

Journal Pre-proof

Remittance Inflows and Economic Growth in Rwanda

Edward Kadozi



PII: S2590-051X(19)30005-X

DOI: <https://doi.org/10.1016/j.resglo.2019.100005>

Reference: RESGLO 100005

To appear in:

Received date: 31 January 2019

Revised date: 14 September 2019

Accepted date: 15 September 2019

Please cite this article as: E. Kadozi, Remittance Inflows and Economic Growth in Rwanda, (2019), <https://doi.org/10.1016/j.resglo.2019.100005>

This is a PDF file of an article that has undergone enhancements after acceptance, such as the addition of a cover page and metadata, and formatting for readability, but it is not yet the definitive version of record. This version will undergo additional copyediting, typesetting and review before it is published in its final form, but we are providing this version to give early visibility of the article. Please note that, during the production process, errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

© 2019 Published by Elsevier.

UNIVERSITY OF AMSTERDAM

Remittance Inflows and Economic Growth in Rwanda

KADOZI Edward

Tel:+250788486141

E-mail:kadoziedward@gmail.com/E.kadozi@uva.nl

University of Amsterdam

Remittance Inflows and Economic Growth in Rwanda

Edward KADOZI

kadoziedward@gmail.com/E.kadozi@uva.nl

Abstract

This paper examines the impact of remittance inflows on economic growth in Sub-Saharan Africa (SSA) countries and Rwanda in particular for the period between 1980 and 2014. It explores whether the growth impact of remittances is conditional on the institutional and development factors in SSA countries. The analytical framework of this study is embedded in the debate between two dominant theoretical approaches about the growth effect of remittances; the national accounts and endogenous growth models. As baseline analysis, the paper employs a cross-sectional analysis of 45 SSA countries, followed by a more in-depth analysis of Rwanda as a case study. The findings reveal that the two theories are complementary but not mutually exclusive in explaining the growth effect of remittances. The cross-sectional analysis of SSA countries shows no statistically significant impact of remittances on economic growth in the region. But the remittance-growth impact is positively and statistically significantly conditioned by the country's level of development, financial development, and education, while the quality of institutional variables adversely affects the remittance-growth impact in the region. In contrast, the same findings reveal a positive and significant growth impact of remittances in Rwanda. The results of the country-level analysis reveal plausible evidence of long-run causality, running from remittances to GDP per capita in Rwanda, but not vice versa. The results demonstrate that the conditional marginal effect of remittances on GDP per capita in Rwanda increases with more remittance inflows to the country. These findings suggest that both the overall institutional environment and that of the financial sector specifically are imperative for enhancing the growth and development impact of remittances in the SSA countries and Rwanda in particular.

Key words: Remittances, Rwanda, Sub-Saharan Africa, Economic Growth

Journal Pre-proof

1.0 Introduction

In recent decades, remittance inflows to developing economies have continued to increase. These inflows reached US \$436 billion in 2014, with US \$34.5 billion to Sub-Saharan Africa (World Bank Migration and Remittance Fact Book, 2016). The global statistics show that these inflows have become a major source of foreign earnings, surpassing foreign direct investments, foreign aid, export earnings and other private capital inflows. The World bank notes that these are only the officially recorded remittances. The true size of remittances, including unrecorded inflows through formal and informal channels, is believed to be larger. According to the World Bank, remittance inflows to Rwanda increased from \$3,381,209 in 1980 to \$128,172,556 million in 2014, representing an increase of 37.91%.

Despite their impressive increase, the growth impact of remittances on the economies of recipient countries remains a contested subject among scholars and policy makers. Findings, either at country or cross-country level, continue to be mixed. This can be attributed to the methodological and theoretical approaches employed to study the issue. More to that, for the case of SSA countries, studies related to remittances and development are also affected by the challenge of accessing reliable and credible data. Most studies examining remittance-growth impact rely on remittance data provided by the World Bank and the IMF. The same data are collected and reported by individual countries to the World Bank. By close scrutiny to the dataset of World Bank Development Indicators, you find that most SSA countries have missing data for several years which affect the credibility and reliability of the analysis. More so, it is difficult to access the same data from some national banks of these countries. To avoid this challenge, some scholars working on SSA countries opt for the use of household survey data- in countries where remittance variables are considered in the household surveys. This facilitates the microeconomic analysis but does not facilitate macroeconomic analysis hence affecting the macroeconomic implications of remittances in the region. As a result, empirical analysis exploring channels through which remittances affect growth continues to be underestimated in the region. I contribute to this body of knowledge by examining the growth effect of remittances in SSA countries and Rwanda in particular.

In consideration of the above issues and the motivation of this study, i adopt two layers of analytical framework, the cross-country and the country level respectively. I first conduct a

cross-section analysis of SSA countries and then focus on Rwanda as a case study to empirically examine the growth impact of remittances for the period from 1980-2014.

At the country level, Rwanda presents an important and interesting case to contextualize the analysis of this study. This is because of the history of the country and the recent impressive progress in development, evidenced in the number of development outcomes and the recommendable progress in the effective institutional and policy environment. Rwanda proves to be an important case for such study based on the history of the country of the last three decades and recent developments, which represents the experience of most of SSA countries- in terms of quality of institutions and overall development outcomes. The country experienced significant political conflicts that culminated in the genocide against the Tutsi in 1994 and, before and during the genocide, the emigration of Rwandans to neighboring regions and far abroad. Not only human lives were lost (estimated at one million Rwandans), but also all institutions. Remittance inflows to Rwanda started to increase exponentially from year 2000 to recent years compared to the previous decades (1980-2000). However, the recent observed progress in development, together with the recommendable progress in institutional and policy effectiveness and the availability of comprehensive credible data (including remittance data) enable us to contextualize the analysis about the growth impact of remittances in the country. These factors (institutional and development factors) qualify Rwanda as an important case for this study. Currently, these developments have shifted the narratives about Rwanda, from the war torn conflict country to the rising star of Africa of countries. More so, the country provides an opportunity of accessing comprehensive and credible data for such a study to the researcher. The findings of this study shed light on the effects remittances on economic growth in the post-conflict countries in SSA countries. Contrary to the previous empirical studies, the findings of this study reveal institutional and development factors conditioning the remittance-growth effects in the SSA region.

The underlying questions of this study are: 1. Do remittances affect the economic growth in SSA countries and Rwanda in particular? 2. Under what conditions do remittances contribute to economic growth in SSA countries? Considering the mixed claims in the literature about the remittance-growth nexus, I opt for an optimistic view by hypothesizing that remittances positively affect the economic growth in SSA countries and Rwanda in particular during the

period of study. I also hypothesize that the impact of remittances on economic growth is conditional on the institutional and development factors in SSA countries. To answer the research questions, the analytical framework of this study is embedded in the debate between the two dominant theoretical approaches about the remittance-growth effect: the national account and the endogenous growth model approaches. Both approaches are briefly explored below.

The national account model postulates that remittances work via macroeconomic outcomes. They directly and indirectly affect the balance of payments through trade deficit, the exchange rate, and inflation (Kireyev, 2006). The theory demonstrates two effects of remittances (positive and negative) on the macroeconomic behavior of the recipient economy. These effects depend on how remittances are utilized in the recipient economy. For instance, if used for consumption, this has an adverse effect on macroeconomic outcomes. If spent on capital goods, there will be a spill-over effect on investments and savings and the remittances can stimulate local production and exports. The endogenous growth model, on the other hand, claims that the remittance-growth effect works via alternative but not incompatible mechanisms: human capital development, total factor productivity, technological diffusion, and physical investments. Remittances interact with these factors of production to stimulate growth and development in the recipient economy.

Despite the empirical application of these two theoretical approaches, little is known about the conditional factors influencing the remittance-growth effect in the recipient countries. Nonetheless, several studies have argued for the importance of these factors in the growth effect of remittances. To test this theoretical hypothesis, this paper empirically examines the plausible factors that condition the growth impact of remittances. That is the conditional role of institutional quality and development factors in SSA countries. This study thus selects those variables most frequently emphasized in the literature of remittance and development: the country's level of development, financial development, quality of its institutions, and education. The role of the institutional environment, the country's level of development and the interactive effect of remittances and human capita development variables are important in enhancing the remittance-growth effect in SSA countries.

The main findings of this paper reveal no statistically significant effect of remittances on economic growth SSA countries. Across SSA countries, the study finds no remittance-growth effect, while in Rwanda, the remittance-growth effect holds. The findings reveal plausible

evidence of long-run causality, running from remittances to GDP per capita in Rwanda, but not vice versa. The study finds that the effect of remittances on growth in SSA countries is positively conditioned by the country's level of development, financial development and education, while the quality of institutions adversely affect this effect in the region.

The rest of this paper is organized as follows: Section 2 reviews the relevant literature; Section 3 presents the trends of remittance inflows to developing countries, SSA countries, and Rwanda in particular; Section 4 contains the data and empirical models, results and interpretation; and Section 5 contains the conclusion and policy implications.

2.0 Literature Review: Remittances and Economic Growth

The relationship between remittances and economic growth of recipient economies remains contested among scholars and policy makers. The underlying question is whether remittances affect the economic growth of recipient countries. Although there is a vast body of literature on this scholarship, conclusions remain mixed. In particular, scholars are divided about the best model to explain the remittance-growth nexus in a way that also takes into account different mechanisms through which remittances affect growth. The methodological issue related to data and the problem of endogeneity between remittances and economic growth have influenced the ongoing empirical debates for developing countries. This section reviews the relevant empirical claims about remittance and growth based the national accounts approach and the endogenous growth model.

2.1 The National Account Approach

The national account approach argues that remittances affect macroeconomic outcomes through their direct and indirect effects on the balance of payment, trade deficit, exchange rate and inflation (Kereev, 2006; Winters and Martins, 2004; World Bank, 2003). The direct effects are that remittances are an integral part of the national account, while the indirect effects are that remittances affect macroeconomic behaviors through their effects on exchange rate and relative prices.

Scholars support the direct channel tend to claim that remittances have a more positive impact on the balance of payments than other capital inflows (such as financial aid, direct investment or loans), because their use is not tied to particular investment projects with high import content,

bear no interest and do not have to be repaid. Others argue that remittances are a stable source of foreign exchange than other private capital flows and that, for certain countries, they exhibit an anti-cyclical character (Buch et al. 2002; Buch and Kuckulenz, 2004; Straubhaar, 1988; see OCD, 2006). The promoters of this theory have consistently argued that, unlike aid, which comes into the economy through the official accounts, remittances, as private inflows once remitted to the home country, can be saved, consumed, or invested. Their effect is through savings, consumption or investments.

Similarly, Amuedo-Dorantes et al. 2006); Woodruff et al. 2007) postulate that remittances promote growth by providing additional foreign exchange and financing business investment. To this end, the majority of the literature argues that remittances affect economic growth by increasing consumption, savings or investment. Indeed, after reviewing several case studies, Lucas (2005) finds that remittances may indeed have served to accelerate investment in Morocco, Pakistan, and India. Glystos (2002) modeled the direct and indirect effect of remittances on incomes and hence on investments in seven Mediterranean countries and found that investment rises with remittances in six out of seven countries.

Moreover, remittances increase recipient country income and output growth. Ratha (2005) argues that remittances augment the recipient individuals' incomes and increase the recipient country's foreign exchange reserves. Indeed, he observes that if remittances are invested, they contribute to output growth and if they are consumed, they generate positive multiplier effects (see, for example, Stahl and Arnold, 1986). Adelman and Taylor (1990) found that for every dollar Mexico received from migrants working abroad, its gross national product (GNP) increased by \$2.69 to \$3.17, depending on whether remittances were received by urban or rural households. In the case of unskilled workers who emigrate to escape unemployment, remittances are likely to provide an even clearer net gain to development in the recipient countries. On this note, Fayissa et al. (2008) find remittances impact economic growth and development in Africa. A 10% increase in the remittances of a typical African would results in an about 0.4% increase in average per capita income. Similarly, Adams et al. (2005) find that 10% increase in per capita official international remittances will lead to a 3.5% decline in the share of people living in poverty.

In contrast, those who argue for indirect benefits claim that remittances affect macroeconomic behaviors through their effects on the exchange rate and relative prices. The literature on this approach claims that large remittance inflows within a country with no capacity result in an appreciation of the exchange rate and inflationary pressure in the recipient country thus, causing a situation of “Dutch Disease”. Several studies have argued that remittances negatively affect the macroeconomic variables such as balance of payments, exchange rates, inflation and exports, leading to the appreciation of real exchange rates, inflation, and export of local goods and services and promoting imports, leading to a balance-of-payment deficit.

Billar (2007) finds that remittances deteriorate the balance of trade by stimulating an increase in imports. Jadotte (2009) and Catrinescu et al. (2009) find that large inflows of foreign exchange can have serious consequences. An appreciation of real exchange rates in the receiving country results in adverse effects on tradable commodities and relative competitiveness. This restricts the export performance, potentially limiting output and employment, especially in small economies where remittance inflows are large in comparison to the country’s GDP. Using the ordinary least square (OLS) and fixed effects (FE) instrumental variables regression models, Bajara et al. (2009) find that decades of private income transfer remittances have retarded long-run economic growth in remittance-receiving economies. The negative effect might be due to the fact that the remittances are generally not intended to serve as investments but rather as social insurance to help family members finance the purchase of life’s necessities.

In sum, the national account model provides an insight about how remittances affect the macroeconomic outcomes of the recipient economy. It demonstrates two channels through which remittances as foreign earnings affect growth through macroeconomic outcomes. The direct channel emphasizes the positive effect of remittances as a source of non-costly external capital inflows that improve the capacity of the national account, finance consumption, savings and investment, thus stimulating production and aggregate output. The indirect channel emphasizes the negative effect of remittances on macroeconomic behaviors through their effects on the exchange rate and relative prices.

The literature on the national account approach thus contains an ongoing discussion about the macroeconomic effect of remittances. Similar literature claim that remittances are external private income for the recipient households and receipts to the national current account of

recipient countries. Their effect depends on how they are utilized in the national economy coupled with the existing institutional and policy environment that could enhance their multiplier effect on the economy. As correctly stated by the IMF (2005), remittances, like aid, may be more effective in a good policy environment. For instance, a good investment climate with well-developed financial systems and sound institutions is likely to imply that a higher share of remittances is invested in physical and human capital (IMF, 2005).

