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The Effect of Diaspora Remittances on Economic Growth: The Case of Rwanda

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THE EFFECT OF DIASPORA REMITTANCES ON ECONOMIC GROWTH: THE CASE OF RWANDA

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This is to certify that the thesis prepared by Bitania Lulu Berhanu, entitled: *'The effect of Diaspora Remittances on Economic Growth: The Case of Rwanda'* and submitted in partial fulfillment of the requirements for the Degree of Master of Art in African Study, Specialization in Human and Economic Development, complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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ABSTRACT

Remittances sent to the sub-Saharan region are amongst the highest recorded, which amounted for more than the total foreign direct investment flow and foreign aid in 2013. They are also believed to increase domestic investment, which in turn increases the macroeconomic stability of a country's economy. With the general objective of investigating the effect of diaspora remittances on economic growth in Rwanda, this study used a time series data from World Bank Development Indicators which spans from 1990 to 2017 and applied an auto regressive distributed lag (ARDL) approach. The outcome of the study revealed that, the long run growth impact of remittances is positive and significant for the study period. This was also backed with a positive and significant short run multiplier effect, which portrays remittances as a driver for economic growth. Moreover, the Stability test has confirmed that the established positive relationship of remittances and economic growth is stable and can fairly be used for forecast.

Key Words: Remittances, Economic Growth, ARDL, Rwanda

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List of Acronyms

AfDB – African Development Bank

ADF- Augmented Dickey-Fuller test

ARDL- The Autoregressive Distributed Lag Model

AU – African Union

AUC – African Union Commission

CIDO – Citizens and Diaspora Office of the African Union Commission

CUSUM- Cumulative Sum Model

CUSUMSQ - Cumulative Sum Square Model

EC- European Commission

ECM- Error Correction Model

EDPRS - Economic Development and Poverty Reduction Strategy

FDI – Foreign Direct Investment

FE – Focus Economics

FPIP - Foreign Policy in Focus

GDP – Gross Domestic Product

GoR – Government of Rwanda

ICPD - International Conference on Population and Development

ICMPD - International Centre for Migration Policy Development

IMF – International Monetary Fund

IOM – International Organization on Migration

MIDA - Migration for Development in Africa

MINAFFET – Ministry of Foreign Affairs and Cooperation and East African Community

NEPAD - New Partnership for Africa Development

NISR – National Institute of Statistics of Rwanda

ODA- Official Development Assistance (ODA)

OECD - Organizations for Economic Cooperation and Development

PSF - Rwandan Private Sector Federation

RDB – Rwanda Development Board

SDGs – Sustainable Development Goals

TOKTEN - Transfer of Knowledge through Expatriate Nationals

UNDP – United Nations Development Program

UN-DESA – United Nations Department of Economic and Social Affairs

UNICEF - United Nations Children Fund

WDI- World Development Indicators

WB – World Bank

Chapter One: Introduction

1.1. Background

Studies measure that the African Diasporas save US$53 billion every year, which might be assembled for African advancement by means of instruments, such as Diaspora bonds, yet despite what might be expected, this saving is invested outside Africa (Plaza and Ratha, 2011). The potential of diaspora involvement on sending nations relies upon various variables, like, its size, area, skills and abilities, the degree of settlement in the nation of residence and the level of association (ICMPD, 2013). In spite of the fact more efforts to craft policies have been introduced in this decade, it is assessed that there are around 400 organizations in 56 nations for diaspora engagement through regulated projects or structures.

The most substantial and the least disputable connection among development and migration are diaspora remittances. Regardless, various examples imply that it is not just the amount of remittance inflows, but the nature of commitment from the diaspora that matters. In India for example, remittances just make up 3.4% of the Gross domestic product, a significant monetary lift is accomplished through Diaspora investments (ICMPD, 2013). Beside government arrangements, policies and motivations, the private sector, NGOs and transnational associations have a significant task to carry out to use the diaspora as assets to serve their nation of origin (ICMPD, 2013). Moreover, a few assessments have discovered a noteworthy connection between diaspora, especially skilled migrants, and investment inflows to countries of origin.

Africa's association with its diaspora is strategized on African Union's Migration Policy Framework for Africa and the African Common Position on Migration and Development (AU, 2005). The AU encourages and prioritizes documenting trends, creating socio-economic conditions that attract, facilitating resettlement, and integrating migration and development policies into national plans with pillars on the diaspora, brain drain, and remittances. The African Union Commission operationalizes its policy initiatives via the Department of Citizens and Diaspora Organizations – Diaspora Division (AU-CIDO) and continues to work with the African Development Bank (AfDB), European Commission, International Organization for

Migration, and The World Bank, specifically on the formation of the African Institute for Remittances.

The development in Diaspora organizations and establishments is firmly connected to the expanded degree of mindfulness on the increase of remittance inflows, which were evaluated in 2015 at over $601 billion, the greater part of which were coordinated towards creating nations economic progress (ICMPD, 2017). African diaspora sent US$40 billion in remittances to African nations in 2010. In West and Central Africa, around half of the nations have created or have begun the improvement of national Diaspora procedures under the lead of a Diaspora-mandated Government office.

Some African countries are making strides by offering diaspora members the same benefits and rights as domestic investors, with the example of Ethiopia through the issuance of yellow cards, duty exemptions and discounted airfares for diaspora actors and diaspora entrepreneurs (AHEAD, 2017) and Mauritius through investment incentives for diaspora members in development sectors. These measures are said to have encouraged many in the diaspora to invest in small businesses in their country of origin (ICMPD, 2012). Such policies have been developed to ease the process of investment and business ownership for Ethiopian Diasporas which led to increased investment in Ethiopia.

This study will take the case study of Rwanda to observe the country's steps taken towards realizing the importance of the Rwandan Diaspora in the national development and in the spirit of the policy of inclusion. The Government of Rwanda has stated that it strongly believes that the Rwandan Diaspora is an important constituent that cannot be ignored and which, if it is well harnessed, can contribute to national socio-economic development (Republic of Rwanda, 2009). *"The Rwandan Diaspora is, clearly, a resource that can make valuable contributions to our quest for a better future for our country. What needs to be done urgently is to devise means of utilising this resource."* ~H.E. Paul Kagame; President of Rwanda (quoted on the presentation made by Mr. Aime Muyombano, Directorate of Diaspora, on Oct 15th, 2018)

1.2. Problem Statement

Diaspora Engagement is a multi-faceted process that ranges from remittances, investments and knowledge transfers, to using the diaspora as ambassadors to building countries' positive images, attract foreign direct investments and to help increase the tourism industry. Studies about diaspora engagement have been done and the importance has been emphasized on various sectors especially economic growth through remittances and investment (Ratha and Shaw 2007) but more should be done in exploring the potential of the African Diaspora. Moreover, African economists who preach against Aid's effect on Africa such as Moyo (2009) discuss widely on how there is a great potential in Diaspora Remittances and Investments to replace the foreign aid that Africa receives. Furthermore, as Africa suffers from the brain drain, diaspora participation would allow the opportunity of reversing the negative effects of it by finding ways of brain gain and knowledge transfers.

At the present time, many African countries are giving special attention into ways to tap into the untapped potentials of their diaspora. Nevertheless, there still exists a significant study gap on the impact of diaspora remittances and investments on socio-economic growth in African countries. The relationship between remittances and growth, especially in SSA, should further be adequately assessed in accordance with the increasing importance of remittances in the total international capital flows. It has become a known fact that there is a great need to provide opportunities for the diaspora to play roles as active citizens in their countries of origin; but these efforts would be reinforced well if backed with studies that analyze their importance in developmental paths and economic systems. Moreover, there is a gap in recorded data, policies and formal institutions dedicated to diaspora engagements to catalyze the diaspora for development nexus, as well as provide impact evaluations of diaspora engagement on growth.

Hence, this study is aimed at assessing the effect of Diaspora Engagement captured through remittances on Economic Growth; featuring the positive practices of Rwanda. Rwanda was selected for this study due to its active diaspora platforms and policies which are contributing in knowledge transformation, capacity and enterprise development in the country. Furthermore, Rwanda is one of the pioneer African countries in formulating Diaspora Policy, which is currently being implemented by the Directorate for Diaspora. It was also believed that the

exemplary mechanisms and events that Rwanda is applying in order to tap into their youth in the diaspora and the cooperation of the government with The Private Sector and the Investment Board to increase diaspora engagements would enrich the study and highlight best practices.

1.3. Objectives

The primary objective of the study is to investigate the effect of Diaspora Remittances on Economic Growth in Rwanda

Specific objectives

1. To review Diaspora Engagement Policy in Rwanda and identify platforms, mechanisms and organizational structures of diaspora engagement;
2. To analyze the effects of diaspora engagement through remittances on economic growth

1.4. Significance of the Study

The result of the study would be beneficiary to African governments as well as policy makers in developing better practices and policies to increase remittance inflows for economic growth and strengthen the already existing platforms of diaspora engagement to tap into the potentials of their diaspora and. Furthermore, this study is open to further improvements and in the long term, may grow into an input for the Diaspora Continental Framework.

1.5. Data and Methodology

The study was conducted mainly using a quantitative method to assess the effect of diaspora remittances translating into economic growth in Rwanda based on time series data between the years of 1990 to 2017 obtained from the World Bank's World Development Index (WDI).

