                                                                                                                                                      | -.7246841*** (.1967048) |
| ODA as % GDP                                                                                                                                                                                                                                             | .281742** (.1089447)    |
| L1.                                                                                                                                                                                                                                                      | .0781373 (.1229066)     |
| Net export as % GDP                                                                                                                                                                                                                                      | .084772 * (.0546486)    |
| L1.                                                                                                                                                                                                                                                      | .2179901*** (.0562641)  |
| Interest rate differential                                                                                                                                                                                                                               | -.042051 (.0766734)     |
| L1.                                                                                                                                                                                                                                                      | -.0692516 (.0762559)    |
| Exchange rate                                                                                                                                                                                                                                            | .0020377 * (.0012121)   |
| Cons                                                                                                                                                                                                                                                     | .4543569 (1.24906)      |
| Note:                                                                                                                                                                                                                                                    |                         |
| <ul style="list-style-type: none"> <li>• values in the parenthesis represent standard errors</li> <li>• The symbol ***, ** and * represent statistically significance level of coefficient at 1%, 5% and 10% significance level respectively.</li> </ul> |                         |

Own Computation based on WDI data (2017)

It is known that relative share and importance of remittances varies across countries. As a result of this we create a dummy variable for remittance based on relative share of remittance in GDP of the country. The created dummy variable is 1 for countries whose share of remittance as % of GDP is more than 2 on average during our study period, 0 otherwise. We then have interacted dummy variable with remittance as % of GDP. Moreover, there could be variation among countries in their external sector as their main sources of foreign exchange earnings could differ. For this reason we create dummy variable, 1 when sampled countries are in west and South Africa region, 0 otherwise. Finally, we have interacted dummy for countries with net export as % of GDP country.

Table 5 above depicts the effect of remittances, by its relative importance. Our result reveals sign and significance of most variables remain the same. Specifically, the higher the remittances to GDP ratio the country receive the more impact they have on reserve accumulation. For instance, the overall impact of remittances on reserve as % of GDP increased to around 2 percentage points.

Regarding comparison of our result with previous work, there are a few empirical literatures uncovered the impact of remittances on foreign exchange reserve. Our results are consistent with the finding of Diego and Ruby (2014) who examined effect of remittance on foreign exchange reserve in 9 Latin American countries. They found that remittance have net positive effect on reserve accumulation of receipt countries in which current remittances have positive impact whereas previous year remittance could deteriorate current level of reserve. Moreover, Das and Serieux (2010) also tried to estimate proportion of remittance diverted toward reverse flows in developing countries. After eliminated part of remittance used for consumption and/or investment, they find the net positive partition of remittance (on average 20-27%) diverted toward reverse flows. That means changes in the rate of remittance flows tended to be positively correlated with changes in debt service payment-to-income ratios and the rate of reserve accumulation relative to income. However, the study didn't specifically show the extent of effect on foreign exchange reserve separately.



## 8. Conclusion and Policy Implication

In recent years volume of remittance flows to developing countries in general and sub-Saharan Africa in particular are rapidly increasing. These flows are more resilient and countercyclical to shocks compared to other external financial resources. Hence, remittances become the most stable foreign exchange earnings for many developing countries and have the potential to play an important role in the economic development.

There are different channels through which remittances affect economy of receipt countries. They could lead to economic growth and hence poverty reduction through increased consumption, filling domestic resource gaps (by raising saving) and hence raising level of investment, improving human capital (reduce school dropout and improve health situation of households), and improving financial sector development. However, remittance inflows could have adverse effect on economy through appreciation of exchange rate, which in turn reduces international competitiveness of economies, and reduce labor supply by creating culture of dependence.

Further, remittances can play important role in reducing economies vulnerabilities to external shock through helping country to maintain adequate level of foreign exchange reserve. Having adequate level of foreign exchange reserve helps country to reduce balance of payment fluctuation and overall macroeconomic instability. Given there is low level of international reserves in many SSA countries, it is important to examine role of inflow remittance in reserve accumulation. Using GMM estimator our study estimated the effect of remittance on foreign exchange reserve in six selected sub-Saharan African countries for the period of 1995-2015. The finding shows that behaviors of remittances is significantly and positively determine the accumulation of foreign exchange reserve. Moreover, the indicators of government policies like economic growth, exchange rate, also net export also positively determine accumulation of foreign exchange reserve.

Therefore, it is very important for policy makers to design policies and strategies that promote remittances and harness their benefits in development. Remittances should thus be welcomed, encouraged, and facilitated. However, high cost of remittances reduce the formal flow of remittances to developing countries, mainly in sub-Saharan Africa, as still a large volume of



remittances flows through informal channels which could hinder the potential positive effect of remittances and making difficult for government to manage it. For instance, according to World Bank report (2017) sub-Saharan Africa continued to have the highest average cost of sending remittances, 9.8 percent, compared to other regions. Moreover, the report highlighted that remittance costs across many African corridors and small islands remain above 10 percent due to low volumes of formal flows, inadequate penetration of new technologies, and lack of a competitive market environment.

Moreover, weaknesses in the financial sector (inefficient banking system) and in government administration (long delays in check clearance) in many sub-Saharan African countries impose substantial transaction costs of remittances in the region. Hence, all concerned body should work hard to easing these constraints including reducing transaction cost so as to increase remittance receipt and bringing a larger share of payments into formal financial system to maximize their development potential and overall societal welfare benefits.

The policy makers should carefully manage these large volumes of remittance flows as they could worsen macroeconomic economic situation. Some empirical evidence shows that there are positive correlations between remittances and exchange rate appreciation in the receipt countries and hence create Dutch disease problem (loss of competitiveness in international trade). This non-wage income could create culture of dependency which reduce labor supply and hence contract economic growth. In particular, the expected impact of remittances on international reserves is highly dependent on the way in which countries treat capital inflows and manage their exchange rate. Thus, Policy maker should find ways to mitigate these adverse effects.

In general, sub-Saharan African countries can improve their economic growth performance and foreign exchange reserve accumulation by strategically harnessing the contributions of remittances through ensuring their efficient and reliable transfers and minimizing the cost of transfers by improving their governance performance in addition to traditional sources of growth. Moreover, ensuring political and economic stability is also important to divert remittances for productive activities like investment than personal consumption. Finally, regarding the negative effect of previous year remittances on foreign exchange reserves, it need further research to know through what channels this could happen and hence how to minimize this effect.

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