2.2 The Endogenous Growth Model

The endogenous growth model argues that the national output growth is determined by endogenous inputs of total factor productivity (technological progress), physical capital, and human capital under the assumption of constant return. Those supporting the model argue that the remittance-growth effect is detected through the factors that the endogenous growth model focuses on, namely, human capital development, total factor productivity, technological diffusion and physical investments (Romer, 1990; Nelson and Phelps, 1996; Benhabib and Spiegel, 1994; see Udah, E. B., 2011). It has been extensively documented that the endogenous growth model supports the view that human capital development and technology diffusion promote economic growth and development through their effect on the total factor productivity (TFP). To this end, Romer (1990) claims that the growth rate of factor productivity depends on the skilled content of human capital.

With regard to remittances, there is limited evidence of a close link between the interaction effect of remittances and that of human capital development variables on economic growth. Most of the existing literature on remittances and human capital development variables focus on micro analysis, determining the development impact of remittances on human capital development. The endogenous growth model bridges this gap by illustrating that the growth effect of remittances is complimented by factors of TFP and technology diffusion. As advanced by Udah. (2011), the endogenous growth model illustrates the channel through which remittances could promote economic growth and development. The central argument of the model is that remittances may accelerate the pace of economic growth through enhancing human capital or productivity. The one important channel through which this could happen is technological diffusion. In addition, Udah (2011) argues that the effect of remittances on growth is not direct but factored in through their influence on human capital. The endogenous growth model uses factor productivity and

human capital and factors in the interaction between human capital and remittances. The argument is that per capita GDP has a positive relationship with human capital, the interaction of human capital with remittances, physical capital, the labor force, technological diffusion, and government capital expenditure on economic and social services. Remittances also improve human capital by increasing resources for health and education (Amuedo-Dorantes et al. 2008; Edwards and Ureta, 2003; Gitter and Barham, 2007). Remittances can also reduce domestic macroeconomic volatility, thereby encouraging greater domestic investment (Barajas et al., 2009). (Balasubramanyam, Salisu and Sapsford, 1999; Makki and Somwaru, 2004; see Uдах, 2011) found a positive interaction between human capital and international transfers though insignificant. The foreign transfer literature shows how the level of human capital stock affects the absorptive capacity of an economy and consequently, the positive effects of capital inflows such as FDI and remittances on economic growth and development.

Moreover, in his empirical study, Uдах (2011) interacted remittances with indicators of human capital development and found that the coefficient of interaction variable was positive and significant. He argues that remittances have a positive effect on economic development but only within a certain threshold of human capital development, although this threshold has not yet been determined. Indeed, Uдах interacted technological diffusion and remittances and found a positive and significant effect, suggesting that remittances impact on economic development via transfer of foreign technology or importation of technology. Rapoport and Docquier (2005) analyzed the link between remittances and education and found that remittances may be seen as repayment of informal loans used to finance educational investments, but also that the prospect of migration makes education a profitable investment for the family. Hence, migration fosters human capital formation, provided that not too many educated individuals emigrate out of the country.

However, critics of this theory have argued that remittances cause moral hazards in the recipient economy, which has a negative effect on productivity and growth. Studies including by Chami et al. (2005), have argued that in some instances, instead of promoting hard work and productivity, remittances encourage laziness in recipient communities or households since people know that they can finance their consumption through remittances. This in turn affects local labor supply and productivity. Similarly, a study by the IMF (World Economic Outlook, 2005), covering 101 countries over 1970-2003, finds no significant relationship between

remittances sent by migrants and growth or between remittances and variables such as education or investment rates. On the side of total factor productivity, there are existing claims that remittance inflows to recipient households erode the quality of governance and reduce accountability to government officials. Abdih et al. (2012; see Clemens et al. 2014) argue that remittances could reduce total factor productivity by eroding the quality of governance. The authors observe that remittances increase the government's revenue base and reduce the cost of rent seeking by public officials. Remittance-recipient households, in effect, have incentive to hold politicians accountable, since they can use remittances to purchase substitutes for public services.

In sum, the two approaches endeavor to demonstrate the stake of remittances in promoting economic growth through their effect on balance of payment, human capital development and technological diffusion in the recipient economy. The review of these two theories indicates the models are compatible and complimentary, rather than mutually exclusive, in explaining the growth effect of remittances. However, the existing theoretical approaches have yet to determine the threshold beyond which remittances negatively affect the real exchange rate and inflationary pressure. Moreover, the literature remains silent about the conditional effect of other factors such as a country's level of development and financial development on the remittance-growth effect in developing countries. It is not merely savings and investments that are important – institutional quality, the policy environment, and the country-specific context are equally essential in determining the growth effect of remittances. I argue that the lack of a theoretical approach that considers channels and conditions through which remittances continuously affect growth and development contributes to the diverging claims about remittances and economic growth and the overall lack of a conclusion.

This paper contributes to this scholarship by employing a two nested methodological framework examining the growth effect of remittances. First, I conduct a cross-section analysis of SSA countries by empirically examining the remittance-growth impact for the period from 1980-2014. I employ variables suggested by the theoretical and empirical literature to determine how institutional and development factors interact with remittances to promote economic growth in the SSA region. In the same analytical framework, I use Rwanda as a case study and examine the effects of remittances on its economic growth in relation to the other SSA countries. I then

further focus on Rwanda by contextualizing the analysis for Rwanda. I examine the causal linkage between remittances and economic growth in Rwanda. In the next section, I present the growth trends of remittances and the descriptive analysis of remittances in SSA countries and Rwanda in particular.

3.0 Remittance Trends in Sub-Saharan Africa

Officially recorded remittance inflows to developing countries increased substantially over the last three and a half decades, from US\$20 billion in 1980 to \$436 billion in 2014. In SSA countries, recorded remittance inflows to the region almost doubled, from US\$18 billion in 1980 to US\$34.5 billion in 2014 (Migration and Remittance Fact book, 2016; World Bank Development Indicators, 2016). Figure 1 shows the trends of remittance inflows to developing countries compared to other sources of external financing. Over the last two decades, remittances have been increasing steadily compared to other external capital inflows.

According to the World Bank (2016), remittances resulting from migration constitute reliable sources of foreign earnings and cushion households' income during bad times. Indeed, remittance inflows to developing countries are more than three times official development aid (ODA) and even bigger than foreign direct investment inflows once China is excluded. De et al. (2015) find that remittances have been stable during episodes of financial volatility even when capital flows fell sharply. Similar scholars claim that remittances help counter-balance fluctuations caused by weaker capital flows to developing countries. However, the empirical question remains how these trends of growing international capital inflows affect growth in developing countries. Figure 2 shows the trends of remittances to SSA countries compared to other external capital flows in the SSA region over the last three decades.

As depicted in Figure 2, the trend of Net-ODA to Sub-Saharan Africa has increased substantially over the recent decades, more so than other capital inflows. This can be attributed to the political and economic instabilities in these countries. Similarly, recorded remittances to SSA countries increased in recent years. Remittance inflows to SSA countries are estimated to be 2.6% of GDP on average, higher than 1.9% average of all developing countries. The World Bank argues that the true size of remittances, including unrecorded flows, is likely to be significantly higher. The available evidence indicates that the region receives the highest volumes of informal remittances (50%) of formal remittances, with less formal remittance

inflows compared to other regions of the world (World Bank (2006, cited in Baldé, 2011). As shown in Figure 2, official remittance inflows to SSA countries are the third source of foreign earnings to the region with similar growth trends as net-FDI. The underlying question remains how these inflows affect economic growth in the region, if at all. What are the factors influencing this growth and how these factors could playing out at country level?

3.1 Remittance Trends in Rwanda

In recent decades, remittance inflows to Rwanda have increased exponentially (mostly from 2000 onwards). According to the World Bank (WDI, 2014), personal remittances inflows to Rwanda increased from US \$3,381,209 million in 1980 to US \$128,172,555 million in 2014. Subjected to GDP, remittances were 0.269% of GDP in 1980 and increased to 1.624% in 2013 (down from 2.6% in 2012).

As indicated in Figure 3, remittance inflows to Rwanda have been increasing exponentially, mostly in recent years. The sharp increase between 1994 and 2000 is due to the effects of genocide against the Tutsis. In this period, remittance inflows increased more compared to the previous constant trend. This is in line with the remittance and development discourse, which argues that during a crisis (either security or economic instabilities) in the recipient country, remittances tend to increase as an alternative source of income for the affected recipients. They also increase when the economy is doing well, but that is for socio-economic reasons. The slight fall in the trend recently (2008-2009 and 2013-2014) can be attributed to the effect of the global financial crisis, which affected the incomes of senders, and the recent effects of global oil prices, respectively. The recent overall steeper increase can be attributed to the Rwandan Diaspora's confidence in the political and economic stability in Rwanda. This, coupled with the government's policy of engaging the Diaspora for economic development back home, translates into increased remittances for socio-economic development.

Figure 4 shows similar growth trends of GDP per capita against remittance inflows to Rwanda from 1980-2014, except in 1994, which can be attributed to the effect of genocide against the Tutsis. As indicated in the figure, the growth trend of GDP per capita fell sharply in 1994, while remittance inflows increased during the same period. This confirms the claims in the literature that remittances increase during hard times such as wars, natural disasters like droughts, and economic setbacks to act as a buffer and source of income for the recipient households.

As shown in Figure 5, in Rwanda, like in other SSA countries, Net-ODA still takes the lion's share of external financial inflows, followed by foreign direct investments and remittances. These trends depict Rwanda's political and economic development trajectory in recent decades. The observed steep upward trends of Net-ODA and remittances to GDP per capita in the early 1990s were greatly influenced by the effects of genocide against the Tutsis in 1994 and thereafter. Another upward trend of remittances, surpassing the foreign direct investments (FDI) is observed between 2008 and 2012, as result of the global financial crisis and its effects. This shows that remittances remained resilient and steady despite the economic shocks of the crisis. It also demonstrates the potential of remittances compared to other external capital inflows.

The recent fall in remittances can be attributed to the effects of oil and commodity prices, which have affected both developed and developing economies, including the income of the diaspora in sending countries. The steeper trend of FDI in recent years could be attributed to Rwanda's economic reforms, which have focused on attracting foreign direct investments, improving the ease of doing business in the country, developing prudent economic policies, and diversification of the economy. These reforms have buffered the economy in the wake of the oil and commodity crisis (World Bank Doing Business Report, 2015). The recent observed fall in the trend of Net-ODA is attributed to Rwanda's quest for self-reliance in terms of development financing by mobilizing internal financial resources rather than relying heavily on donor funding. It is also attributed to the abrupt cut of aids by development partners between 2009-2011. The evidences show that remittances and foreign investments share similar increasing growth trends over the recent years, while Net-ODA is falling in Rwanda. These observed positive growth trends, both in remittances inflows and in the overall economic growth in Rwanda, prompted the researcher's interest to empirically examine the stake of remittances in Rwanda's economic growth for the period from 1980-2014, but in the comprehensive context of SSA countries.

3.2 Contribution to the Scholarship

This paper contributes to the existing scholarship by examining the economic growth impact of remittances in SSA countries, with particular focus on Rwanda, between 1980 and 2014. It addresses the most overlooked aspects in the theoretical and empirical studies examining the development impact of remittances, 1) the theoretical and analytical approach employed in examining the remittance-growth impact of remittances in developing countries, 2) institutional

and development factors mediating the remittance-growth impact, 3) how to deal with measurement and data issues characterizing developing countries mostly SSA countries. This study is embedded in two dominant theoretical approaches, the national account model and the endogenous growth model. The national account model and the endogenous growth theory explicitly focus on the macroeconomic implications of remittances. These theories are not mutually exclusive, but none of these approaches systematically explain the causal mechanisms by which remittances affect macroeconomic development outcomes, mediated by the prevailing institutional and policy environment in the recipient country.

The most contemporary studies on remittances and economic growth in development countries are characterized by what I would call “a linear approach” to examine the growth effect of remittances in the recipient countries either at cross-country or country studies. As a result, most of the existing empirical studies- for instance the ones examining remittance-growth effect in SSA countries show mixed findings across the region. None of these studies have gone further to examine what might be causing inconclusive findings in the region. However, the question remains as to why remittances positively affect growth in some countries and not in others? This question propels this study to investigate different conditional factors influencing remittance-growth effect. This paper contributes to this scholarship by adopting three main novel approaches. First, the study examines the remittance-growth effect in SSA countries, and the institutional and development factors conditioning the latter effect. The conditional factors matter if we are to better understand the contribution of remittances in development. Second, informed by empirical review, the study employs a nested analytical approach to better understand the growth effect of remittances at cross-country and at country level respectively. With the available data, the study systematically examines the remittance-growth effect within 45 SSA countries and institutional and development factors influencing the latter effect. Sub-Saharan African countries vary in terms of the level of development and institutional quality. On average, the region is characterized by poor quality institutions (both political and economic institutions) which affect their economic performance. We know well that an inefficient institutional quality and policy environment strongly affects the overall remittance-development impact. Because they strongly influence the volume of remittance inflows and how efficiently remittances are utilized in the productive investments that spur economic growth. Indeed, Faini (2002) finds remittance-growth impact and this impact is conditioned by the sound policy

environment that fosters macroeconomic certainty and supports the build-up of social and productive infrastructures. But we also know from practical experience that accessing credible and reliable data for such a study is a night mayor in some African countries. However, we know that the contextual aspect matters. We well know that the contextual aspect matters. Therefore, I contextualize the analysis by conducting an in-depth analysis of Rwanda as an important case study. In Rwanda, I conduct an extensive analysis of how remittances affect economic growth.

Overall, the findings of this study help to shape our understanding about the holistic and systematic growth impact of remittances in the context of SSA countries and Rwanda in particular. The paper argues that the remittance-growth impact should not be thought of in isolation (economic growth and institutional factors in isolation). Instead, the broader view about the development impact of remittances and the causal interplay of institutional and development factors that condition the growth and development impact should be considered.

4.0 Empirical Analysis of Remittances and Economic Growth

This study examines the effect of remittances on the economic growth in Rwanda in a cross-section analysis of SSA countries for the period 1980-2014. It contextualizes the analysis of Rwanda by examining the direction of long-run causality between remittances and economic growth in Rwanda over the same period. Further, the study analyzes factors affecting the growth effect of remittances in different contexts.

In the economic growth literature, scholars are preoccupied by the rate at which countries bridge the gap between the current status of their economies and the desired long-term growth path. Remittances come into play as an inflow that affects various channels relevant to successful economic growth and development, such as investment in physical and human capital, external capital inflows represented by official development assistance, foreign direct investments, and openness. I use cross-country data for 45 SSA countries (where their data are available) and Rwanda data in particular to conduct the analysis.