1.6. Scope and limitation of the study

The study was mainly designed and built from various readings and findings, data extracts from World Bank Development Indicators. The study attempted to have broadened perspectives of looking into the subject by carefully selecting indicators of diaspora engagement along with all the other variables that may affect economic growth. Nevertheless, some indicators could not be

exactly captured with the available data on World Development Indicators, and were modified to be captured by proxy variables.

The attempt to include diaspora investment as one of the diaspora engagement indicators did not succeed due to lack of recorded data on Diaspora Investment due to Rwanda Development Board's stand to treat the Rwandan diaspora community as locals, hence their investment was documented as part of domestic investments. The study then took the domestic investment which was captured by Gross Capital Formation from WDI data due to the failed attempt to get a complete locally registered data by the RDB. The study was limited to assessing the effect of remittances rather that demonstrating the wider picture of diaspora engagement.

Additionally, a wider scope of data was to be used from the year 1961 till 2018. Unfortunately, one of the main variables of growth indicators (labor force) only had data available starting 1990, which limited the study to trim the data down to 27 years duration, which still was considered to be fairly enough.

1.7. Organization of the study

The remainder of this study is organized as follows. Chapter two gives a brief review both on the theoretical and empirical literatures in line with migration, remittances, brain-drain and the impact on economic growth. Subsequently, the third chapter deals with the overview of the Rwandan economic profile, migration-development nexus in Rwanda and review of the Rwandan Diaspora policy and implementation progress. Chapter four explains model specification, the data type used and source along with methodology adopted. The econometric analysis is discussed in chapter five. The last chapter deals with conclusion based on findings obtained from the analysis.

Chapter Two: Literature Review

2.1. Theoretical perspective

2.1.1. Definition of important concepts

Who Migrates and why?

Migration started as early as the beginning of the human race. People have always been in movement in search of improved living conditions or escaping unsafe phenomena in their native land. International migration is such a diverse and complex phenomenon that no single theory has been able to provide a satisfactory all-encompassing explanation. The focus of international migration has been influenced by a number of disciplines such as Economics, Sociology, Geography, Commerce, Management, Law, Political Science, Demography, and Psychology, rendering the theorizing of international migration a complex task. The causes of international migration are better understood by incorporating a variety of perspectives and factors.

Who is a Migrant?

Outside of general definitions of *migration* and *migrant*, such as those found in dictionaries, there exist various specific definitions of key migration-related terms, including in legal, administrative, research and statistical spheres. According to the International Organization for Migration (IOM, 2018), a migrant is '*any person who is moving or has moved across an international border or within a State away from his/her habitual place of residence, regardless of (1) the person's legal status; (2) whether the movement is voluntary or involuntary; (3) what the causes for the movement are; or (4) what the length of the stay is*', a broad definition indeed.

The Recommendations on the1998 United Nations Recommendations on Statistics of International Migration also distinguish between *long-term migrants* and *short-term migrants*. A *long-term migrant* is defined as *a person who moves to a country other than that of his or her usual residence for a period of at least a year (12 months), so that the country of destination effectively becomes his or her new country of usual residence.* Short-term migrants are defined as *persons who move to a country other than that of their usual residence for a period of at least 3 months but less than a year* – except for those travelling for the purposes indicated above, which exclude a change in the country of residence (IOM, 2018).

The IOM further defines *forced* migrants as;

(1) Asylum seeker: *A person who seeks safety from persecution or serious harm in a country other than his or her own and awaits a decision on the application for refugee status under relevant international and national instruments.*

(2) Refugee: A person who, '*owing to a well-founded fear of persecution for reasons of race, religion, nationality, membership of a particular social group or political opinions, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country'* based on the Geneva Convention passed in 1951, Art. 1A.

Who is Diaspora?

The term ***diaspora*** (Greek διασπορά, a scattering or sowing of seeds) is used to refer to any people or ethnic population forced or induced to leave their traditional ethnic homelands, being dispersed throughout other parts of the world, and the ensuing developments in their dispersal and culture. Oxford Dictionary defines it as a group made up of migrants from a particular area living scattered outside their place of birth but remaining in contact with it through transnational linkages. In the IOM publication 0f 2006, "diasporas" is seen as a term that conveys the idea of transnational populations, living in one place, while still maintaining relations with their homelands, being both "here" and "there". (Ionescu, 2006). According to the respective definition of the diaspora, the diaspora may consist of nationals who are currently residing outside of the country and might also include those who changed their nationality but kept links with the country of origin. Some countries also include second- or third-generation diaspora members who have retained their original nationality or those who have assumed other nationalities (ICMPD, 2013).

The term *diaspora* is used in academic and policy circles to refer to people (and often their descendants) from a specific country who are living abroad. However, there is no single agreed-upon definition of the term. In fact, it has been suggested that the term *transnational communities* may better describe the reality of contemporary migration experiences, where migrants may establish and maintain connections with people in their home communities or migrants in other countries. IOM (2018 a) uses the terms *diaspora* and *transnational communities* interchangeably. Some scholars agree that the distinctive characteristic of Diasporas from other migrant groups is

the presence of strong cultural, linguistic, historical, religious and affective ties with the country or community of origin, or a sense of shared identity and belonging.

The African Union defines the African diaspora as "consisting of people of African origin living outside the continent, irrespective of their citizenship and nationality and who are willing to contribute to the development of the continent and the building of the African Union."

Rwandan Diaspora refers in general to all Rwandans who left their country voluntarily or were forced to live in other countries of the world and are willing to contribute to the development of Rwanda (Republic of Rwanda, 2009).

What are Remittances?

Remittances are financial or in-kind transfers made by migrants directly to families or communities in their countries of origin. The World Bank compiles global data on remittances, notwithstanding the myriad data gaps, definitional differences and methodological challenges in compiling accurate statistics. Its data, however, do not capture unrecorded flows through formal or informal channels, and the actual magnitude of global remittances are therefore likely to be larger than available estimates (IOM, 2018).

Personal remittances comprise personal transfers and compensation of employees consisting of all current transfers in cash or in kind made or received by resident households to or from nonresident households (WDI definition). Compensation of employees refers to the income of border, seasonal, and other short-term workers who are employed in an economy where they are not resident and of residents employed by nonresident entities.

What is Brain Drain?

The term "brain drain" was first conceived by the British Royal Society to describe the outflow of scientists and technicians to the United States and Canada in the 1950s and early 1960s (Baptiste and FPIF, nd). In the present day, this term has come to explain the large-scale emigration of educated individuals from the countries of their birth, especially flow of skilled individuals from the developing world to Western Europe and North America.

Of all the description given to “Brain drain”, the one that summarizes it well is the migration of professional and skilled personnel in search of the better standard of living and quality of life, higher salaries, access to advanced technology and more stable political conditions in different places worldwide. This migration of professionals for better opportunities, both within countries and across international borders, is of growing concern internationally because of its impact on the economy and other work sectors in developing countries.

2.1.2. Theories of Migration and Development Nexus

Migration has substantial economic, social and environmental dimensions. It is thus closely related to sustainable development, with its overarching objective of poverty eradication, changing consumption and production patterns and protecting and managing the natural resource base for economic and social development (UN, 2003).

The migration-development nexus is becoming of growing interest, which has led to an increase in research on the subject. There has been significant progress in the understanding of migration aspirations of various economic, risk diversification and environmental factors due to the expanded efforts to collect and analyze data. The results of migration on both receiving and sending countries captured by remittances, social effects, and diaspora networks; and the role of development in stimulating migration are also being explored and better grasped.

Even if the understanding of the highly complex system of demographic, economic, social and environmental factors remains incomplete, this study tries to shed light on the economic relationship between migration captured by remittances and development captured by economic growth. The study will also highlight the negative impacts of migration on sending countries, specifically in sub Saharan countries. These countries suffer from a phenomena referred to as “Brain Drain”, a term that reflects the export of skilled migrants from their countries of origin

The impact of migration on development in migrant sending communities and countries has been the subject of continuous and sometimes heated debate especially over the past four decades. In this debate, the different theories developed to explain the migration and development nexus can generally be distinguished in two fundamentally opposed approaches of “migration optimists” and “migration pessimists” (de Haas, 2008).

The migration optimists are mainly based on neo-classical migration economy and developmentalist modernization theories. Regardless of differences between neo-classical and developmentalist views, they both believe that migration has generally had a positive impact on the development process in sending societies. Whereas in a strictly neo-classical world, the developmental role of migration is entirely realized through factor price equalization, common developmentalist views (which have long predominated post-WWII development policies) expect migration to generate counter-flows of capital (remittances and investment) and knowledge, which can be invested and are believed to subsequently stimulate development and modernization. In particular return migrants are seen as active agents of economic growth. Most migration pessimists draw on structuralist social theory, which encompasses neo- Marxist, dependency, world systems, and, at least to a certain extent, cumulative causation theory. In general, structuralist approaches towards migration and development tend to address migration as a negative phenomenon contributing to the further *underdevelopment* of sending societies.

Developmentalist views

Neo-classical theoretical model of balanced growth sees migration as a form of ideal distribution of production factors to the benefit both sending and receiving countries. In this perspective, the re-allocation of labour from rural, agricultural areas to urban, industrial sectors, is considered as an essential prerequisite for economic growth and, hence, as an essential component of the entire development process (Todaro 1969, cited in deHaas, 2008). But, neo-classical migration theory has not inculcated income remittances from migrants to the areas of origin (Taylor 1999:65).