4.1 Data and Econometric Techniques

The study relies on the relationship between personal remittances and real GDP per capita as a proxy for economic growth and introduces a range of relevant control variables. This study opts

for definition of personal remittances¹ and data are in current U.S. dollars. The selection of control variables was guided by the existing literature but also by need to include as many SSA countries as possible in the sample to increase the number of observations and explanatory power, while considering the availability of data from these countries as a limiting factor. Five main control variables were selected: the initial lag of real GDP per capita, foreign direct investment percentage of GDP, gross capital formation percentage of GDP, secondary school enrollments as a percentage of total, and openness and credit to financial sector percentage of GDP as a proxy for financial development. Later, a dummy variable of Rwanda and the interaction term of remittances and quality of institutional variables were added to examine the mechanisms through which the growth effect of remittances is conditioned by institutional and development factors.

In Table 1, Table 2 and Figure 6, I report the summary statistics, the correlation matrix of the studied variables, and the scatter plot of percentage of remittances of GDP in SSA countries for the year 2012, respectively. Figure 6 shows the scatter plot of SSA countries in terms of percentage of remittances to GDP per capita in 2012. I employed the scatter plot analysis to depict where Rwanda fits in relation to other SSA countries. Most countries are distributed around the line of fit, although some, such as the Seychelles, Mauritius, Nigeria, Cabo Verde, Lesotho, South Africa, Swaziland, Namibia, and Angola, appear to be outliers compared to the other SSA countries. The percentage of remittances of GDP per capita of these countries is 8% higher. Rwanda is located slightly below the line of fit with an estimated percentage of remittances of GDP per capita of 6.8% in 2012.

4.2 Econometric Techniques

To examine the effect of remittances on economic growth in SSA countries, the study employs a panel data framework. The empirical model (1) suggests that economic growth is determined by the past year's real GDP per capita, the percentage of remittances of GDP and a set of other control variables. The primary focus of this empirical model is to examine the nature

¹ For the purpose of this study, the definition of remittances is that of “personal remittances”, which is the sum of personal transfers and compensation of employees. The definition is taken from the sixth edition of the IMF's Balance of Payments Manual in revision BPM6,¹ published in 2010. It encompasses the comprehensive aspects of remittances. According to the World Bank second edition Migration and Remittances Fact book (2011), remittances are defined as the sum of workers' remittances, compensation of employees, and migrants' transfers. Recently World Bank also adopted personal remittances in the World Development Indicators.

and significance of the remittance variable and the coefficient of the related interaction term in the growth model. This paper follows four stages of analysis: The first stage is a panel of random effect (RE) analyses examining the impact of remittances on economic growth in SSA countries. The rationale behind the panel data analysis is to provide heterogeneity in the estimated coefficients and capture dynamic effects in my endeavor to control for the endogeneity problem. I address this problem first by including the country-specific effects and testing that the empirical model is suitable for estimating economic growth. I employ the random effect estimation technique to cater for the interaction effect of remittances and the Rwanda dummy.

In the second stage, instrumental variable (IV) techniques are introduced to address the problem of endogeneity. In the third stage, I examine whether the impact of remittances on growth in SSA countries is conditioned by the institutional quality, the level of development and human capital development variables. A number of interaction variables have been introduced to empirically examine which plausible conditions affect the remittance-growth effect in SSA countries. Lastly, I contextualize the analysis to Rwanda by introducing an interaction term of the Rwanda dummy and remittances to determine the growth effect of remittances in Rwanda. To this end, a further analysis is carried out, using cointegration and error correction model estimation techniques to examine the long-run relationship between remittances and economic growth and the direction of long-run causality between remittances and economic growth in Rwanda.

I operationalize the above steps first by estimating a benchmark model, which examines the impact of remittances on economic growth in SSA countries using the random effects technique. A simple log-linear Cobb-Douglass production function is specified. Several researchers in the field have used this empirical approach, including (Addison, 2004; Akinpelu et al. 2013; Catrinescu et al. 2006); Fayissa, 2008). The general estimated model is given below:

$$\text{LogY}_{it} = \beta_0 + \beta_1 Y_{it-1} + \beta_2 \text{Rem}_{it} + \beta_3 \text{FDI}_{it} + \beta_4 \text{GCF}_{it} + \beta_5 \text{OPEN}_{it} + \beta_6 \text{ENR}_{it} + \eta_i + \varepsilon_{it} \dots \dots \dots (1)$$

Where, LogY_{it} is measured as the log of real GDP per capita in country I at time t ; Y_{it-1} is the logarithm of GDP per capita lagged one year, Rem_{it} is a measure of remittances as a share of GDP (as % of GDP); FDI_{it} is the measure of foreign direct investments as a share of GDP used to capture the effect of external sources of capital on growth; GCF is the gross fixed capital formation as a percentage of GDP used as a proxy for investment in the physical capital; OPEN_{it}

is the measure of openness to trade for each country under consideration, measured as the ratio of summation of exports and imports to GDP to capture the impact of trade and the openness of the economy on economic growth; ENR_{it} is the measure of school enrollment, measured as secondary enrollments as a percentage of total (% of relevant age group); η_i is a country-specific time invariant effect; and ε_o is an error term. According to Schultz (1980), Romer (1986), Lucas (1988) and Barro (1990 cited in Fayissa et al., 2008), secondary school enrollment can be employed as measure of investment in human capital. It is expected to have a positive effect on the economic growth of developing countries

Second, I address the problem of endogeneity by employing a generalized method of moment (GMM) estimator as put forward by Arellano and Bond (1991; see Catrinescu et al., 2006 and Aggarwal et al. 2006). The recent studies on remittances and economic growth have used this technique as a remedy for the lack of a good instrumental variable in the econometric estimations.

To specify the GMM model, equation (1) can be written as follows:

$$Y_{it} = \alpha' Y_{it-1} + \beta' X_{it} + \eta_i + \varepsilon_{it} \dots\dots\dots (2)$$

Where,

Y_{it} is the Log of real GDP per capita; Y_{it-1} is the Log of GDP per capita lagged one year; X_{it} is a vector of explanatory variables; η_i is the Unobserved country-specific effects, α' β' are the coefficients of parameters to be estimated; ε_{it} is the time-varying error term.

To eliminate unobserved heterogeneity (η_i), Arellano and Bond (1991; see Ferdaous, 2016) suggest first-differencing equation (2) to eliminate the unobserved country-specific effect, since the disturbance does not vary with time. This eliminates omitted variable bias and overcomes endogeneity by using lagged values of the explanatory variables as instruments. This leads to Model 3:

$$\Delta Y_{it} = \alpha' \Delta Y_{it-1} + \beta' \Delta X_{it-1} + \gamma' \Delta Z_{it} + \varepsilon_{it} \dots\dots\dots (3)$$

Where ΔY_{it} is the first-differenced natural log of GDP per capita in country i during time t ; ΔY_{it-1} is lagged differenced of the dependent variable; ΔX_{it-1} is a vector of lagged level and

predetermined and endogenous variables; Z_{it} is a vector of exogenous variables; and α , β and γ are parameters to be estimated. I estimate the coefficients of the variables to examine the joint effects of remittances and economic growth in SSA countries using the GMM and two stage least square (2SLS) estimation models. This leads to the third step examining whether the impact of remittances on growth in SSA countries is conditioned by the quality of institutions or by the level of development and human capital development.

4.2.1 Factors Influencing the Remittance-Growth Effect in SSA Countries

In this section, I employ a random estimation technique to examine whether the remittance-growth effect is conditional on the institutional and development factors in SSA countries. At this level, I employ the key conditions put forward by several empirical findings and conclusions in the field of remittances and economic growth (Mutuzeviciute et al., 2016; Valeriani and Peluso, 2011; Catrinescu et al., 2009); Catrinescu et al., 2006). These conditions include the country's level of development, financial development, human capital development and institutional quality. The political stability and regulatory quality are employed to examine institutional quality. The assumption is that political stability and regulatory quality enable a policy framework that ensures economic stability and an open business regulatory environment. That, in turn, fosters formal remittance transfers and channeling of these inflows into productive investments, which promote growth and development in SSA countries.

For estimation purposes, I adopt the baseline static model to analyze the conditional effect of the above factors. I introduce the variables that proxy institutional and development factors separately and interact them with remittance percentage of GDP per capita to gauge how their interaction term influences economic growth (GDP per capita) in the region. In a similar vein, a number of interactions variables are factored in to empirically estimate which plausible conditions affect the growth effect of remittances in SSA countries. By doing so, I modify Model 1 and estimate the following four conditional random effect models:

$$\text{LogY}_{it} = \beta_0 + \beta_1 \text{InGDP}_{it-1} + \beta_2 \text{Remit}_{it} + \beta_3 (\text{X*Rem})_{it} + \beta_4 \text{X}_{it} + \eta_i + \mu_t + \varepsilon_{it} \dots \dots \dots (4)$$

Where,

InGDP_{it-1} is the logarithm of the initial real GDP per capita lagged one year to proxy for the country's level of economic development in SSA countries. Remit_{it} is the remittance percentage

to GDP. $(X*Rem)_{it}$ is the interactive term of the conditional variables that proxy institutional, development level and human capital development in SSA countries interacted with the remittance percentage to GDP to explain Y_{it} . For the purpose of this study, $(X*Rem)_{it}$ represents the following conditional variables:

- The variable for level of development, its proxy is the logarithm of the initial real GDP per capita lagged one year ($\ln GDP_{it-1}$);
- The political stability and regulatory quality variables are proxies for institutional variable (for more technical details, refer to the end notes);
- The education variable, which is the measure of school enrollment, measured as secondary enrollments as a percentage of total, is a proxy for human capital development;
- While the percentage of credit to private sector to GDP (CPS/GDP%) is a measure of financial development and a proxy for financial sector development.
- Other control variables (represented by X_{it}) are explained above.

At this level, it is worth noting that the parameters that are used to draw the conclusion are β_2 and β_3 in the four estimated models, based on Model 4. I therefore, test their signs and significance of the latter parameters as well as their conditional marginal effect on real GDP per capita (Y_{it}). In the next section, I estimate the remittance-growth effect at the country level.

4.2.2 Remittances and Economic Growth in Rwanda

In this section, I contextualize the analysis to Rwanda as a case study to examine the remittance-growth effect in Rwanda (step four). I adopt two-step nested analyses: First, I introduce an interaction term of remittances and the Rwanda dummy ($Rem*Z$) in Model 1 above. To capture the impact of the interactive term and other control variables included in X_{it-1} in Model 1 of Table 3, I modify the specification further to provide Equation 5 below. The main objective is to estimate and evaluate the coefficients of remittances and those of the interactive term in Model 5. Brabor et al. (2006) argue that a conditional hypothesis can easily be tested using multiplicative interaction models. I therefore follow and implement this assertion. Y_{it} and X_{it-1} are continuous variables, while Z is a dichotomous variable that equals one (in my panel

dataset) when the required condition is met and zero otherwise.²

$$Y_{it} = \alpha'Y_{it-1} + \beta'X_{it-1} + \lambda Z_{it} + \delta(Rem*Z)_{it} + \varepsilon_{it} \dots \dots \dots (5)$$

Where,

Z is the Rwanda dummy (Rw) and Rem*Z is the interactive term of the Rwanda dummy (Z) and remittances (Rem) explaining Y_{it} with other control variables explained above. Using Equation 5, I examine the marginal effect of X_{it-1} on Y_{it} when Z_{it} is present. In other words, I test how the marginal effect of X_{it-1} is conditional on the value of Z_{it} .

Lastly, I validate the effect of remittances on economic growth in Rwanda by employing the cointegration test and error correction model (ECM) to examine the remittance-growth effect and the direction of long-run causality between remittances and economic growth in Rwanda, using annual time series data of Rwanda for the period from 1980-2014. I test for stationarity of data using an ADF test and employ a Johansen test of co-integration to examine whether the two series are co-integrated and have a long-run equilibrium relationship. Several researchers have used these techniques to assess such causality (Muhammad Shafiq et al., 2012). The underlying hypothesis is that there is long-run relationship between remittances and GDP per capita and the direction of causality runs from remittances to GDP per capita in Rwanda. I test this hypothesis using the Johansen test of cointegration and error correction model.

$$\Delta Y_t = \beta_0 + \beta_1 \Delta X_t + \gamma(X_{t-1} - Y_{t-1}) + \mu_t \dots \dots \dots (6)$$

Where; ΔY_t is the first differenced variable of GDP per capita and γ , is the coefficient of error correction term.

$(X_{t-1} - Y_{t-1})$ is the error correction term and μ_t has zero mean given ΔX_t X_{t-1} , Y_{t-1}

² An interaction of Rwanda dummy and remittances. I assign the Rwanda dummy a categorical value of 1 and the rest of SSA countries 0. Brabor et al. (2006) assert that for a conditional hypothesis to improve the empirical analysis, the following four conditions must be met: 1. analysts should use interaction models whenever the hypothesis they want to test is conditional in nature, 2. scholars should include all constitutive terms in their interaction model specifications, 3. scholars should not interpret constitutive terms as if they are unconditional marginal effects, and 4. analysts should calculate substantively meaningful marginal effects and standard errors. The conditional hypothesis says that “an increase in X is associated with an increase in Y when condition Z is met, but not when condition Z is absent” (Brabor et al., 2006).

are all past values of X_t and Y_t . Y_t is the Rwandan real GDP per capita and X_{t-1} are the lags of remittances. The empirical results of the analysis are presented below.

4.3 Empirical Results and Discussion

This section presents the results of the empirical estimation models explained in the previous section. I present first the results of the panel data analysis with the random effects model employed to analyze the effects of remittances on GDP per capita in 45 selected SSA countries and the results of factors conditioning the remittance-growth nexus in SSA countries. Then, I present the results of remittance-growth impact in Rwanda in relation to other SSA countries, and lastly, the results of the Johansen test of cointegration and the error correction model.

4.3.1 Results of Remittance-Growth Nexus in SSA Countries

Several tests of Model 1 and 2 were carried out in order to obtain a robust fit of the data. Accordingly, in Table 1, column 1 presents the estimation results for the benchmark model for RE without the interaction term, while column 2 presents the estimation results of random effects model with the interaction term. The 0.8846 value of the R-squared for random effects model shows that 88.46% of variation in the real GDP per capita is explained by variation in the predictor variables used in the RE model.

As shown in Table 3, remittances have no statistically significant effect on GDP per capita in the SSA region. And one possible reason for this result is that remittance-growth effect in the region is heterogeneous. In other words, the variation in terms of the remittance-growth effect in the region is country-specific influenced by development and institutional factors which are also country-specific. Implying that, the level of development and institutional and policy framework play out differently within SSA countries.

The above results reinforce the findings of previous studies (see Clemens and McKenzie, 2014; Baldé, 2009; Rodrik, 2016) which claim that, cross-country analysis fail to depict remittance-growth effect in SSA region. And suggest country specific analysis. Indeed, Clemens and McKenzie (2014:1) assert that, “cross-country regressions lack power to detect remittance-growth effects.” Although there is no existing empirical study that has investigated the heterogeneity of SSA countries in terms of remittance-growth effect, this study could not roll out the remittance-growth effect in SSA countries. Instead, the study suggests that the remittance-

growth effect plays out differently within SSA countries. Other than that, remittances could be affecting economic growth in the region through other channels, such as financial development, investments and education. Besides the variables for education and openness, other variables show no significant effect on GDP per capita in the region. Results from tests indicate a statistically significant positive effect of remittances and FDI on GDP per capita, which is overshadowed by the influence of lagged GDP per capita in the model. This reflects strong influence of the level of previous growth (proxy by GDP per capita) on the future growth of SSA countries, compared to other control variables. Besides that, these results are in line with the conditional convergence theory and most studies which argue that developing economies' per capita income tends to grow faster than that of developed economies because their diminishing returns (particularly capital) are not as strong as in capital-rich countries (Mathur, 2005).

The results from the two models indicate a positive and statistically significant effect of education and trade openness on GDP per capita in the region. A 1% increase in human capital investment measured by secondary school enrollments as a percentage of total increases GDP per capita with 3.88% in the two models. A 1% increase in the percentage of summation of exports and imports to GDP per capita results in a 1.12% and 1.18% increase to GDP per capita, respectively. Apart from the difference in the level of significance and the magnitude of the coefficients, the results from the two models are comparable. The effect of initial GDP per capita, trade openness and education on GDP per capita is however high compared to the coefficients of remittances, FDI and GCF in the region. These results are robust with few standard errors. Based on the estimation results, the findings from the SSA region are not surprising; They are consistent with other studies on SSA countries (Fayissa, 2008; Mustapha et al., 2014) which confirm the significant effect of trade openness and human capital as determinant factors for economic growth in the region. Accordingly, this study addresses the methodological issue related to the country-specific by customizing the empiric analysis to the country level analysis of remittance-growth effect in Rwanda.

In Rwanda, the remittance-growth effect holds. This is pronounced when an interaction term of remittances and Rwanda dummy is introduced in the random effect model (Table 3). The coefficient of remittances is positive but insignificant (0.0124), while the coefficient of the interaction term of remittances and the Rwanda dummy is positive and statistically significant

(0.0397***), providing strong evidence in favor of a marginal positive effect of remittances to GDP in Rwanda. In other words, the marginal effect of remittances to GDP per capita increases as more remittance flows to Rwanda. I verify the validity of this significance by predicting the margin effect of remittances on GDP per capita in Rwanda in relation to the rest of SSA countries. To do that, I interact the Rwanda dummy and remittances to GDP per capita. I assign the Rwanda dummy a categorical value of 1 and the rest of SSA countries 0. As shown in Figure 7, the predictive marginal effect of remittances to GDP per capita in Rwanda is significant and higher (the confidence bands do not overlap with zero above zero) than in the other SSA countries, which indicates no significance effect.

The plot in Figure 8 indicates the presence of a marginal effect of remittances to GDP per capita in Rwanda compared to other SSA countries at different values. As illustrated in Figure 7, the conditional marginal effect of remittances on GDP per capita in Rwanda is higher and significant compared to the rest of SSA countries, where it is positive but flatter and, more importantly, not significant. For Rwanda, the estimated confidence interval is statistically significant, providing strong evidence that the conditional marginal effect of remittances on GDP per capita in Rwanda increases as more remittances flow to the country.

4.3.2 Remittance-Growth Effect in SSA Countries: Results of Instrumental Variable Techniques

In this section, I examine the remittance-growth effect while addressing the problem of endogeneity, using instrumental variable techniques of 2-SLS and 2-GMM. I extend the random effect model with interaction term and employ the IV estimation techniques to test the validity of the internal instruments. The two estimation techniques are based on internal instruments only. Thirteen instruments were used in the specifications, disaggregated as follows: 1, the lagged log of remittances to GDP as instrumented. The seven variables used as instruments are the initial lagged log of GDP per capita, the lagged log of the total percentage of school enrolment, FDI, GCF, the openness, the interaction term of remittances to GDP, and the Rwanda dummy. The six variable lags (from lag 2-7) of initial GDP per capita were used as excluded instruments in both techniques. Accordingly, Table 4 presents estimation results of the Two Stage Least Square (2-SLS) and two generalized methods of moments (2-GMM) estimations on the growth effect of remittances in SSA countries.

I find no significant difference in the results of instrumental variable estimations with the results of Table 3. As shown in Table 4ⁱ there is no statistically significant effect of remittances on GDP per capita in long run across the SSA countries, but there is a negative one in the short run. This also seems to confirm that there is no homogenous remittance-growth effect across the SSA countries. The effect appears to vary depending on the country-specific conditions, which was not catered for in the model. I cater for this aspect using Rwanda as the case study in the next section. The results of 2-SLS reveal that the null hypothesis that variables are exogenous and instruments are weak is rejected and the alternative hypothesis that variables are endogenous is thus accepted. The results of the 2-GMM estimation confirm that estimates do not have a weak instrument problem and are valid and correctly specified. This confirms the null hypothesis that instruments are uncorrelated with the error term and the excluded instruments are correctly excluded from the estimated equation. Specifically, the findings suggest a moderate effect of remittances on GDP per capita across SSA countries. For this purpose, I extend the analysis to estimate the plausible conditions that could be affecting the growth effect of remittances in the SSA countries using the institutional and development variables specified above.

4.3.3 The Conditional Effects of the Remittance-Growth Nexus in SSA Countries

The findings reveal a moderate effect of remittances on growth in SSA countries. This section empirically examines factors influencing the remittance-growth effect in the SSA region. It examines how institutional and development variables condition the growth effect of remittances in SSA countries. Table 5 presents the results of institutional and development variables conditioning the remittance-growth effect in SSA countries. Table 5 reveals mixed findings about the conditional effect of the institutional and development factors on the remittance-growth effect in SSA countries. Generally, Table 5 shows a positive and statistically significant effect of the interaction terms of the country's level of development, financial development, education and remittances on economic growth, while the institutional variables adversely affect the growth effect of remittances in the SSA region. Accordingly, Model 1 of Table 5 indicates that the country's level of development affects the remittance-growth effect. The results reveal a negative and statistically insignificant coefficient of remittances, but a positive and significant coefficient of interaction term of the country's level of development and remittances. Concerning the conditioning role of the country's level of development on the remittance-growth effect, results reveal a negative and significant marginal effect ($-0.0384 + 0.0241 = -0.0143$) of remittances on

growth, providing strong evidence that the marginal effect of remittances in SSA countries increases with the country's level of development. These results are in line with the existing claims arguing that remittances promote economic growth in relatively developed countries and that the remittance-driven growth effect is less pronounced in less developed countries (Mutuzeviciute et al., 2016; Yoko Niimi et al. 2006). This can be attributed to the fact that such countries (for example, SSA countries) are still struggling with structural and institutional issues and the country's capacity to take advantages of such external capital inflows. The existing institutional and policy environment do not encourage remittance transfers and mediate the growth effect of these inflows. The premise is that a conducive institutional environment fosters remittance inflows and channeling of these inflows into productive investments that spur economic growth. Catrinescu et al. (2006) have argued that, in the presence of good institutions, remittances could be invested in greater amounts and more efficiently, ultimately leading to higher output. Kapur (2004) stated that, "institutions matter in how remittances are used, then the best way for recipient governments to ensure that remittances contribute to positive economic growth is to foster better quality of institutions, thus ensuring that a greater proportion of remittances is utilized for productive investments". However, across the SSA region, countries differ in terms of level of development and institutional quality and policy environment that could enhance remittance inflows and channeling of these inflows into productive investments to spur growth and development in the region.

In Model 2 of Table 5, I show that financial development complements the growth effect of remittances in the SSA countries. The findings indicate a negative and statistically insignificant coefficient of remittances (-0.0468), but the coefficient of interaction term of remittances and financial development is positive and statistically significant (0.0718**). This provides strong empirical evidence that the conditional marginal effect (positive 0.025) of remittances on economic growth is complemented by the prevailing institutional quality of financial institutions in the SSA region. These results are consistent with the previous findings on SSA countries arguing for the importance of financial sector development in enhancing formal remittance transfers, access to financial services, increase of banking liquidity and channeling these funds into productive investments that could spur growth in the region. Indeed, Nyamongo et al. (2012) find that a high degree of financial development allows migrants to send money home cheaply, quickly and safely. If these resources were transmitted in larger amounts, this would stimulate

competition among financial institutions and institutional reforms with a view to channeling remittances into productive investments.

The results of the interaction term of remittances and education shown in Model 5 of Table 5 confirm the growth effect of remittances through human capital development in the SSA region. Accordingly, the findings indicate a negative and insignificant coefficient of remittances (-0.143) on growth, while the coefficient of interaction term of remittances and education is positive and statistically significant (0.0936***). The negative conditional marginal effect of the interaction term of remittances and education (-0.049) suggests that remittance-education driven growth decreases in countries with a limited institutional framework and fewer human capital development policies, which negatively affects the remittance-growth effect through human capital development in SSA countries. In other words, the prevailing institutional frameworks and policies are not pro-human capital development in these countries. These findings are in line with the endogenous growth model and several previous studies (Rapoport, et al. 2005; Adenutsi, 2010; Adams, 2011). It has been shown that some SSA countries are still struggling to achieve recommendable human development indicators. This has a bearing on the growth-effect of remittances like other external capital inflows in the region.

Model 3 and 4 of Table 5 estimate the conditional role of institutional quality in enhancing the growth effect of remittances. The proposition is that political stability and an efficient regulatory environment encourage formal remittance inflows and channeling of these inflows into productive investments that spur growth and development in the recipient country. However, the findings reveal that the remittance-growth effect in SSA countries is negatively influenced by the quality of institutions in the region. Accordingly, the variable for regulatory quality does not have a significantly meaningful, positive conditioning effect on remittances (-0.626**) in the region. It does have an independent positive effect on growth, yet it does not seem to serve as a meaningful conditioning variable on the remittance-growth nexus, while the interaction term of remittances and regulatory quality is positive but insignificant (0.0936). More so, the negative sign (-0.5324) in the marginal effect of remittances on GDP per capita implies that the high regulatory environment does not necessarily make remittances more growth promoting. A strict regulatory framework rather has a growth-undermining effect in the region. Practically, such a system encourages unproductive use of remittances characterized by market imperfection, a lack

of competition, exclusive agreements leading to monopoly, a lack of transparency, and information asymmetry. This, in turn, leads to a high cost of formal transfers and more remittances transferred through informal channels and thus, unproductive use of remittances. Indeed, Orzoco Manuel (2013) claimed that in most African countries where exclusive agreement prevails, competition is restricted, costs are therefore high, and people ultimately resort to informal payment and transfer mechanisms. Thus, institutions do matter.

Similarly, the results in Model 4 of Table 5 reveal the negative conditional effect of political stability on the remittance-growth effect. The findings indicate a positive and insignificant coefficient of both remittances and the interaction of remittances and political stability. The marginal effect of the remittances-growth nexus and political stability turns out to be positive (0.027), though insignificant. These results strongly suggest the significant influence of political stability on the remittance-growth impact in the region, though the effect varies between countries. The negative effect of this variable seems to be associated with factors such as political instabilities, corruption, government ineffectiveness and structural issues that affect the socio-economic environment. These results are in line with several empirical studies (Catrinescu et al., 2008; Natalia Catrinescu et al., 2006; Abdih et al., 2008) that argue that a favorable institutional environment is a prerequisite condition for SSA countries to reap the growth effect of remittance inflows in the region.

In sum, the cross-sectional analysis of SSA countries shows no statistically significant impact of remittances on economic growth in the SSA region. The failure to depict the remittance-growth effect seems to suggest that the effect of remittances on economic growth varies within SSA countries, implying that the effect of remittances plays out differently within the region, but remains moderate across the region. The findings indicate that the remittance-growth impact is positively influenced by the country's level of development, financial development and education, but adversely affected by the quality of institutional variables in the region, such as political instabilities and strict regulations. The findings also suggest that institutional and development factors play out differently within SSA countries, implying that the remittance-growth effect is country-specific within the SSA region. In relation to this, Chang (2011) observes that the country cross-section results are themselves a problematic and complex on empirical analysis of institutional variables. I address this issue by contextualizing the analysis to

Rwanda as a case study. Rwanda, as a country with a demonstrably positive performance in set of institutional and development variables over the last two decades, is an interesting case for analyzing the remittance-growth effect in such a context. More so, the country has rich data required to study the growth impact of remittances.

As discussed above, Rwanda's economic development and institutional performance over the last two decades, coupled with the recent policies geared to engage its diaspora in the national development, make it an interesting case for the remittance-growth effect analysis in SSA countries. For instance, the Mo Ibrahim governance index report puts Rwanda among the five African countries demonstrating greater improvement in overall governance level and sustainable economic opportunities over the last decade. Indeed, the report emphasizes that "Rwanda is the only country to feature both among the ten highest scoring and the ten most improved countries over the past ten years" (Mo Ibrahim governance index report, 2016). The report places Rwanda first in Africa in performance in human capital development. Transparency International (Transparency International annual report, 2015) has Rwanda as the fifth least corrupt country in Africa, 44th Worldwide and least corrupt among East African countries. The World Bank Doing Business Report (2015) ranks Rwanda as the second African country in ease of doing business. In the next section, I present results specifically examining the effects of remittances on economic growth in Rwanda.

4.3.4 Remittances and Economic Growth in Rwanda

This section presents findings about remittances and economic growth in Rwanda. Table 3 presents the results of the interaction term of remittances and the Rwanda dummy for GDP per capita in Rwanda compared to other SSA countries. The section also presents the results of the Johansen test of cointegration and the error correction model employed to estimate the long-run relationship between remittances and economic growth and the direction of causality between remittances and economic growth in Rwanda.