According to "developmentalist" views dominating development policies in the 1950s and 1960s, migrants were seen as important agents of change and innovation, investing remittances in economic enterprises at their countries of origin. It was also hypothesized that migrants not only bring back money, but also new ideas, knowledge, and entrepreneurial attitudes that they have acquired as a result of migration. In this way, migrants would contribute to the accelerated spatial diffusion of modernization and play a mentally and financially positive role in development.

Cumulative causation and structuralist views

Cumulative causation theory suggests that migration is a vicious circle that leads productivity and wealth at the origin to further decrease, and undermines regional and local economies by depriving communities of their most valuable labour force, increasing dependence on the outside world, and stimulating subsequent out-migration. The theory was developed earlier by the Swedish economist Gunnar Myrdal (1957) well before the renaissance of Marxist social theory, and it seems to fit well in a historical-structural and dependency framework of asymmetrical growth, and was taken up again with enthusiasm in the 1970s (DeHaas, 2008).

The optimistic views on migration and development were increasingly challenged under the joint influence of a cumulative number of empirical studies and policy experiences and alterations in development theory towards historical-structuralist views. In historical-structuralist views, migration is alleged to have failed in resolving or improving the structural conditions that were believed to cause migration (Papademetriou 1985). This historical-structuralist perspective interprets migration as essentially a negative escape from despair which contributes little to development. Additionally, many migration researchers have argued that migration has even contributed to aggravating problems of underdevelopment. In sending countries, migration would contribute to an uncontrolled depletion of their already scarce supplies of skilled manpower (Papademetriou, 1985).

Cumulative causation and historical structuralist theories do not see migration as a means to development, rather as a negative force which deprives developing countries of their valuable human and material capital resources exploited for the benefit of industrialized countries and urban-based capitalist groups within developing countries. While the importance of remittances as a source of foreign currency has been generally recognized over the years, the attitude towards the emigration of highly skilled people has generally been more negative. The “brain drain” has been commonly perceived as detrimental to development, as it is perceived to rob poor countries of their valuable skilled and professional labour resources in which states have invested many years of education (Adams 1969; Baldwin 1970 cited in deHaas, 2008).

An additional indication that corresponded with the historical-structuralist Marxist views and dependency opinions in development theory and practice was the failure to invest remittances

that were sent back in such a way they could contribute to development in the regions and communities of origin, which turned the argument of neo-classical and developmentalist approaches upside down.

A pluralist perspective

Findings from different studies are manifestly contradictory. In some cases, migration seems to have a positive effect on the different dimensions of social and economic development, in other cases it seems to have no effect or even negative effects (De Haas, 2007). This does not only imply the differences in approaches which result in different interpretations of similar empirical data and research methodology; but also shows the real existing differences for varied realities.

Inequalities in access to employment, markets, education and power affect the daily struggles of most people from the developing world, and limit their capability to overcome poverty and underdevelopment. As the neo-classical and developmentalist perspectives tend to underestimate, and structuralist perspectives tend to overestimate the importance of these structural constraints, an improved theoretical perspective on migration and development has to be able to account for the role of structure; the limiting or enabling general political, institutional, economic social, and cultural context in which migration takes place, as well as agency; the limited but real capacity of individuals to overcome constraints and potentially reshape the structural context (DeHaas, 2008).

Empirical and theoretical advances in the study of migration and development have challenged the unrealistic determinism of both the functionalist ("optimist") and structuralist ("pessimist") perspectives. This has given rise to a more subtle vision, in which, depending on the specific development context, both positive and negative development responses to migration are possible. Recent empirical evidence has generally confirmed the propositions of the new economics of labour migration and related household and transnational approaches, which all stress the *real* ability of individuals and the household to which they belong to overcome spread income risks, increase income and to overcome local development constraints such as failing markets and other institutions through the process of migrating (DeHaas, 2008).

2.2. Review of Empirical Evidence

2.2.1. Remittances and Economic Growth

Remittances are financial or in-kind transfers made by migrants directly to families or communities in their countries of origin. Various researchers have argued that remittances impact economic growth through different channels. The macroeconomic impacts of remittances have been disregarded due to a theoretical strand which suggests workers' remittances are mainly used for consumption purposes and, hence, have minimal impact on investment. In other words, remittances are widely viewed as compensatory transfers between family members who lost skilled workers due to migration (Fayissa and Nsiah, 2008). Based on household survey data from various African countries, few empirical studies have examined the role of remittances in reducing poverty (Lucas and Stark, 1985; Adams, 1991; Sander, 2004; Azam and Gubert, 2005; Adam, 2006 cited in Fayissa and Nsiah, 2008). A recent study on the impact of remittances on economic growth in South Africa over the period from 1970-2017 showed a negative result which then argues that it is not only remittance inflows that matter, but also how the remittances are utilized to influence economic growth (Nyasha and Odhiambo, 2019).

A similar study by Saad and Ayoub (2019) tried examine the effects of remittances and governance on economic growth in ten MENA countries over the period 2002-2017, with findings that indicate a negative result due to the fact that remittances are channeled to consumption. However, taking into consideration the dimensions of governance leads to conflicting results of interaction terms (remittances multiplied by governance indicators) have positive impact on growth.

In contrast, on an analytical study by Olayungbo and Quadri (2019) which investigated the relationship among remittances, financial development and economic growth in a panel of 20 sub-Saharan African countries over the period of 2000 and 2015, remittances and financial development were found to have positive effects on economic growth both in the short and the long run. Another empirical study which used a time series data for 33 years on the Ghanaian economy established that remittances lead to economic growth in Ghana (Nyeadi and Atiga, 2017).

Remittances are also believed to increase investments in physical capital and domestic investment, which in turn increases the macroeconomic stability of domestic economy (Abdullaev, 2011). Ratha and Mohapatra (2007) state that when a recipient country experiences economic downturn because of a financial crisis, natural disaster or political conflict, remittances tend to rise and stabilize the macro economy which in turn have a positive role on investment decision. Moreover, the evidences portrayed on the World Bank (2006) conclude that remittances play a vital role in increasing domestic investment. In terms of trade, a study demonstrated the increase in remittances provides an opportunity for developing countries to import more and export less, as their current-account balance will increase by the size of the remittances ($98 billion in net terms). The model results show that total imports into developing countries would increase by $58 billion in 2025 (1.1 percent relative to the baseline), as aggregate exports decline by $40 billion (0.7 percent). However, overall migration and trade are not substitutes for each other, because migration has many other economic effects that have more power to stimulate or reduce trade (WB, 2006).

2.2.1.1. Trends of Remittances

The World Bank compiles global data on remittances, notwithstanding the innumerable data gaps, definitional differences and methodological challenges in compiling accurate statistics (WB, 2014). Its data, however, do not capture unrecorded flows through formal or informal channels, and the actual magnitude of global remittances are therefore likely to be larger than available estimates.

The IOM (2018) publication states that despite these limitations, available data reflect an overall increase in recent decades, from USD 126 billion in 2000, to USD 575 billion in 2016. Since the mid-1990s, remittances have greatly surpassed Official Development Assistance (ODA) levels, defined as government aid designed to promote the economic development and welfare of developing countries (as shown in Figure 2.1).

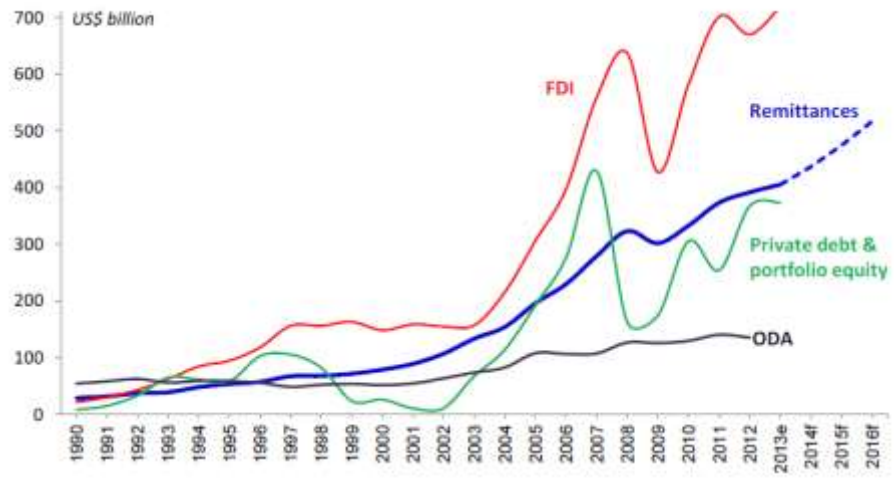


Figure 2.1. International Remittance figures at large, and growing

Source: World Development Indicators (WB, 2014)

Remittances to developing countries are showing significant increase. Remittance flows to low- and middle-income countries (LMICs) grew by 9.6 percent in 2018, up from the 8.8 percent rise in 2017, and are now the largest source of foreign exchange earnings (WB, 2019). A record of $529 billion Growth in remittance flows to developing countries had accelerate to an annual average of 8.4 percent from 2015 to 2018, raising flows to $436 billion in 2014 and $516 billion in 2016 (WB, 2014). In 2019, remittance Flows to Low- and Middle-Income Countries are recorded to be larger than Official Development Assistance and more stable than private capital flows, 1990–2019 as shown in the Figure 2.2.