According to the results of Model 2 in Table 3, the remittance-growth effect holds in Rwanda. This is pronounced when an interaction term of remittances and the Rwanda dummy is introduced in the random effect model (in Table 3). The coefficient of remittances is positive but insignificant (0.0124), while the coefficient of the interaction term of remittances and the Rwanda dummy is positive and statistically significant (0.0397***), providing strong evidence

of the positive marginal effect of remittances to GDP per capita in Rwanda. This implies that the marginal effect of remittances on GDP per capita increases as more remittances flow to Rwanda. The validity of this significance is verified by predicting the margin effect of remittances on GDP per capita in Rwanda in relation to the other SSA countries. The results of predictive marginal effects are presented below in Figure 8 and 9.

As indicated in figure 8 and 9, the predictive marginal effect of remittances on GDP per capita in Rwanda is significant and higher (the confidence bands do not overlap with zero; they are above zero) than the rest of other SSA countries which indicates no significance effect.

The plot in Figure 8 indicates the effects on linear prediction of remittances to GDP per capita in Rwanda in relation to other SSA countries at different values. As illustrated in both Figure 8 and Figure 9, the conditional marginal effect of remittances on GDP per capita in Rwanda is higher and statistically significant compared to that of the rest of SSA countries, where it is positive but flatter and not significant. For Rwanda, the estimated confidence interval is statistically significant, providing strong evidence confirming that the conditional marginal effect of remittances to GDP per capita in Rwanda increases as more remittances flow to the country. But results reveals no statistically significant effect of Rwanda genocide against Tutsi during the period of war. Though, it is apparent in the descriptive analysis- as depicted in figure 4.

Furthermore, the results of the Johansen test of cointegration and the error correction model were employed to estimate the long-run relationship between remittances and economic growth in Rwanda and the direction of causality between remittances and economic growth. These estimation techniques are employed to validate the remittance-growth effect in Rwanda. Table 6 presents the results of the unit root of related variables, maximum lags selected. The results of the Johansen test of co-integration and error correction model are also presented. Since the focus is on Rwanda, I used Rwandan data only for the analytical purpose.

Augmented Dickey-Fuller (ADF) and Phillips Peron (PP) tests were employed to estimate the stationarity of the variables of interest. Accordingly, the results in Table 6 indicate that the real GDP per capita, the percentage of: remittances, openness, FDI and GCF to GDP per capita are integrated at level $I(1)$. That is, at first difference and their respective P-values are less than critical values (at 5% level of significance). Education, on the other hand, is non-stationary and

gains stationarity after differentiation at second level. Therefore, the data are non-stationary time-series integrated at the order of one $I(1)$ and $I(2)$, see Table 6. A visual inspection of the data shows a clear upward trend for both the GDP per capita and remittances in Rwanda. The highest order of integration of the variables is two. I therefore apply the cointegration test and the vector error correction model (VECM) for remittances and real GDP per capita in Rwanda. I first determine the maximum lags to be used. Results of lag selection are presented in Table 7.

The results in table 7 show that the FPE, AIC, HQIC, SBIC choose maximum lags of three. This demonstrates that the bivariate model of remittances and GDP per capita is explained by three lags. The results of the cointegration test are necessary prerequisites for the error correction model test. The results of the Johansen test of cointegration double confirm the existence of cointegration among remittances and GDP per capita. In other words there is a long-run relationship among remittances and GDP per capita in Rwanda. Thus, the null hypothesis is accepted, confirming a cointegrating relationship between the two variables. Table 8 presents the results of the cointegration test of remittances and economic growth in Rwanda. With these results, I test the long-run causality between remittances and GDP per capita using a vector error correction model. Table 9, 10 and 11 present the results of the VECM, the results of serial correlation on the long-run causality between remittances and GDP per capita, and the results of the normality test for distribution of residuals using the Jarque-Bera test, respectively.

The overall results of the model fit well. The results in Table 9 indicate that the direction of long-run causality runs from remittances to GDP per capita in Rwanda. The value of β_1 is 0.263** and it is significant at the 5% level. This value represents the short-run coefficient and short-run equilibrium. This means that the system will correct its previous period disequilibrium at a speed of 26.3% between remittance percentage to GDP per capita. For the long-run equilibrium, on the other hand, the coefficient of error correction term is negative (-0.240***) and it is significant at the 5% level, indicating the rate at which the system corrects the previous period disequilibrium of the system. This implies that the system corrects its previous period disequilibrium at a speed of 24% annually.

The results of serial correlation (see Table 10) on the long-run causality indicate no autocorrelation among remittances and GDP per capita (the null hypothesis). The p-value is not significant (0.98), thus accepting the null hypothesis. The test of normality distribution of

residuals safely indicates that the residuals are normally distributed. Accordingly, Table 11 shows that the p-value of the dependent values and for the overall model is significant. Therefore, the null hypothesis is rejected, confirming that the residuals of the model are normally distributed.

4.3.3 Conclusion and Policy Implications

This paper examines the impact of remittance inflows on economic growth in SSA countries and Rwanda in particular for the period between 1980 and 2014. It also examines whether this growth effect is conditional on the institutional and development factors in SSA countries. The analytical framework of this paper is embedded in the theoretical and empirical debate between two dominant theoretical approaches about the remittance-growth effect: the national account model and the endogenous growth model.

The findings reveal that the two theories are complementary, but not mutually exclusive in explaining the growth effect of remittances. The cross-sectional analysis of SSA countries show no significant impact of remittances on economic growth in the SSA region. This implies that the effect of remittances on economic growth varies within SSA countries. And the variation in terms of the remittance-growth effect in the region is country-specific influenced by development and institutional factors which are also country-specific. The study finds that the remittance-growth impact is positively influenced by the country's level of development, financial development and education, but adversely affected by the quality of institutional variables in the region, such as political instabilities and strict regulations. The findings also suggest that institutional and development factors play out differently within SSA countries, which implies that the remittance-growth effect is country-specific within the SSA region.

In contrast, at country level, the remittance-growth effect holds. The findings reveal a positive and significant remittance-growth impact in Rwanda. The marginal effect of remittances to GDP per capita increases as remittance inflows to Rwanda increase. Similar findings reveal plausible evidence of a long-run relationship between remittances and GDP per capita. The long-run causality runs from remittances to GDP per capita in Rwanda, but not vice versa.

The positive and significant effect of remittances on economic growth in Rwanda can be attributed to how institutional and development factors play out in Rwanda. Rwanda has

experienced political stability, different structural reforms and effective institutional delivery and policy environment over the last two decades. As result, the country has experienced an average annual GDP growth of 7% (against the 4% average of the SSA region) over the last decade, making it the third-best economically performing country in Africa. This paper argues that these positive developments in terms of governance, economic development and human capital development strongly enhance mechanisms through which remittances affect economic growth in Rwanda, compared to the moderate remittance-growth effects across SSA region. Indeed, these positive developments result in a high-quality institutional environment, which in turn ensures formal remittance transfers and channeling of these inflows into productive investments in the country. The political and economic stability, coupled with the diaspora engagement policy, increase the diaspora's confidence in the country and their willingness to invest in their home country. The effective institutional policy environment encourages remittance-driven development outcomes and fosters overall economic growth in Rwanda.

This paper finds that the evidenced negative effect of quality of institutional variables in conditioning the remittance-growth effect in the region implies that structural and policy issues do not apply homogenously across SSA countries, hence influencing the basis of the variation. Nevertheless, this does not rule out the development effect of remittances in the region. The effect could be analyzed through other channels, such as poverty, which was not addressed in this study. The remittance growth-effect could also be country-specific (as evidenced by Rwanda's case) and depend on the prevailing institutional policy environment.

Considering the difficulty of the endogeneity that exists between remittances and growth and the methodological and data issues (mostly macroeconomic data at cross-country level), further research that explores other approaches through which remittances affect development outcomes in the origin countries, focusing on micro-level analysis, is imperative. This forms the author's next research project. These findings suggest that the overall institutional policy environment, for instance, in the financial sector, is imperative to enhance the growth and development impact of remittances in the SSA region and Rwanda in particular.

5.0 References

- Abdih, Y., Dagher, J., Chami, R., & Montiel, P. (2008). *Remittances and institutions: Are remittances a curse?* (No. 8-29). International Monetary Fund.

- Abdih, Y., Chami, R., Dagher, J., & Montiel, P. 2012. "Remittances and institutions: Are remittances a curse?". *World Development*, Vol.40(4), pp.657-666.
- Adams Jr, R. H., & Page, J. (2005). Do international migration and remittances reduce poverty in developing countries?. *World development*, 33(10), 1645-1669.
- Adams Jr, R. H. (2011). Evaluating the economic impact of international remittances on developing countries using household surveys: A literature review. *Journal of Development Studies*, 47(6), 809-828.
- Adelman and Taylor (1990), Is structural adjustment with a human face possible? The case of Mexico, *Journal of Development Studies*, 26:387-407
- Adenutsi, D. E. (2010). Do international remittances promote human development in poor countries? Empirical evidence from Sub-Saharan Africa.
- Addison, E. K. (2004). The macroeconomic impact of remittances. *Presentation at the*.
- Aggarwal, R., Demirguc-Kunt, A., & Martinez Peria, M. S. (2006). *Do workers' remittances promote financial development?*. The World Bank.
- Anyanwu, J. C., & Erhijakpor, A. E. (2010). Do international remittances affect poverty in Africa?. *African Development Review*, 22(1), 51-91. DOI:10.1111/j.1467-8268.2009.00228.x
- Amuedo-Dorantes, Catalina and Susan Pozo. 2006a. "Remittance Receipt and Business Ownership in the Dominican Republic" *The World Economy*, 29(7): 939-956
- Amuedo-Dorantes, C., Georges, A., & Pozo, S. (2008). Migration, remittances, and children's schooling in Haiti. *The Annals of the American Academy of Political and Social Science*, 630(1), 224-244.
- Akinpelu, Y. A., Ogunbi, O. J., Bada, O. T., & Omojola, O. S. (2013). Effects of remittance inflows on economic growth of Nigeria. *Developing Country Studies*, 3(3).
- Anderson, T. W., & Hsiao, C. (1982). Formulation and estimation of dynamic models using panel data. *Journal of econometrics*, 18(1), 47-82.
- Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo

- evidence and an application to employment equations. *The review of economic studies*, 58(2), 277-297.
- Baldé, Y. (2009). Migrants' remittances and economic growth in Sub-Saharan Africa. *Laboratoire d'Analyse et de Prospective Economique (LAPE), Universite de Limoges, France*.
- Baldé, Y. (2011). The impact of remittances and foreign aid on savings/investment in Sub-Saharan Africa. *African Development Review*, 23(2), 247-262.
- Benhabib, J., & Spiegel, M. M. (1994). The role of human capital in economic development evidence from aggregate cross-country data. *Journal of Monetary economics*, 34(2), 143-173.
- Billar, S. (2007). University of Iowa for International Finance and Development Briefing No. 3: Remittances.
- Brambor, T., Clark, W. R., & Golder, M. (2006). Understanding interaction models: Improving empirical analyses. *Political analysis*, 14(1), 63-82.
- Brambor, T., Clark, W. R., & Golder, M. (2006). Understanding interaction models: Improving empirical analyses. *Political analysis*, 14(1), 63-82.
- Buch, C., Kuckulenz, A., Le Manchec, M. (2002): Worker Remittances and Capital Flows, Kiel Working Paper No. 1130, Kiel Institute for World Economics, Kiel.
- Buch, C., Kuckulenz, A. (2004): Worker Remittances and Capital Flows to Developing Countries, Centre for European Economic Research (ZEW) Discussion Paper 04 31, ZEW, Mannheim.
- Butkus, M. (2016). Remittances, development level, and long-run economic growth. *Economies*, 4(4), 28.
- Catrinescu, N., Leon-Ledesma, M., Piracha, M., & Quillin, B. (2009). Remittances, institutions, and economic growth. *World Development*, 37(1), 81-92.
- Catrinescu, Natalia, Miguel León-Ledesma, Matloob Piracha, and Bryce Quillin, 2006, "Remittances, Institutions, and Economic Growth," IZA Discussion Paper No. 2139 (Bonn:IZA).
- Chami, R., Fullenkamp, C., & Jahjah, S. (2005): "Are immigrant remittance flows a source of

- capital for development?” *IMF Staff papers*, Vol, 52(1), pp. 55-81.
- Clemens, M. A., & Ogden, T. 2014. “Migration as a strategy for household finance: A research agenda on remittances, payments, and development.” *Center for Global Development Working Paper*, (354). Washington, DC 20036
- Clemens, A. Michael, David McKenzie 2014. “Why Don’t Remittances Appear to Affect Growth?” *CGD Working Paper* 366. Washington, DC: Center for Global Development.
- Chang, H. J. (2011). Institutions and economic development: theory, policy and history. *Journal of Institutional Economics*, 7(4), 473-498.
- Chami, R., Fullenkamp, C., & Jahjah, S. (2005), Are immigrant remittance flows a source of capital for development?. *IMF Staff papers*, 52(1), 55-81.
- De, S., Islamaj, E., & Yousefi, S. (2015). Can Remittances Help Promote Consumption Stability. *Global Economic Prospects*, 4.
- Dilip Ratha, Sanket, Mohapatra, Caglas, Sonia Plaza, William Shaw and AbebeShimeles (2011), Earl Babbies, (2007); *The Practice of Social Research*, 11 Edition
- Driffield, N., & Jones, C. (2013). Impact of FDI, ODA and migrant remittances on economic growth in developing countries: A systems approach. *The European Journal of Development Research*, 25(2), 173-196.
- Edwards, A. C., & Ureta, M. (2003). International migration, remittances, and schooling: evidence from El Salvador. *Journal of development economics*, 72(2), 429-461.
- Faini, Riccardo 2006 : “Remittances and the brain drain”. *IZA Discussion Papers*, No. 2155, Bonn, German. Institute for the Study of Labor (IZA)
- Fayissa, B., & Nsiah, C. (2010). Can remittances spur economic growth and development? Evidence from Latin American countries (LACs). Department of Economics and Finance Working Paper Series
- Fayissa, Bichaka and Nsiah, Christian (2008), the impact of remittances on economic growth and Development in Africa. Department of economics and finance working paper series.
- Ferdaous, J. (2016). Impact of remittances and FDI on economic growth: a panel data analysis.

- Journal of Business Studies Quarterly*, 8(2), 58.
- FinScope Report (2013), Financial Inclusion in Rwanda, Access to finance RwandaGapen, M. T., Chami, M. R., Montiel, M. P., Barajas, M. A., & Fullenkamp, C. (2009). *Do workers' remittances promote economic growth?* (No. 9-153). International Monetary Fund.
- Gjini, A. (2013). The role of remittances on economic growth: An empirical investigation of 12 CEE countries. *The International Business & Economics Research Journal (Online)*, 12(2), 193.
- Gitter, S. R., & Barham, B. L. (2007). Credit, natural disasters, coffee, and educational attainment in rural Honduras. *World Development*, 35(3), 498-511.
- Glytsos, N. P. 2002. "The role of migrant remittances in development: Evidence from Mediterranean countries." *International Migration*, Vol, 40(1), pp. 5-26.
- Glytsos, N. P. (2005). The contribution of remittances to growth: A dynamic approach and empirical analysis. *Journal of Economic Studies*, 32(6), 468-496.
- Giuliano, P., & Ruiz-Arranz, M. (2009). Remittances, financial development, and growth. *Journal of Development Economics*, 90(1), 144-152.
- Granger, C. W. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica: Journal of the Econometric Society*, 424-438.
- Ibrahim Index of African Governance Index Report (2016): a Decade of African Governance 2006-2015, MO IBRAHIM FOUNDATION
- International Monetary Fund (2005): "World Economic Outlook" International Monetary Fund, Washington, DC.
- Jadotte, E. (2009). *International migration, remittances and labour supply: The case of the Republic of Haiti* (No. 2009.28). Research paper/UNU-WIDER.
- Kireyev, M. A. 2006. "The Macroeconomics of Remittances: The Case of Tajikistan." *IMF Working Papers No 06/2*. Washington, DC. International Monetary Fund.
- Lucas, R. E. 2005. "International Migration and Economic Development: Lessons from

- Low- Income Countries.” Edward Elgar Publishing. Sweden
- Mathur, S. K. (2005). Absolute convergence, its speed and economic growth for selected countries for 1961-2001. *Korea and the World Economy*, 6(2), 245-273.
- Mo Ibrahim Governance Index Report (2018), Ibrahim Index of African Governance accessed 16th April, 2019
- Matuzeviciute, K., & Butkus, M. 2016. “Remittances, development level, and long-run economic growth.” *Economies*, Vol, 4(4), pp. 28.
- Nelson, Richard R. and Edmund S. Phelps(1996): Investment in Humans, Technological Diffusion, and Economic Growth," American Economic Association Papers and Proceedings, May 1966, 56, 69(75).
- Niimi, Y., & Ozden, C. (2006). *Migration and remittances: causes and linkages*. The World Bank.
- Nyamongo, E. M., Misati, R. N., Kipyegon, L., & Ndirangu, L. (2012). Remittances, financial development and economic growth in Africa. *Journal of economics and business*, 64(3), 240-260.
- Orozco, M. (2013). *Migrant remittances and development in the global economy*. Boulder, CO: Lynne Rienner Publishers.
- OECD (2006), International Migrant Remittances and their Role in Development, International Migration Outlook, ISBN 92-64-03627-X
- Orrenius, P. M., Zavodny, M., Canas, J., & Coronado, R. (2010). Do remittances boost economic development-evidence from Mexican states. *Law & Bus. Rev. Am.*, 16, 803.
- Rachdi, H. (2011). The causality between financial development and economic growth: A panel data cointegration. *International Journal of Economics and Finance*, 3(1), 143.
- Ratha, D., & Riedberg, J. (2005). On reducing remittance costs. *Unpublished paper*. Development Research Group, World Bank, Washington, DC.
- Rapoport, H. and Docquier, F (2005) The Economics of Migrants`Remittances, IZA Discussion Paper 1531.Bonn, Germany

- Rodrik, D. 2016. "An African growth miracle? *Journal of African Economies*." Vol, 27(1), pp. 10-27.
- Roodman, D. (2006). An index of donor performance.
- Romer, P. M. (1990). Endogenous technological change. *Journal of political Economy*, 98(5, Part 2), S71-S102.
- Romer, P.M. (1986), "Increasing returns and long-run growth", *Journal of Political Economy*, Vol. 94 No. 5, pp. 1002-36.
- Shafiq, M., Haq, U. I., Khan, A., & Khan, S. 2012. "The role of foreign remittances and economic growth in poverty alleviation: Time series evidence from Pakistan." *World Applied Sciences Journal*, Vol, 19(3), pp. 366-369.
- Shimeles (2011), *Leveraging Migration for Africa. Remittances, Skills and Investments*. World Bank, Washington DC.
- Sosa, L. C., & Durango, C. A. M. (2006). *Migration as a safety net and effects of remittances on household consumption: the case of Colombia*. Banco de la República
- Staiger, D., and J. H. Stock (1997): "Instrumental Variables Regression with Weak Instruments," *Econometrica*, 65, 557–86.
- Stahl, C. W., & Arnold, F. (1986): "Overseas workers' remittances in Asian development." *International Migration Review*, Vol, 20(4), pp. 899-925.
- Stock, J. H., Wright, J. H., & Yogo, M. (2002). A survey of weak instruments and weak identification in generalized method of moments. *Journal of Business & Economic Statistics*, 20(4), 518-529.
- Straubhaar, T. (1988): *On the Economics of International Labor Migration*, Haupt, Bern-Stuttgart.
- Udah, E. B. (2011). Remittances, human capital and economic performance in Nigeria. *International Journal Of Human Development and Sustainability*, 4(1), 103-117.
- Valeriani, E., & Peluso, S. (2011): "The impact of institutional quality on economic growth

and development: An empirical study.” *Journal of Knowledge Management, Economics and Information Technology*, Vol, 1(6), pp. 1-25.

Winters, L. A., & Martins, P. M. (2004). When comparative advantage is not enough: business costs in small remote economies. *World Trade Review*, 3(3), 347-383.

Woodruff, C., & Zenteno, R. (2007). Migration networks and microenterprises in Mexico. *Journal of development economics*, 82(2), 509-528.

World Bank Migration and Remittance Fact Book, 2016

World Bank (2003): “World Development Report 2003: Sustainable Development in a Dynamic World”, The World Bank, Washington, DC.

World Bank Doing Business report (2015), Going Beyond Efficiency, Economy Profile, Rwanda

World Bank Development Indicators, 2016), World Development Indicators, Washington, DC,

World Bank

World Bank (2011), Migration and Remittances Factbook, all sourced from;

www.worldbank.org,

Website:

www.profeco.gob.mx

www.iom.org

www.bnr.rw

www.afdb.orgwww.investopedia.com/articles/economics/08/trade-deficit-effects.asp accessed 24th January 2016

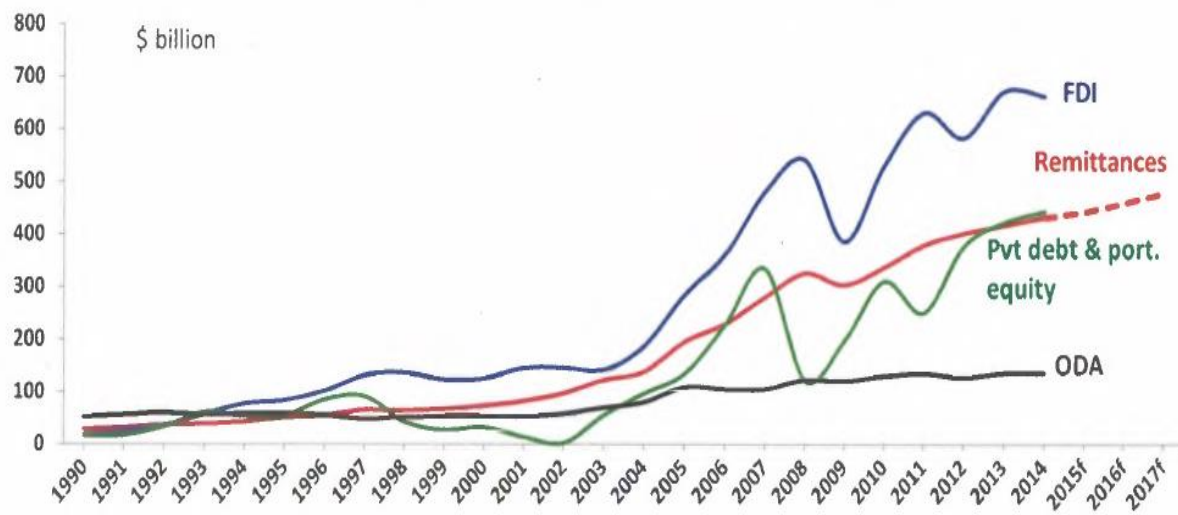
<http://www.transparency.org/cpi2015> accessed on 27th March 2017

Journal Pre-proof

Appendix

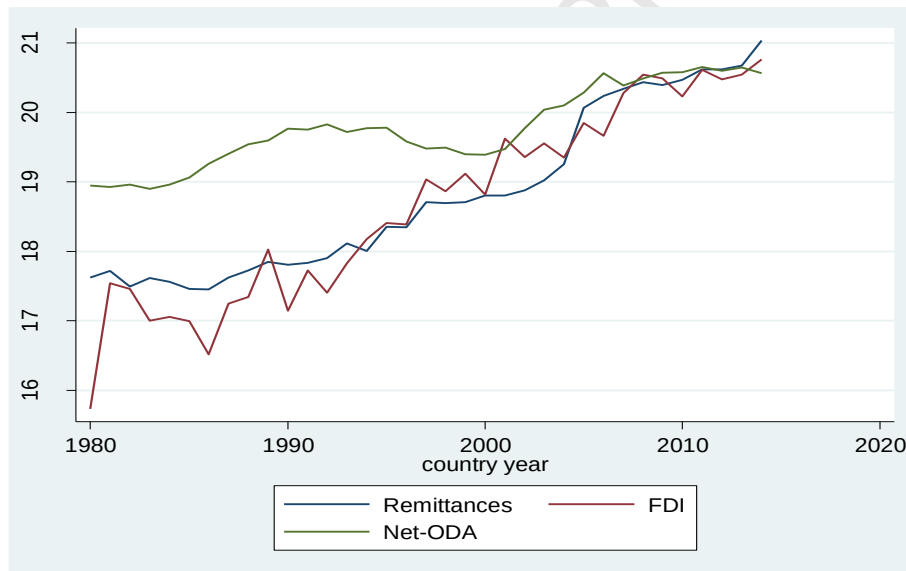
Figures and Tables

Figure 1: Showing Remittances to Developing Countries Versus Other External Financing Inflows, from 1990-2014 in Billions US\$



Source: Development Indicators Group, World Bank, *Migration & Remittance FactBook*, 2016 3rd Edition

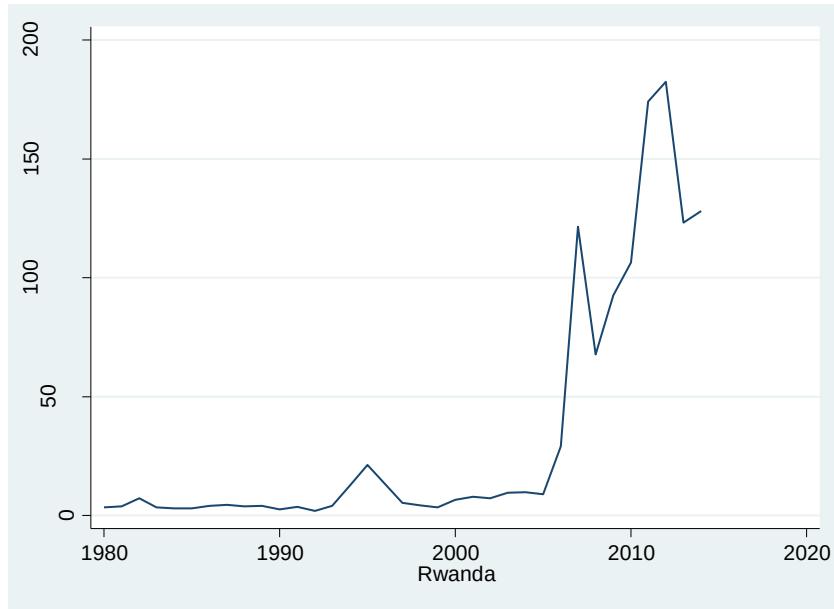
Figure 2: Showing Trends of Remittances to Sub-Saharan African Countries Versus Other External Capital Inflows, from 1980-2014- in Billions US\$



Source: Author's estimation³ based on (May 2016) time series data from World Bank

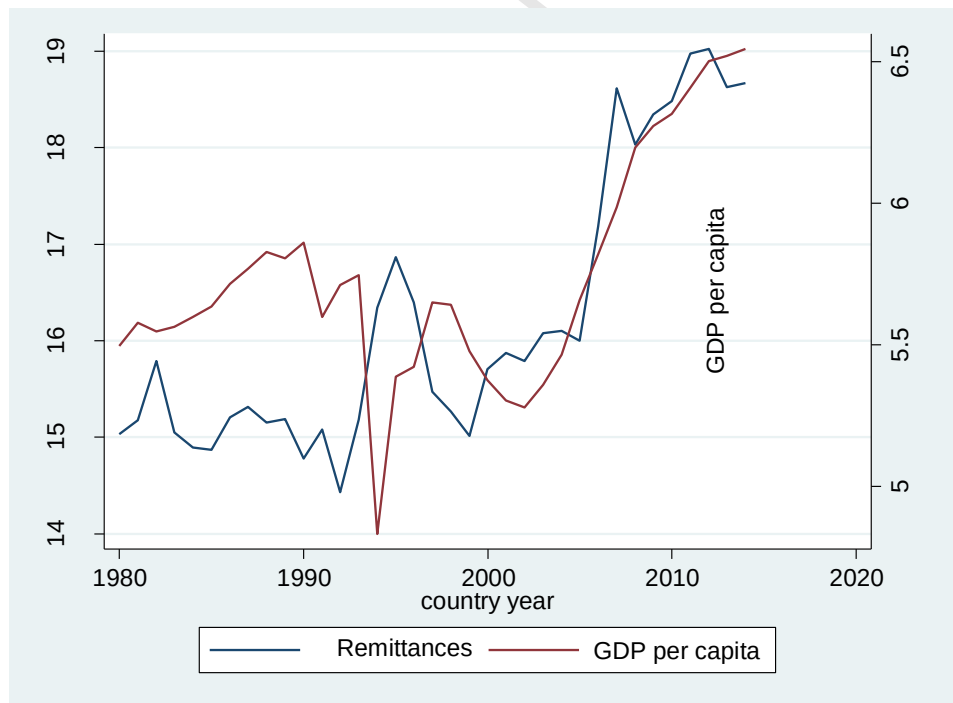
Figure 3: Showing the Growth Trends of Remittance Inflows to Rwanda, 1980-2014 (US\$ millions)

³ Based on the time series data from the World Bank and the Quality of Governance Datasets respectively.