Figure 2.2. Remittance Flows to Low- and Middle-Income Countries in 2019

Source: World Bank (2019, pp 1)

Remittances in Sub Saharan Africa and Rwanda

Remittances sent to the sub-Saharan region are amongst the highest recorded and were estimated to grow by 9.6 percent from $42 billion in 2017 to $46 billion in 2018 (WB, 2019). Projections indicate that remittances to the region will keep increasing, but at a lower rate, to $48 billion by 2019 and to $51 billion by 2020. This amount was more than the total foreign direct investment flow and foreign aid in 2013 (WB, 2014). The late Prime Minister of Ethiopia, H.E. Meles Zenawi, once told Parliament that remittances from the Ethiopian diaspora almost equaled the country's export earnings from coffee, the major foreign exchange earner for the country. The National Bank of Ethiopia reported that formal remittances reached about $1 billion back in 2006 (NBE, 2006), which is now said to have tripled itself. Nigeria, the largest remittance-recipient country in Sub-Saharan Africa and the sixth largest among LMICs, received more than $24.3 billion in official remittances in 2018, an increase of more than $2 billion compared to the year before.

Formalizing the transfer of remittances is believed to permit the generation of revenues that could be invested nationally in the social and economic development of the home countries. On the other hand, the author believes it would be interesting to see the effect of informal remittances as it is important to steer interests regardless of high sending prices. On a report published by Access to Finance Rwanda (AFR, nd), it is stated that Rwanda receives 9.7 billion Rwandan francs sent each year by close to 5000 Rwandans living in the United Kingdom alone, even when the average cost of sending 129,000 Rwandan francs from the UK to Rwanda is 13%, one of the highest average cost in the region, and almost twice as much as sending money to Kenya, where it costs just 7% of the amount sent. The cost of sending $200 to the Sub-Saharan African region averaged 9 percent in 2018 Q4, almost the same as in 2018 Q3 which remains far above the global average of 7 percent and the SDG target of 3 percent to be achieved by 2030 (WB, 2019).

2.2.2. Brain Drain and Development

According to the latest figures, a high percentage of highly educated Africans migrate oversees. For example, between 1990 and 2000, the stock of high-skilled immigrants from African countries residing in the OECD countries increased by 90 per cent. As a consequence, a number of African countries lost a significant proportion of their highly educated labor force (Capuano and Marfouk, 2013)

On his study of African Migration and Brain drain, Shinn (2008) has manifested that in the three decades between 1960 and 1989, an estimated 100,000 highly skilled African workers and professionals left for Europe and North America which constituted about 30 percent of Sub-Saharan Africa's highly skilled personnel. Recent studies show the drastic increase of skilled man power migration in Africa.

On the study of Capuano and Marfouk (2013), it was found that the largest countries are affected more by the exodus of highly skilled workers. The top eight sending countries in 2000 were South Africa (173,411), Morocco (155,994), Egypt (151,451), Nigeria (148,780), Algeria (87,777), Kenya (80,287), and Ghana (67,105). However, when the brain drain is measured as a proportion of the national highly skilled labor force, small countries suffer from a massive brain drain. This is the highest in Cape Verde (82 percent), Seychelles (77 percent), Gambia (68 percent), and Mauritius (56 percent).

The most vulnerable sector in African countries affected the most by Brain Drain seems to be the health sector. The migration of health professionals represents a plague for African countries as health indicators are poor, the mortality rate is high, and shortages are particularly severe in the medical sector (Capuano and Marfouk, 2013). Approximately 65,000 African-born physicians and 70,000 African-born professional nurses were working overseas in a developed country by 2000 which represented about one-fifth of all African-born physicians and one-tenth of African-born professional nurses (Shinn, 2008). There are fewer than ten doctors for every 100,000 people in twenty-four of the forty-four Sub-Saharan African countries for which statistics are available.

Shinn (2008) further elaborates how individual country situations offer an even more depressing picture. For example in Ethiopia, more than 3,000 doctors have left, leaving 900 to meet the

needs of nearly 78 million people in 2008, and it was recorded that there are more Ethiopian doctors on the east coast of the U.S. than there are in Ethiopia. Uganda has one doctor for every 100,000 patients. More than 500 Ugandan doctors work outside the country, 200 of them in South Africa. One-third to a half of all graduating doctors in South Africa migrate to the U.S., United Kingdom, and Canada while over 21,000 Nigerian doctors practice in the U.S. There are reportedly more Malawi-trained doctors in Manchester, England, than there are in all of Malawi. Zimbabwe has lost 50 percent of its health care professionals. Kenya has an acute shortage of neurosurgeons—one for each three million Kenyans while Tanzania, Uganda, and Ethiopia have only two each for the entire country. Malawi and Zimbabwe did not have any neurosurgeons at the time of the research.

There are numerous reasons causing professionals and skilled personnel to leave their country of birth and migrate to the western world in search of better life. Weak economy and low living standard, political instability and hostile conditions, lack of quality education and professional development environment, cultural norms that suppress human and democratic rights, HIV/AIDS and epidemic disease outbreaks such as Ebola are considered as major reasons (Beine et al. 1994, Shinn 2008., Sriskandarajah 2015).

In most cases, the pull attraction is the opposite of the push factor. Strong economy, high wages and high standard of living, instigating opportunities for professional and career advancement, backed with better human resource policies, supervision, and training, research funding and scholarships, and opportunities of entrepreneurship, innovation are the main reasons appealing for skilled migrants to leave their countries. Furthermore, political stability, democracy and peace, fewer bureaucratic frustrations, availability of well-equipped hospitals and universities along with benefit packages for health care, life insurance, and retirement are amongst the most common triggers (Beine et al. 1994, Shinn 2008., Sriskandarajah 2015).

Some developed countries actively recruit in developing countries for skill categories such as doctors and nurses. In fields like medicine, this becomes survival of the fittest with troubled and economically weak countries the “big losers” (Baptiste and FPIP, nd). Immigration policy is another significant pull factor. Canada, The United States, France and Germany, among others, have put in place visa policies that encourage the brain drain. The United States offers employment-based immigrant visas for persons of extraordinary ability in the sciences, arts,

education, business and athletics. In his 2013 State of the Union address, for example, President Barack Obama listed attracting "the highly skilled entrepreneurs and engineers that will help create jobs and grow our economy" as a key tenet of immigration reform (Baptiste and FPIP, nd). This sentiment is widespread among policymakers.

2.2.2.1. Consequences of Brain Drain on Development

Many parts of the African continent are currently affected by a shortage of qualified human resources, created in part by the large-scale departure of professionals and university graduates. Thousands of African professionals including medical doctors, nurses, accountants, engineers, managers and teachers leave their home country each year to pursue better prospects in other countries – both on and off the continent (IOM, 2004). While this movement may have some beneficial effects in certain locales, in many countries this "brain drain" is a handicap for sustainable development. This is particularly the case when it affects priority development sectors (e.g. health, education) in countries that have limited ability to attract and retain qualified workers. The outward movement of human resources can lead to the deterioration of basic social services, slow the development of the private sector and heighten the dependency of the African economies on costly foreign expertise.

With "Brain Drain", Sub- Saharan Africa has experienced the most serious negative consequences as compared to all the world's regions by losing the best brains due to migration. The implications for poor sending countries are instantly recognizable. According to the African Capacity Building Foundation, African countries lose 20,000 skilled personnel to the developed world every year from key public services that are believed to drive economic growth, and articulate calls for greater democracy and development (Sriskandarajah, 2015). All the developed world's efforts to increase aid to these countries may not matter if the local personnel required to implement development programs are absent.

On an empirical study made on three major economies of Africa (Raji *etal.,* 2018), the low economic growth in Nigeria, Ethiopia and Kenya is significantly linked to brain drain owing to several factors such as institutional failure, low investment, and endemic level of

corruption as well as lack of social amenities like health care system, quality education, and infrastructures.

To fill the gap caused by this brain drain in various sectors, Africa employs up to 150,000 expatriate professionals at a cost of $4 billion annually (Shinn, 2008). This eminent gap which comes at such a cost to Africa was quantified in the extensive study conducted by Shinn (2008) in which an estimated 300,000 African professionals live and work outside the continent, about 15% of which holding PhDs. All these numbers and percentages show that the best minds of the continent are elsewhere helping to contribute to the development of already developed countries instead of the poor sending countries.

Improved Health care and health components such are life expectancy at birth can be used to capture development. In a sad reality, the health infrastructure in much of Africa is facing a crisis due to brain drain, backed with growing health challenges and outbreaks, high population growth rates, inadequate financial resources. The World Health Organization reported in 2006 that out of fifty-seven countries worldwide suffering from a severe shortage of health workers, thirty-six were in Sub-Saharan Africa (Shinn, 2008). Studies focusing on the impact of migration of health personnel found that the medical brain drain has a detrimental effect on public health, measured as the rate of adult death and infant child mortality (Capuano and Marfouk, 2013)

In contrast to the above elaborated studies on how skilled migration affects economic growth, there is a side of research focused on return migration which portrays developing countries are believed to benefit from return migration, whereby individuals returning with physical and human capital earned abroad are more productive (Gibson and McKenzie, *nd*). Return migration is also hypothesized to have broader payoffs to others in the home country through transfer of skills and knowledge gained abroad based on studies by Dos Santos and Postel-Vinay, 2003, (cited in Gibson and McKenzie, *nd*).

The results of microeconomic study conducted by Gibson and McKenzie (*nd*) show large positive benefits of high-skilled migration for citizens of high emigration countries, with the main benefits being to the migrants themselves, who benefit through massive gains in income and through greater human capital. This is measured to translate to higher remittances, but rare

engagement in trade or foreign direct investment. These highly skilled migrants also contribute in knowledge transfer as return migration proved to be common, but a gap was identified in constructive engagements with their local governments or businesses in their home countries.

2.2.3. Middle of the ground argument

The general assertion of this study is that the net effect of migration on development should depend on the negative and positive outweighs of remittances and brain drain. The empirical findings of the diverse set of studies reviewed in the previous sections show that Migration-Development nexus could have different connotations based on different factors.

Many studies have proved remittances to have positive impact on economic growth, but those which found opposing results have stated the need to formulate conducive policies and good governance, as well as platforms to channel remittances to investments which could contribute to development beyond consumption. On the other hand, it is a proven fact that brain drain had severely robbed African countries of their highly skilled labour force which has a direct negative impact on economic growth and development. Sending countries could attempt to counter this loss with better diaspora engagement policies which in turn would result in increased diaspora investment and inclusive roles in economic growth.

Conversely, Africa may need to consider exporting human resource as a way of reducing population pressure and export diversification. There is a negative brain drain and a positive remittance/investment impact. Thus, what matters for the effect of migration on development is the net effect of these opposing forces.

Chapter Three: Data and Methodology

3.1. Introduction

The study was conducted mainly using a quantitative method to assess the impact of Rwandan diaspora engagement translating into economic growth based on time series data between the years of 1990 to 2017 obtained from the World Bank's World Development Index (WDI).

3.2. Dependent and Explanatory Variables

This section discusses the variables included in the model and their hypothesized effects. As the data set was extracted from WDI database, the study used the definitions given by World Bank.

Dependent Variable (Y)

GDP per capita

GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources (WDI definition). Data are in current U.S. dollars. GDP per capita is an important indicator of economic performance and a useful unit to make cross-country comparisons of average living standards and economic wellbeing (FE, 2017).

Explanatory Variables (X_i)

Personal Remittances (RIM)

Personal remittances comprise personal transfers and compensation of employees. Personal transfers consist of all current transfers in cash or in kind made or received by resident households to or from nonresident households. Personal transfers thus include all current transfers between resident and nonresident individuals. Compensation of employees refers to the income of border, seasonal, and other short-term workers who are employed in an economy where they are not resident and of residents employed by nonresident entities. Data are the sum of two items defined in the sixth edition of the IMF's Balance of Payments Manual: personal

transfers and compensation of employees. Data are in current U.S. dollars. This study hypothesizes remittances to have a positive impact on economic growth.

Gross capital formation, (GCF)

Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress." According to the 1993 SNA, net acquisitions of valuables are also considered capital formation. Data are in current U.S. dollars. This study hypothesizes investments to have a positive impact on economic growth.

Total labor force (LFT)

Labor force comprises people ages 15 and older who supply labor for the production of goods and services during a specified period. It includes people who are currently employed and people who are unemployed but seeking work as well as first-time job-seekers. Labor force size tends to vary during the year as seasonal workers enter and leave. The shortcoming for this pool is not everyone who works is included. Unpaid workers, family workers, and students are often omitted, and some countries do not count members of the armed forces. As a result, the total labor force for countries may not be correctly captured due to the level of non-market economic activity which may result a negative or positive relationship with GDP per capita (Statistical Consultants Ltd, 2010).

Export of goods and services (EXP)

Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments. Data are in current U.S. dollars. It is hypothesized to have a positive impact on growth.

Net official development assistance received (AID)

Net official development assistance (ODA) consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of ODA recipients. It includes loans with a grant element of at least 25 percent (calculated at a rate of discount of 10 percent). Data are in current U.S. dollars. Foreign aid may have a positive impact on GDP per capita as it is believed to have been an important economic growth factor throughout the history. Nonetheless, it may also show a negative result based on the arguments of recent escalated poverty levels and decline of growth rates with growing foreign aid (Doyo, 2009)

External debt (ED)

Total external debt is debt owed to nonresidents repayable in currency, goods, or services. Total external debt is the sum of public, publicly guaranteed, and private nonguaranteed long-term debt, use of IMF credit, and short-term debt. Short-term debt includes all debt having an original maturity of one year or less and interest in arrears on long-term debt. Data are in current U.S. dollars. The impact of external debt on growth could both be negative or positive. External debt funds directed to the value added sectors of the economy could positively affect growth performance (Al Kharusi and Ada, 2018), in contrary, external debt could crowd out private investment and hinder national growth as stated in neo-classical theories. In Rwanda's case, Bank/Fund assessment of Rwanda's debt sustainability analysis indicates continuation of low risk of debt distress (IMF, 2018), and this study thus hypothesizes a positive relationship.

General inflation (CPI)

Inflation as measured by the annual growth rate of the GDP implicit deflator shows the rate of price change in the economy as a whole. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency. Inflation may have negative or positive impact on growth given the policies and strategies put forth by governments.

Life expectancy at birth (LEB)

Life expectancy at birth, measured in years, indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. In theory, increasing life expectancy may have positive or negative effects. This is because lower mortality may increase income per capita by increasing the productivity of available resources (Lorentzen, et al. 2008), but on the other hand, lower mortality may lead to an increase in population size which may result a negative growth rate (Acemoglu and Johnson, 2007). Thus, either negative or positive signs may appear in this study.

Lagged value of GDP Per Capita (LAG1GDP)

LAG1GDP is lagged variable of the log of the dependent variable (LNGDP) by 1 year added as an independent variable on the ARDL long run analysis. Lagged values are used in Dynamic Regression modeling when the forecast of the next period depends on past values of the same series.

POLICY is a dummy variable added to measure the impact of the diaspora policy which was implemented in 2009. As much of the effects of the Rwandan diaspora policy may be addressed by remittances and gross investment, the effects such as knowledge, skills, work, culture, and other possible inputs that come with the diaspora package are assumed to be captured under this variable.

3.3. General Model of the study

The general model of the study is the Harrod–Domar model which is a classical Keynesian model of economic growth (Harrod, 1939). It is used in development economics to

explain an economy's growth rate in terms of the level of saving and productivity of capital. It suggests that there is no natural reason for an economy to have balanced growth.

$$Y = f(A, L, K) \quad \ldots\ldots(1)$$

Where Y is the economic growth, L is the total labor force and K is the capital stock and A is the total factor of productivity not captured by L and K. The model the takes the natural logarithm transformation of equation 1 on both sides and expands it to time dimension as follows;

$$\ln(Y_t) = \ln(A_t) + \ln(L_t) + \ln(K_t) \quad \ldots\ldots(2)$$

Since A (the total factor of productivity) is in turn determined by the available stock of Human capital (H) and Remittance income (R), taking the natural logarithm of the function it can be stated as;

$$\ln(Y_t) = c + \ln(H_t) + \ln(R_t) + \ln(L_t) + \ln(K_t) \quad \ldots\ldots(3)$$

We take the above equation as the general model. We will specify the extended model after defining the dependent variables taken for this study on the below section.

3.4. The Auto Regressive Distributed Lag (ARDL) Model

In time series analysis, it is important to understand the behavior of variables, their interactions and integrations over time. If major characteristics of time series data are understood and addressed properly, a simple regression analysis using such data can also tell us about the pattern of relationships among variables of interest (Shrestha and Bhatta, 2018). Time series data may have some kind of relationship with its previous values. The autoregressive (AR) character of time series model indicates that present value of any variable is determined by its past value and some adjustment factors. Such adjustment factors are estimated from the relation of current value with past values (Shrestha and Bhatta, 2018).

The autoregressive distributed lag (ARDL) model was used on this study to assess the cointegration of variables and measure long term and short terms effects. ARDL has been used for decades to model the relationship between variables in a single-equation time series setup. Its popularity also stems from the fact that cointegration of nonstationary variables is equivalent

to an error correction (EC) process, and the ARDL model has a re-parameterization in Error Correction form (Engle and Granger, 1987; Hassler and Wolters, 2006).

The ARDL approach is chosen for the study because the approach allows both the dependent and independent variables to enter the model with lags, thereby allowing the past values of variables to determine its present values. This flexibility in terms of the structure of lags of the regressors is particularly plausible because reactions to a change in each variable may be different depending on various factors and in some cases they may respond to the changes in underlying factors with a lag (Pesaran *et al.,* 2001).

ARDL approach has also additional advantage of yielding consistent and unbiased estimates of the long run coefficients that are asymptotically normal irrespective of whether the underlying regressors are in the first order of integration, I (1) or level order of integration I (0) (Peasaran and Shin, 1999; Peasaran *et al.,* 2001). In line with this, ARDL based estimators of the long run coefficients are super consistent and valid inferences can be made using standard normal asymptotic theory (Pesaran and Shin, 1999). This method is also relatively more efficient in the case of small and finite sample size. Another advantage of ARDL model is that it can distinguish between dependent and independent variables and thus allows testing for the existence of the long run relationship between the variables.