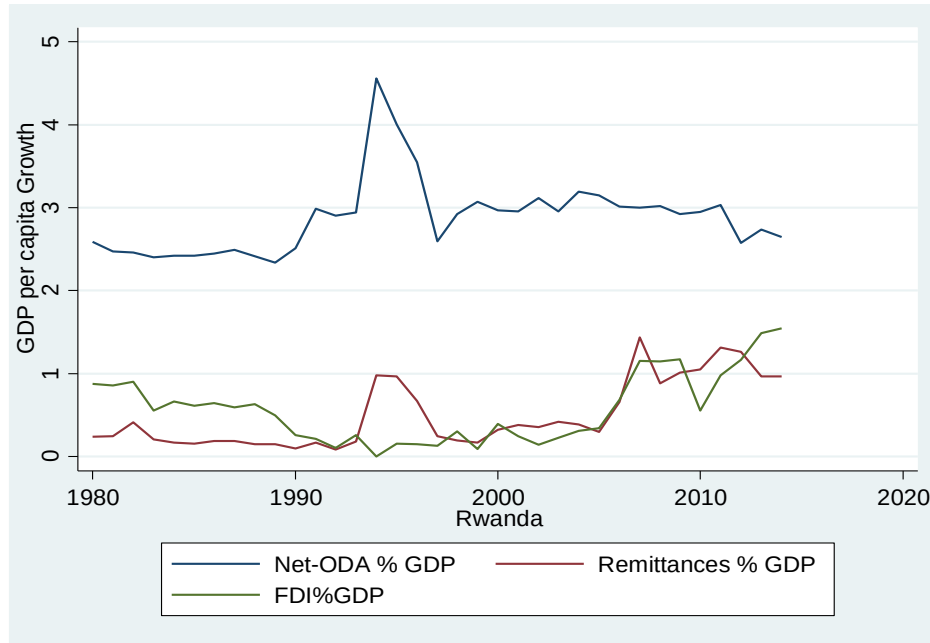
Source: Author's estimationⁱⁱ based on (May 2016)time series data from World Bank

Figure 4: Showing the Growth Trends of GDP per Capita against Remittance Inflows in Rwanda: 1980-2014



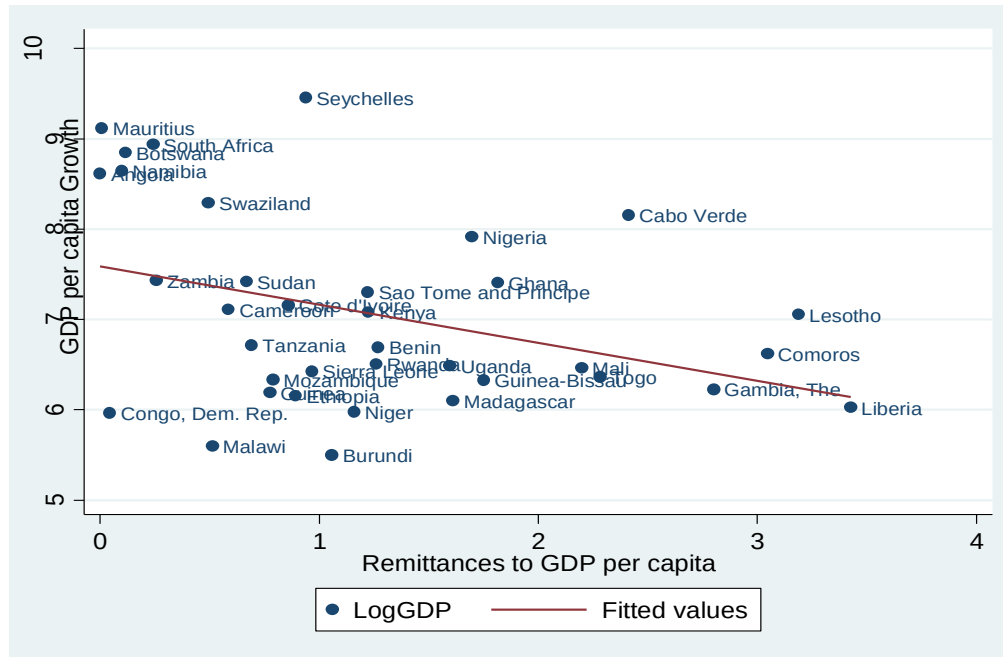
Source: Author's estimation based on (May 2016)time series data from World Bank

Figure 5: Showing the Trends in Percentage of External Capital Flows to GDP per capita in Rwanda, from 1980-2014



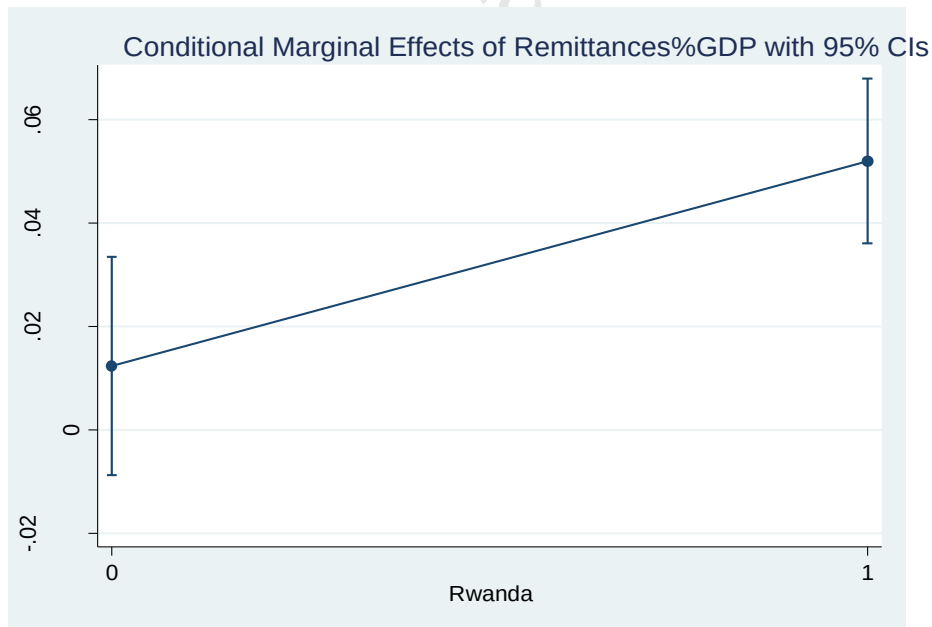
Source: Author's estimation based on (May 2016) time series data from World Bank

Figure 6: Showing Two Way Scatter Indicating the Percentage of Remittances to GDP in SSA Countries in 2012



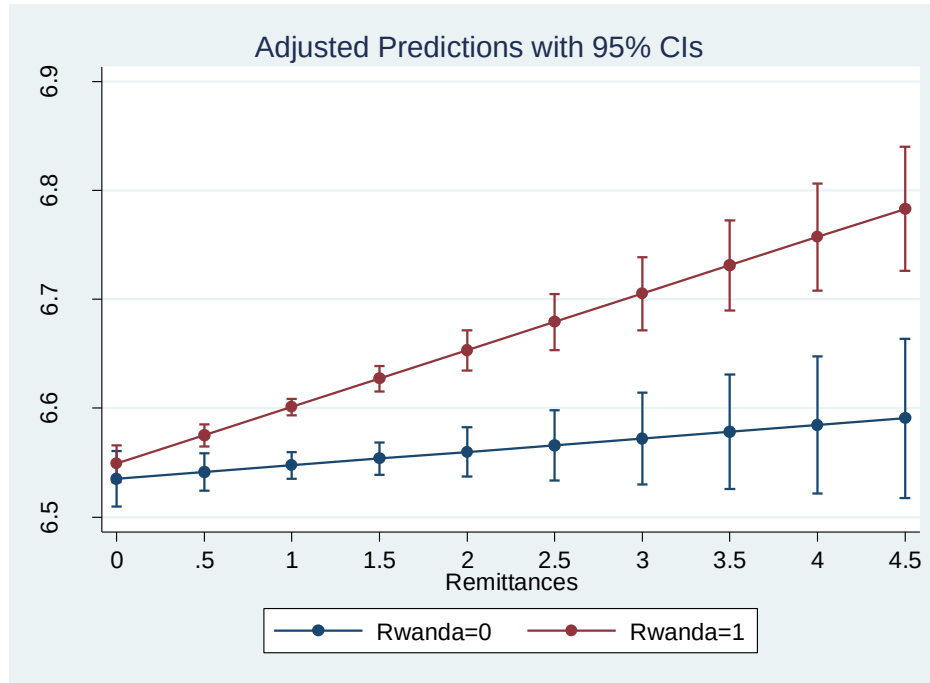
Source: Author's estimation based on (April, 2016) time series data from World Bank

Figure 6: Showing the Conditional Marginal Effect of Remittances on GDP per capita in Rwanda and Other Sub-Saharan African Countries



Source: Author's estimation based on (January 2017) time series data from World Bank

Figure 7: Showing the Conditional Marginal Effect of Remittances to GDP per capita in Rwanda and Other Sub-Saharan African Countries



Source: Author's estimation based on (January 2017) time series data from World Bank

Table 1: Showing Summary Statistics

	Mean	Std	Min	Max
GDP percapita	6.52	1.04	4.8	10
Rem%GDP	1.00	1.00	0.0	5
GCF%GP	3.05	0.43	1.4	4
OPEN	17.91	1.88	11.0	22
FDI%GD	0.95	0.86	-1.9	4
Education	3.27	0.77	0.9	5
Rwanda	0.04	0.21	0.0	1
Interaction	0.11	0.50	0.0	3
N	634			

Notes: All other variables are transformed into logarithm except Rwanda dummyⁱⁱⁱ.

Table2: Pairwise Correlations Between Variables used in the Growth Equation

	GDP	Rem%GDP	Education	GCF%GDP	FDI%GDP	OPEN
GDP	1					
Rem%GDP	0.141***	1				
Education	0.732***	0.00234	1			
GCF%GDP	0.250***	0.446***	0.236***	1		
FDI%GDP	0.133***	0.135***	0.193***	0.366***	1	
OPEN	0.774***	0.0435	0.477***	-0.255***	-0.0780*	1

* p<0.05, ** p<0.01, *** p<0.001

Notes: This table reports the correlation matrix of the both dependent and main control variables. Stars signify significance at 1%, 5% and 10%. Number of observations:634.Variables for: Real GDP per capita, secondary enrollments as a percentage of total (as a proxy for education) and TOT%GDP (trade openness), Rem%GDP, GCF%GDP, FDI%GDP represent remittance percentage to GDP, Gross capital formation to GDP and FDI percentage to GDP respectively all are in logarithms. The table two indicates the degree of comparison and level of significance of correlation as per every variable in the correlation matrix. It shows that all independent variables are correlated and significant to the dependent variable (GDP per capita). Table 2 above depicts a positive and statistically significant correlation between remittances inflows and real GDP per capita to SSA countries. Based on the time series from the World Bank and the Quality of Governance Datasets respectively.

Table 3: Results of Random Effects Models for SSA Countries

	(Model 1)	(Model 2)
	RE	Interaction
VARIABLES	Log GDP	Log GDP
Lagged GDP per capita	0.990***	0.991***
	(0.0119)	(0.0123)

Lagged GCF % GDP	0.00280 (0.0218)	0.00244 (0.0219)
Lagged Openness % GDP	0.0112** (0.00549)	0.0118** (0.00577)
Lagged FDI % GDP	0.0102 (0.00807)	0.00991 (0.00813)
Lagged Education	0.0388*** (0.0128)	0.0389*** (0.0129)
Rwanda Dummy	–	0.0139 (0.0179)
Rwanda Civil War (Dummy)	–	-0.172 (0.182)
Lagged Rem % GDP	0.0117 (0.0104)	0.0124 (0.0108)
Lagged Rem*Rwanda	–	0.0397*** (0.0132)
Constant	-0.259* (0.149)	-0.276* (0.158)
Observations	632	632
Number of iso3n	40	40

Notes: All independent variables are lagged one year and they are in logs.