The estimated equation for the ARDL model to explore the impact of diaspora remittances and investment along with the other explanatory variables on GDP per capita is the log-linear equation below. This is the empirical model used in long and short run forms.

$$\ln(GDP) = c + \beta_1 \ln(GCF)_t + \beta_2 \ln(EDS)_t + \beta_3 \ln(AID)_t + \beta_4 \ln(RIM)_t + \beta_5 \ln(CPI)_t + \beta_6 \ln(LFT)_t + \beta_7 \ln(LEB)_t + \beta_8 \ln(EXP)_t + \beta_9 Policy_t + \beta_{10} LAG1GDP + \varepsilon_t \quad \ldots\ldots(4)$$

3.5. Econometric Procedures

3.5.1. Stationarity or Unit Root Test

In such researches containing time-series data, it is compulsory to examine the stationarity properties of the variables preceding any econometric analysis. A stationary series fluctuates around a constant long-run mean and, this implies that the series has a finite variance which does not depend on time. On the other hand, non-stationary series have no tendency to return to a long-run deterministic path and the variances of the series are time-dependent.

A number of alternative tests are available for testing whether a series is stationary. Usually augmented Dickey-Fuller (ADF) and Phillips and Perron (1988) tests have been used by researchers. This study used ADF test for finding unit roots in time series. If the ADF test statistics is less than the critical value, the decision rule is fail to reject the null hypothesis of the time-series variable having a unit root or being non-stationary. On the other hand, if the ADF test statistics is greater than the critical value, it confirms the rejection of the null hypothesis inferring to the stationarity of the time-series variable.

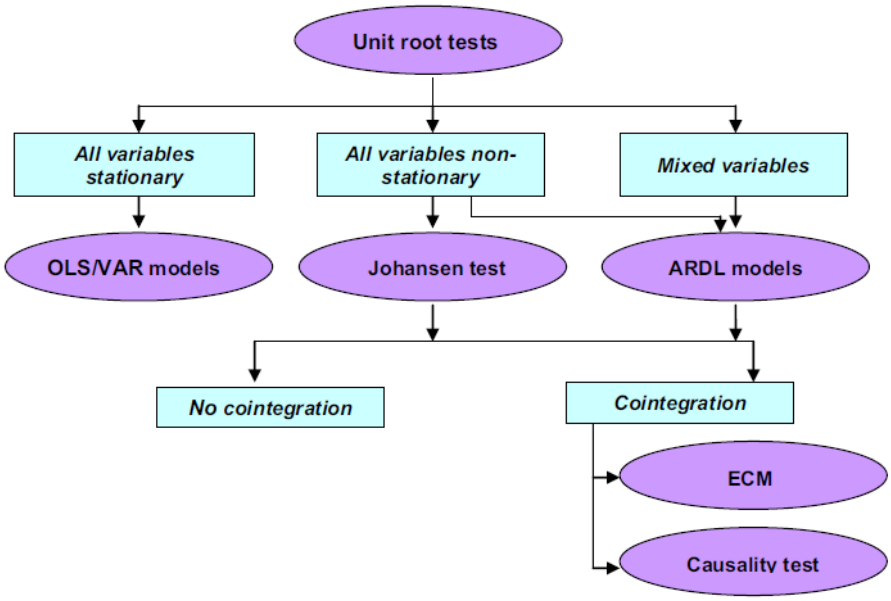


Figure 3.1. Method selection for time series data
OLS: Ordinary least squares; VAR: Vector autoregressive;
ARDL: Autoregressive distributed lags; ECM: Error correction models

Source: Shrestha and Bhatta (2018)

3.5.2. Cointegration Analysis

For the reasons mentioned in the previous section, this study will carry out the ARDL model to determine the long run and short run relationships between our dependent variable and explanatory variables. But for the ARDL approach to be correctly implemented, all the requirements must be checked. The first step is to check the existence of long run relationship among the variables of interest that is determined by F- test, also known as Wald test. We also test the diagnostics (stability) tests to confirm the reliability of the model.

The cointegration test will then be run after the estimation of long run relationship and to determine their values, subsequently the short run elasticity of the variables with error correction representation of the ARDL model (Peasaran *et al.* 2001). The purpose of applying the error correction version of the ARDL model is to determine the speed of adjustment at which our dependent variable returns to the equilibrium given the change in the independent variable. After the long run model is estimated, the next duty is to model the short run dynamics of the model by estimating an Error Correction Model associated with the long run estimates. This is specified as follows

$$\Delta \mathbf{LNGDP} = \mathbf{c} + \lambda\, \mathbf{ECM}_{t-1} + a_1 \Delta \mathbf{LNGCF}_{t-1} + a_2 \Delta \mathbf{LNEDS}_{t-1} + a_3 \Delta \mathbf{LNAID}_{t-1} + a_4 \Delta \mathbf{LNRIM}_{t-1} + a_5 \Delta \mathbf{LNCPI}_{t-1} + a_6 \Delta \mathbf{LNLFT}_{t-1} + a_7 \Delta \mathbf{LNLEB}_{t-1} + a_8 \Delta \mathbf{LNEXP}_{t-1} + a_9 \Delta \mathbf{Policy}_{t-1} + a_{10} \Delta \mathbf{LAG1GDP}_{t-1} + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

Where: $\mathbf{ECM}_{t-1}$ is the error correction term that will be obtained from ARDL long run dynamics of the model and it is expected to have negative sign showing the eliminating speed of the model. It indicates the speed of adjustment to restore equilibrium in the dynamics model, i.e. how quickly the variables converge to equilibrium.

3.5.3. Bound Test for Long Run Relationship

Before assessing the ARDL approach to Cointegration, it is necessary to test the existence of Cointegration or a long-run relationship among the time-series variables by using a test called Bound test critical values (Peasaran *et al*. 2001) This study used the F-test statistics which tests the joint null-hypothesis that the coefficients of lagged level variables are zero implying no long-run relationship.

The F statistic gets compared with the lower and upper bounds of critical values. If the F-statistic is greater than the upper bound, it can be concluded that there is long-run relationship among the variables. In contrast, if the F-statistic is less than the lower bound test, one can conclude that there is no long run relationship among the variables under consideration.

Determination of optimal lag structure is crucial in ARDL model, because it helps us to address the issue of over parameterizations and to save the degree of freedom. This was also assessed in this study.

3.5.4. Diagnostic Tests for Long Run Relationship

Diagnostic tests tell us about the robustness of estimated coefficients. Diagnostic test statistics are generally not reported automatically by software and thus should be estimated separately. The diagnostic and stability test is used on this model to confirm soundness of the model by checking if there is a serial correlation between two and more residuals, and the variance nature of the residual i.e. hetroskecedasitcity.

The null hypothesis of hetroskecedasitcity test assumes that the error variances are all equal versus the alternative that the error variances are a multiplicative function of one or more variables. The Serial Correlation test checks if there is a serial correlation (auto-relation) between two and more residuals with a null hypothesis which assumes the existence of serial correlation among variables.

3.5.5. Structural Stability Test

Structural stability of the long run and short run relationships for the study period can be examined by cumulative sum (CUMSUM) and the cumulative sum of squares (CUMSUMSQ) of the recursive residual test (Pesaran, Shin and Smith, 2001). CUSUM test consists to detect the instability of the intercept（Farhani, 2012). The test is based the first set of n observations and is updated recursively which will then be plotted against the break points to assess the given parameter consistency. In this study the plot of CUMSUM and CUMSUMSQ starts from 2012, implying that the test is based on the recursive residuals from observations before 2012. The test chooses the first n observation by itself.

Chapter Four : Rwandan Diaspora Policy and Implementation Review

4.1. General Overview of Rwanda

Rwanda is landlocked republic lying south of the Equator in east central Africa. Known for its breathtaking scenery, Rwanda is often referred to as *le pays des mille collines* (French: land of a thousand hills") (Encyclopaedia Britannica. (2019). The capital is Kigali, located in the center of the country on the Ruganwa River. Rwanda is bounded to the north by Uganda, to the east by Tanzania, to the south by Burundi, and to the west by the Democratic Republic of the Congo (Kinshasa) and Lake Kivu.

Rwanda is a geographically small country covering an area of 26,338 sq. km (IOM, 2019) with one of the highest population densities in sub-Saharan Africa with a densely packed population of about 12.5 million people (WB, 2018). Languages spoken in Rwanda are Kinyarwanda (official), French (official), English (official), and Swahili. Major religions include Christianity and indigenous beliefs.

Ethnic strife between the majority Hutu and minority Tutsi factions peaked in 1994. Civil war and genocide at that time left Rwanda's economy and social fabric in shambles. The years that followed have been characterized by reconstruction and ethnic reconciliation.

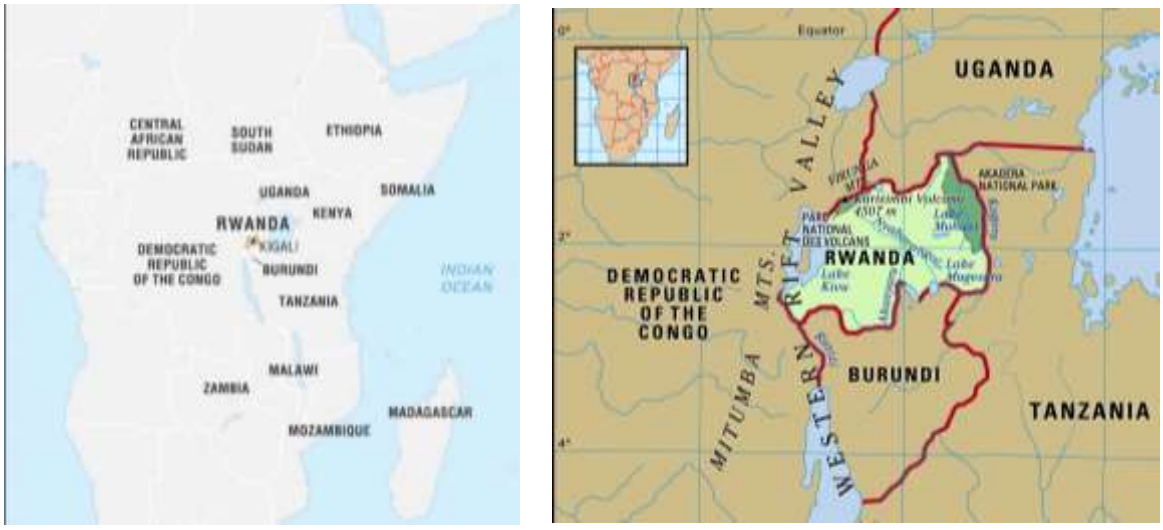


Figure 4.1: Rwanda on the African map

Source: Encyclopaedia Britannica (2019)

4.2. Migration and Remittance Patterns in Rwanda

Due to the different national phenomena that occurred over the years following the colonial history of the country, migration trends from Rwanda have followed different paths shaped by political and socioeconomic factors. This migratory dynamics dates back to pre-colonial times and became more important during the colonial period and especially since 1960 (Republic of Rwanda, 2009). By 2009, Rwanda was among few countries with millions of nationals living outside the country, but whose exact number was unknown.

IOM (2019) states that given Rwanda's peace and stability since the genocide against the Tutsi in 1994 and its geographical location, the country has become a safe haven for people fleeing conflicts and other hardships in the region. Rwanda hosts thousands of refugees from neighboring countries in refugee camps as well as in urban settings. Based on the IOM report, as of 30 April 2018, Rwanda accommodates 158,194 refugees from the Democratic Republic of Congo (74,276) and Burundi (83,918) (IOM, 2019). Additionally, the country is also receiving Rwandan nationals who are returning home after years spent living as refugees or asylum seekers abroad. Over 3.4 million refugees returned in the peaceful years after the 1994 genocide against the Tutsi.

Oronzo (2009) argues that the UNHCR established that at the end of the nineties, there were more than one million people as refugees in neighboring countries and more than 10,000 people under asylum conditions. Many of these refugees integrated into the different societies as migrants or nationals of those countries (Uganda, Tanzania, and Kenya). Statistics showed an estimated 240,761 migrants of Rwandan nationality in 2009, though government officials estimate that the size of the Rwandan diaspora may be larger than that, even if the diaspora includes only first generation Rwandans residing abroad.

Over the years, Human Development Indicators in Rwanda have demonstrated improvements as shown on the Figure 4.2 which reflects on the positive development of the country.

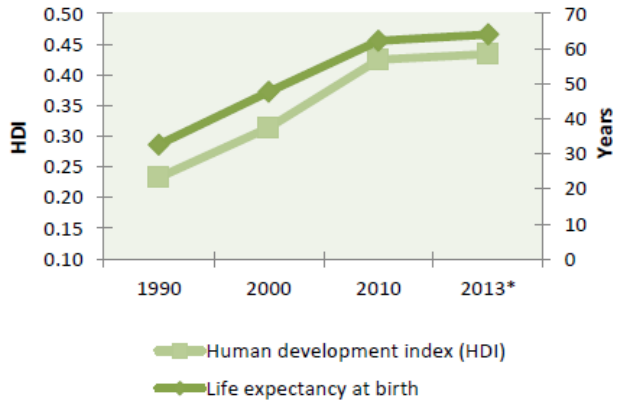


Figure 4.2: HDI from 1990 – 2013 in Rwanda

Source: UNICEF, Migration Profiles: Rwanda 2014

Remittance inflows have tremendously grown between 2000 and 2010. It is good to note that the decade of 2000-2010 is when most efforts were made by the government to engage Rwandan Diaspora, which led to the design of the Rwandan Policy in 2009. Table 3.3 also shows the effect of the increase in remittances as a share on the country's GDP which suggests there is a positive relationship between the two variables.

Table 4.1: Rwanda Development Patterns with Remittances

	1990	2000	2010	2013*
Life expectancy at birth	32.6	47.7	62.3	64.1
Adult literacy rate (ages 15 and older)	57.9	64.9	65.9	..
Combined gross enrolment ratio in education (per cent)	37.8	48.1	68.4	70.3
GDP per capita (PPP in thousands of US dollars)	511	560	1 172	1 354
Human development index (HDI)	0.23	0.31	0.43	0.43

* 2013 or latest available

Remittances (years are approximate for some indicators / countries)

	1990	2000	2010	2012*
Inflows (millions of US dollars)	3	7	103	156
Outflows (millions of US dollars)	21	28	76	103
Inflows as a share of GDP (%)	0.1	0.4	1.8	2.2

* Estimate

Source: UNICEF, Migration Profiles: Rwanda 2014

4.3. Review of Rwandan Diaspora Policy and implementation progress

The Rwandan Diaspora Policy was introduced in June, 2009 as a guiding framework of how the Government of Rwanda wishes to see the Rwandan Diaspora being integrated in the national development of their native country. It is said to be the outcome of a process of extensive consultations that brought together representatives of local partner institutions, recommendations from Rwandan Diaspora Conventions, remarks of Rwandan delegates who met Diaspora in various occasions, individual consultations and Private sector.

The policy analyses different categories of Rwandan Diaspora (short-term and long-term) and proposes a Rwandan Diaspora area investigation and worries its qualities and difficulties. It supports the vital system for the assembly and coordination of Rwandan Diaspora in the national improvement and proposes a basic structure for the usage of the approach. This arrangement was created dependent on the Constitution of Rwanda for the most part on its article 7, 23 and 24, Rwandan vision 2020 and its three pillars; Good Governance, private area advancement and Knowledge based economy.

The Rwandan Diaspora policy plays an active role of the national planning toolkit and aligns with the national policy and planning instruments such as vision 2020, Economic Development and Poverty Reduction Strategy (EDPRS) - National Investment Strategy, Rwanda Government's seven years programme, International Development Objectives (MDGs, NEPAD, UN & other international sector conventions).

The policy has five main chapters; Introduction which defines the diaspora and sets the background; General Guidelines of how the diaspora policy will be aligned with national policy and planning instruments; Rwandan Diaspora Sector's strengths and constraints which also sets the vision, mission and objectives of the sector; Programs of the sector; and Institutional framework for policy implementation.

4.3.1. Socio-Economic importance of the Rwandan Diaspora

The Policy shed light on how Diaspora is often seen as a resource that countries of origin can tap into for their development needs. In the Diaspora, reside some of the most educated, entrepreneurial and wealthy of a country's citizens. There is a growing recognition that diaspora

facilitate and increase trade, investment and cultural linkages between the different countries that they are connected to, and therefore become important development actors. The resources of these communities that flow across borders are immensely varied and range from skills, knowledge and ideas to cultural capital, financial and trade resources.

In line with the review of the policy, this study conducted interviews to further analyze the progress Rwanda has made in meaningfully engaging its diaspora. Mr. Aime Muyombano, the Rwandan Diaspora Directorate, has stated the multifaceted approaches being undertaken by the directorate to engage Rwandan diaspora. He expressed his contentment on approximately 30% of the experts in The Ministry of Foreign Affairs being from the diaspora following the government's vast recruitment of Diaspora experts that are now included in policy design and financial mobilization. He estimates that at least 25% of the country's investment is by its diaspora.

4.3.1.1. Remittances

As stated on the Diaspora Policy (2009), a survey by the National Bank of Rwanda showed that remittances from the Diaspora represent almost 50% of the foreign currency exchanged on Kigali exchange market and is increasing very fast. From $60 million in 2006, remittances from Diaspora were $103 Million in 2007 and were amounting to over 200 million US dollars for the year 2018 as shown on Figure 4.3. Three quarter of this amount is from informal transfers and is probably underestimated.

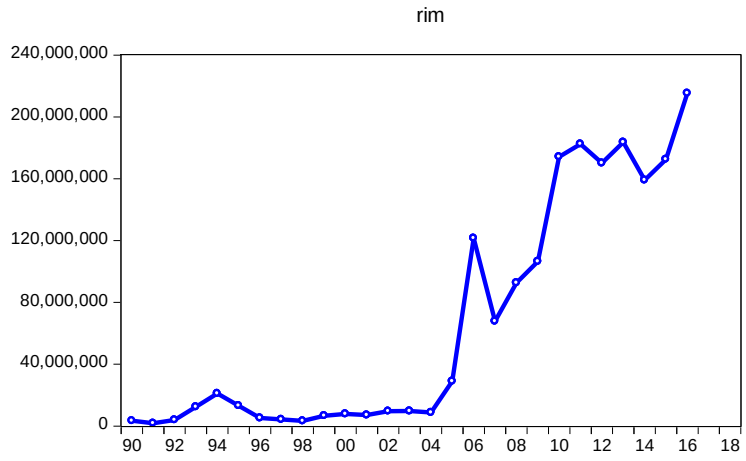


Fig 4.3.: Remittances in Rwanda from 1990 – 2017 (Author's analysis based on WDI data from 1990-2017)

Remittances from the Rwandan diaspora contributed an estimated 2 per cent to the GDP in 2016 and grew by 34.4% since 2007 (IFAD, 2017). Notable community development programs from diaspora remittances are One Dollar Campaign (2008-2010), No Rwandan Left Behind (2016) and participation in the One Cow Per Family (2006-2015) initiative.