Robust Standard errors are in parentheses: * p<0.05, ** p<0.01, *** p<0.001

Table 4: Remittance-Growth Effect in SSA Countries: Results of Instrumental Variable Techniques

	Model 1	Model 2	Model 3
	2-SLS	2-GMM	2-GMM
VARIABLES	D2.LogGDP	LogGDP	LogGDP
Lagged D2. Rem % GDP	-0.0760** (0.0303)	–	–

Lagged D2. GDP	-0.416***	—	—
	(0.0905)	—	—
Lagged D2. Education	0.0127	—	—
	(0.119)	—	—
Lagged D2. FDI % GDP	-0.00115	—	—
	(0.00881)	—	—
Lagged D2. GCF % GDP	0.0351	—	—
	(0.0322)	—	—
Lagged D2. Openness % GDP	0.0647	—	—
	(0.0561)	—	—
Lagged D2. Rem*Rwanda	0.450	—	—
	(0.615)	—	—
Lagged Rem % GDP	—	0.000102	-0.00187
	—	(0.00399)	(0.00481)
Lagged GDP	—	0.987***	0.986***
	—	(0.0291)	(0.0323)
Lagged (Log)Education	—	0.0358*	0.0400
	—	(0.0213)	(0.0267)
Lagged FDI % GDP	—	0.00596	—
	—	(0.00800)	—
Lagged GCF % GDP	—	0.0249	—
	—	(0.0516)	—
Lagged Openness % GDP	—	0.00796	0.00974
	—	(0.00664)	(0.00633)
Rwanda Dummy	—	-0.714	-0.710
	—	(0.656)	(0.520)
Lagged Rem*Rwanda	—	0.298	0.294
	—	(0.268)	(0.210)
Lagged FDI % GDP	—	—	-0.000615

	—	—	(0.00103)
Lagged GCF % GDP	—	—	0.00205
	—	—	(0.00312)
Constant	0.0792**	-0.212	-0.202
	(0.0341)	(0.167)	(0.208)
Observations	366	520	539
R-squared	0.030	0.985	0.985

Standard errors in parentheses *** p < 0.01, ** p < 0.05, * p < 0.1

Table 5: Results of Factors Influencing the Remittance-Growth Effect in SSA

INDEPENDENT VARIABLES	Dependent variable is log GDP per capita				
	(Model 1)	(Model 2)	(Model 3)	(Model 4)	(Model 5)
Rem% GDP	-0.0384 (0.0368)	-0.0468 (0.115)	-0.626** (0.257)	0.0471 (0.104)	-0.143 (0.0968)
FDI % GDP	0.0802*** (0.0177)	0.174*** (0.0261)	-0.185* (0.0972)	0.110*** (0.0415)	0.103*** (0.0311)
Openness	-0.0670*** (0.0221)	-0.446*** (0.0631)	-0.172*** (0.0426)	-0.583*** (0.0488)	-0.351*** (0.0460)
Rem*Init'l Dev't Level	0.0241* (0.0123)	—	—	—	—
Initial Dev't Level	0.785*** (0.0556)	—	—	—	—
Rem*Fin. Dev't	—	0.0718**	—	—	—

	–	(0.0316)	–	–	–
CPS%GDP	–	0.154*	–	–	–
	–	(0.0833)	–	–	–
Rem*Reg Quality			0.0936	–	–
	–	–	(0.0591)	–	–
Reg Quality - Estimate	–	–	0.676***	–	–
	–	–	(0.128)	–	–
Rem*Political Stability	–	–	–	-0.0199	–
	–	–	–	(0.0307)	–
Pol Stability - Estimate	–	–	–	0.0859	–
	–	–	–	(0.110)	–
Education	–	–	–	–	0.425***
	–	–	–	–	(0.0712)
Remittances*Education	–	–	–	–	0.0936***
	–	–	–	–	(0.0356)
Constant	2.450***	13.79***	11.66***	17.12***	11.20***
	(0.707)	-1.251	(0.746)	(0.899)	(0.819)
Observations	996	944	44	115	651
Number of iso3n	42	41	6	18	40

Standard errors in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

N.B: Model 1 is an interaction of remittances and initial level of development and its level effects; Model 2 is an interaction of remittances and financial development and its level effects; Model 3 is an interaction of remittances and regulation quality and its level effects; Model 4 is an interaction of remittances and political stability and its level effects, while Model 5 is an interaction of remittances and education variable and its level effects.

Table 6: Showing the Summary Results of Unit Root Tests

Variable	Order of integration	P-Value	Test-Stat	5% Critical Value
Log(GDP per capita)	I(1)	0.000	-4.289	-2.980
FDI(% to GDP)	I(1)	0.002	-3.425	-2.980
Rem (% to GDP)	I(1)	0.000	-4.985	- 2.980
Openness(% to GDP)	I(1)	0.000	-6.115	-2.980
GCF(% to GDP)	I(1)	0.000	-5.599	-2.980
Education (% Gross Sec)	I(2)	0.002	-3.741	-3.600

Source: Stata 14

Table 7: Showing the Number of Lags Selected

Sample: 1983-2013, but with a gap

Number of Obs

=25

No of Lags	LL	LR	df	P	FPE	AIC	HQIC	SBIC
0	167.376		4		0.002022	-0.539005	-0.40378	-0.051455
1	244.799	15.485	4	0.004	0.001529	-0.838389	-0.649073	-0.155819*
2	278.519	6.744	4	0.150	0.001668	-0.78815	-0.544744	0.08944
3	340.539	12.404*	4	0.015	0.001487*	-0.9964313	-0.666816*	0.108298

Notes: **Endogenous:** GDP per capita and Rem (% to GDP). **Exogenous:** Education (% Gross Sec), GCF (% to GDP), Openness (% to GDP), FDI(% to GDP). LL= The log likelihood, LR= Likelihood-ratio, df=degree of freedom, P=probability, FPE= The final prediction error, AIC=Aikake Information Criterion, HQIC=Hannan Information Criterion, Bayesian Information Criterion. For further detail see (Mphumuzi Sukati, 2013)

Table 8: Showing the Results of Cointegration Test

Trend: Constant

No of Observations: 34

Sample:1981-2014

Lags: 1

Max Rank	Trace Stat	Critical Values (at 5 %)
0	12.5951*).	15.41

1	0.2441	3.76
2		

Max Rank	Max Statistic	Critical Value (at 5%)
0	12.351	14.07
1	0.2441	3.76
2		

Notes: Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1; No of Obs: 34

Table 9: Showing the Results of Vector Error Correction Model, VECM

	(Model 1)	(Model 2)
	VEC	
VARIABLES	D_LogGDP	D_Log Rem%GDP
Error correction term (L._ce1)	-0.240*** (0.0777)	0.263** (0.105)
Lagged LogGDP	-0.201 (0.172)	-0.0471 (0.232)
Lagged Log Rem%GDP	-0.116 (0.163)	0.228 (0.220)
Constant	0.0299	0.0272

(0.0334)

(0.0450)

Observations

33

33

Notes: Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1; No of Obs: 33

Table 10: Showing the Results of Serial Correlation on the Long-Run Causality between Remittances and GDP per capita

No of Lags	Chi2	df	Prob>Chi2
1	0.4242	4	0.98045
2	10.323	4	.90485

Ho: No autocorrelation at lag order

Table 11: Showing the Results of Normality Test for Distribution of Residuals using Jarque-Bera Test

Equation	Chi2	df	Prob>Chi
D.LogGDP	241.061	2	0.00000
D.Log Rem%GDP	25.668	2	0.00000
All	266.729	4	0.00000

End Notes

ⁱ Model 1 of table 2, presents the results of the second differenced equation of two stage least square (2-SLS) estimation technique following the Arellano and Bond's (1991) endeavoring to increase robustness of the results while considering the specification of errors, multicollinearity and homoscedasticity (Raju Jan Singh, 2010). In this model, i transformed data by differencing ΔY_{it-2} and ΔX_{it-2} . As illustrated in model 1 in table 4, the double transformation of the data effectively drops the number of observations (first observations for each individual and its R^2 values) but improves the validity of instruments (Anderson-Hsiao, 1982). The results indicate a negative coefficient but statistically significant effect of remittances on GDP per capita. Accordingly, a ten percentage rise in remittances-to-GDP per capita would negatively affect per capita GDP by 7.6 percentage points. This suggests that there is negative effect of remittances to all SSA countries in short-run. However, the negative significance of the coefficient doesn't roll out the growth effect of remittances in the region, instead it is in short-run. Moreover, the results of model 1 indicate that the hypothesis testing of endogeneity indicate that the P-values are less than 5% thus, i reject null hypothesis that variables are exogenous, and accept the alternative hypothesis that variables are endogenous. The results indicate that F-test values is 14.3 greater than critical value (0.012) and the R-squared, 0.03, therefore i reject the hypothesis that instruments are weak. These results confirm with the literature which affirms that if the F statistic exceeds 10 then, the instruments are sufficiently strong (Staiger and J.H Stock, 1997, Stock, J.H. Wright, and M Yogo, 2002).

Model 2 and 3 in table 2, present the results of endogeneity and weak instrument specifications using 2-GMM estimation technique. Accordingly, results of endogeneity in model 3 indicate that the level of significance is 1.2 less than 5% significant level thus, rejecting the null hypothesis that variables are exogenous and accept the alternative hypothesis that variables are endogenous. The results of F-statistic for weak instruments using Hansen's J test (for overidentifying) indicate that F-statistics is above the critical value, at 5 percent significance level ($2.29763 > 0.1296$ (critical values) and the R-squared values are 0.215 less than 2.29763. The results safely indicate that the estimates do not have weak instrument problem. There are valid and correctly specified. Therefore, i accept the null hypothesis that instruments are uncorrelated with the error term and the excluded instruments are correctly excluded from the estimated equation.

The results indicate that it's only in model 2 in table 4 where the coefficient of remittances to GDP per capita is positive but statistically insignificant. While in model 3, results indicate negative coefficient of remittances on GDP per capita with no statistical significance. Therefore, results from the three models of table 4 indicate that, there is no positive association between remittances and GDP per capita in long-run, but there is a negative one in the short-run in the SSA region.

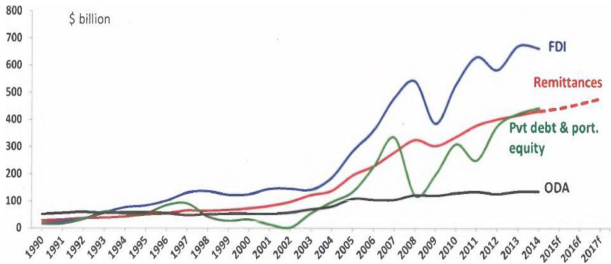


Figure 1

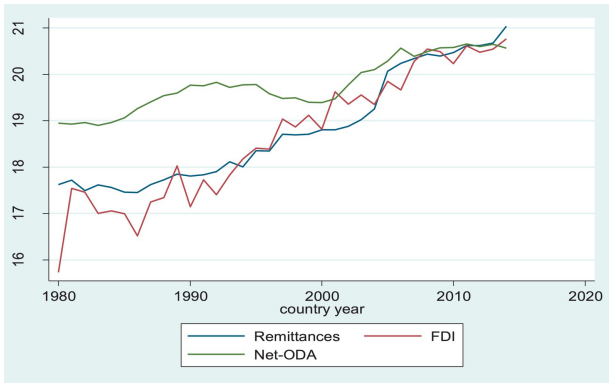


Figure 2

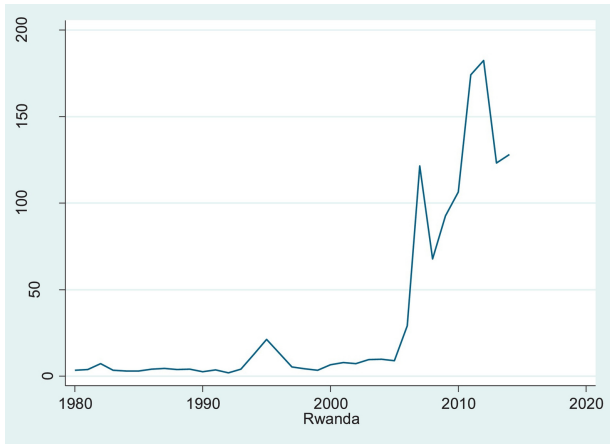


Figure 3

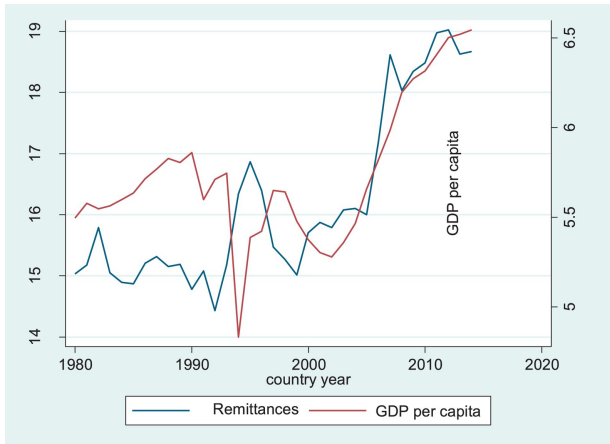


Figure 4

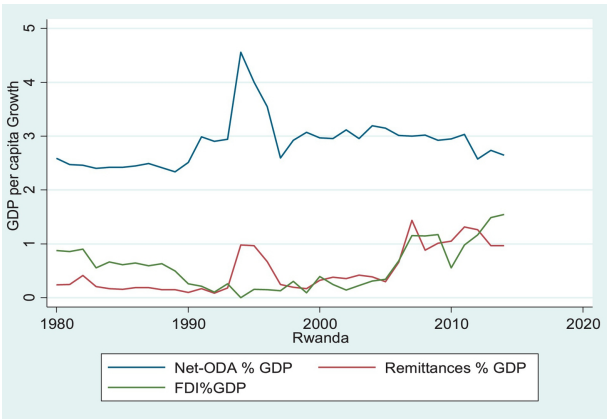


Figure 5

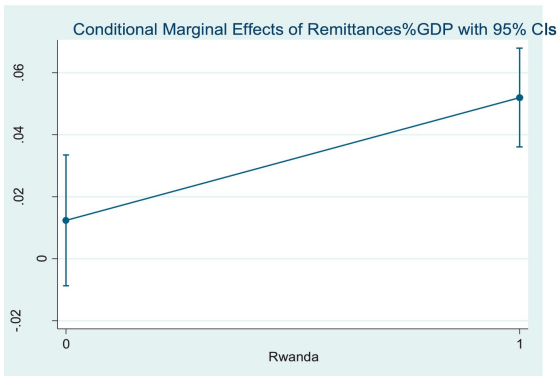
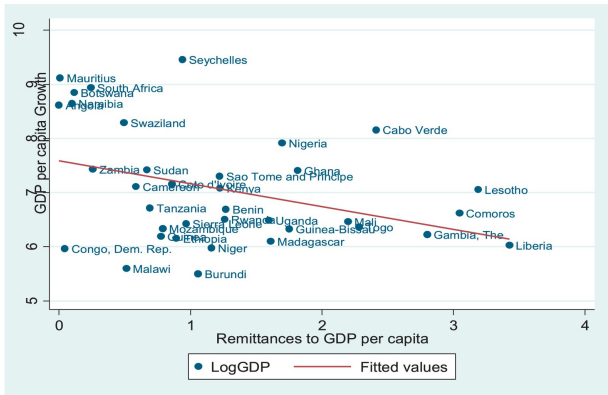


Figure 6

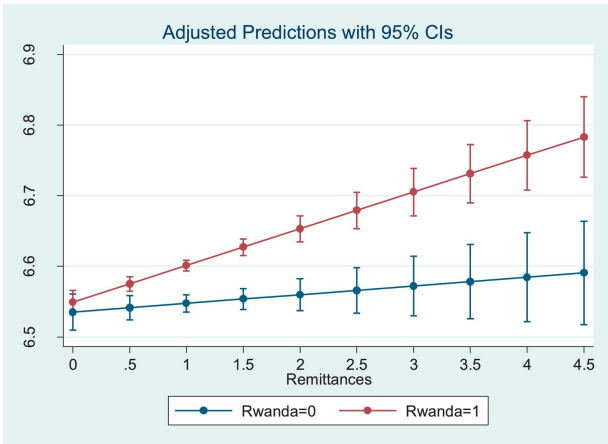


Figure 7