The descriptive Figure 4.4 shows the trends of GDP and Remittances for the last two decades.

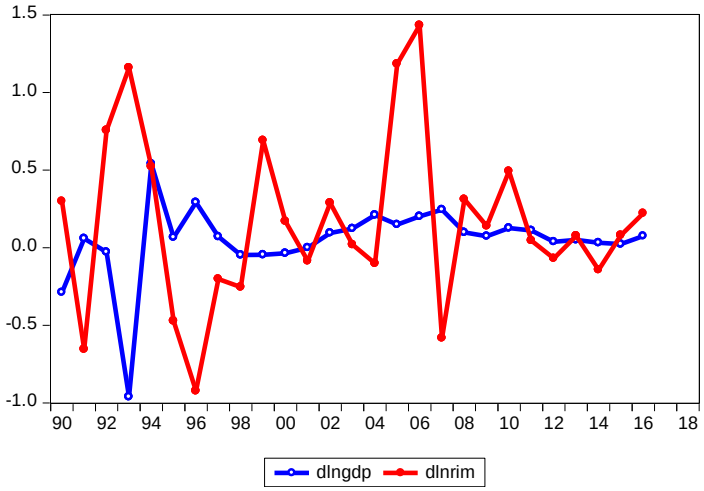


Fig 4.4.: Differenced values of GDP vs. Remittances in Rwanda from 1990 – 2017 (Author's analysis based on WDI data from 1990-2017)

4.3.1.2. Diaspora Investments

Economic capital is not only represented by remittances and savings, which constitute a fraction of the total private capital flow, but it also relates to direct investments made by diaspora members in business activities. The Rwandan National Investment Strategy (Republic of Rwanda, 2017) attracts foreign investors and Rwandan diaspora by establishing an attractive and favorable environment for doing business, including legal and financial reforms, tax incentives, and private sector friendly administrative procedures.

Together with the implementation of the diaspora policy, enhanced efforts of diaspora and foreign investments resulted in drastic increase of Rwanda's Gross Capital Formation as shown in the Figure.

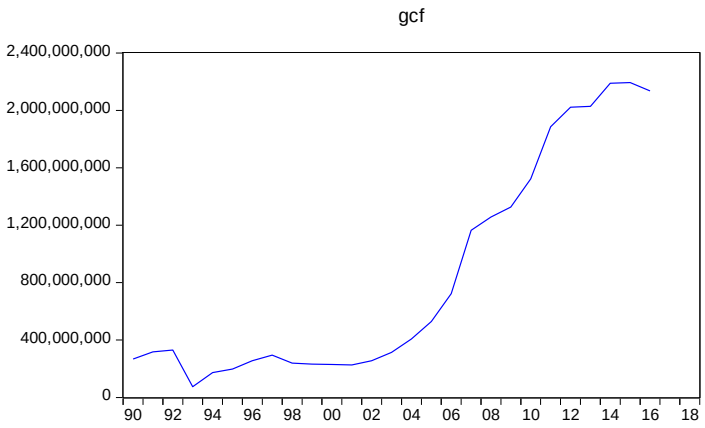


Fig 4.5.: Gross Capital Investment in Rwanda from 1990 – 2017 (Author's analysis based on WDI data from 1990-2017)

In the recent years, Rwandan diaspora is credited for the construction of high standard buildings mostly in Rwandan urban centers and is linked with the recent development of the real estate market services. In the interview conducted with the investment development analyst, Mr. Chris P. Shyaka, from the Rwandan Development Board, he confirms of the different incentives classified under fiscal and non-fiscal to attract diaspora investment in the past few years (RDB, 2019). He further stated an immense increase of diaspora investment has been recorded in the housing, agribusiness and energy sectors. He highlighted that the astounding improvement of business registration has contributed greatly to the investment increase; as an online platform has been established to remotely register businesses within 6 hours only.

The Rwanda Development Board is evidence that Rwanda is open for business as it serves as a one stop shop for all investors. The Rwanda Development Board was set up by bringing together all the government agencies responsible for the entire investor experience under one roof. This includes key agencies responsible for business registration, investment promotion, environmental clearances, privatization and specialist agencies which support the priority sectors of ICT and tourism as well as SMEs and human capacity development in the private sector (RDB, 2019).

The strides made to increase Rwandan diaspora investment was also discussed with Mr. Geoffrey Kamanzi, Director of Trade & Business Development at the Private Sector Foundation, where he stated the growing interest of Rwandan Diaspora in business investments;

especially in the sectors of Real estate, automobile, agriculture and agri-processing, export and import and online market. The Private Sector Federation (PSF) is a professional organization established in 1999 replacing the former Rwandan Chamber of commerce and Industry, dedicated to promote and represent the interests of the Rwandan business community. It is an umbrella organization that groups 9 professional chambers namely Agriculture and Livestock, Commerce, Arts and Crafts, Finance, ICT, Industry, Liberal Professions, Tourism, Women Entrepreneurs, and Young Entrepreneurs. Since its establishment, it has registered major achievements including pioneering Business Development Services (BDS), registered wins in advocacy and played a strong national and regional role.

This study found the main pitfall to be the fact that diaspora investments are not recorded as one category, but only captured within local investments. This makes is difficult to measure the improvement of diaspora investment and its specific impact to economic growth of Rwanda. Nevertheless, it is found that the gross capital formation positively and significantly moves together with the GDP as shown on Figure 4.6.

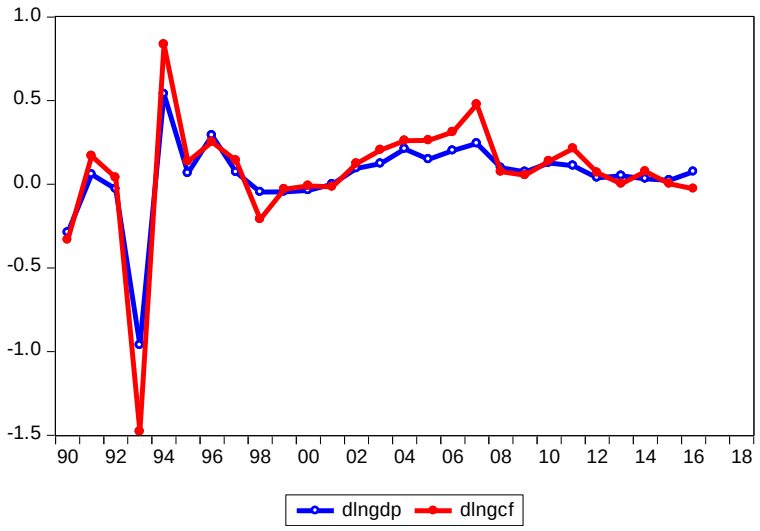


Fig 4.6.: Differenced Values of Gross Capital Formation vs. GDP in Rwanda from 1990 – 2017 (Author's analysis based on WDI data from 1990-2017)

4.3.1.3. Knowledge and Skills transfers

Skills accumulated by diaspora members are invaluable in terms of the development of a variety of sectors such as health, education and technology (IOM, 2018b). The policy correspondingly

states how knowledge transfer can be done through volunteer services (like in MIDA or TOKTEN programs), short-term consultancy services or partnership between local and Diaspora professionals and organizations.

Transfer of Knowledge through Expatriate Nationals (TOKTEN)

The main objective of the TOKTEN programme was to reverse the 'brain drain' by encouraging Rwandan nationals to provide their expertise, transfer of knowhow and skills, through short-term volunteering as UN Volunteers. The TOKTEN programme was implemented from December 2005 to December 2007 through a partnership between the Government of Rwanda and UNDP. The evaluation findings indicated that the project was highly successful, and achieved most of its objectives. Most of the 47 highly qualified recruited volunteers had science and technology backgrounds, followed by those with agriculture, health and ICT backgrounds.

Migration for development in Africa (MIDA)

MIDA is a capacity-building programme, launched since 2012, which helps to mobilize competencies acquired by African nationals abroad for the benefit of Africa's development. (IOM, 2014). The MIDA programme in Rwanda had the ultimate aim of contributing to the improvement of the health sector in Rwanda by bringing qualified Rwandan nationals back to Rwanda to engage in the transfer of knowledge and capacity building. With the collaboration of IOM, MINAFFET and the Ministry of Health (MoH), the project was able to successfully recruit and place 9 out of 15 targeted health professionals and placed them at 6 health institutions (IOM, 2013 a). Increased quality of care of the patients and capacity-building of hospital management staff were achieved. The outreach strategy for recruiting health professionals also served as an important tool for MINAFFET to better communicate with the Rwandan community members abroad (IOM, 2013 b).

4.3.2. Diaspora Mapping Exercise in UK, Netherlands, Belgium, Germany

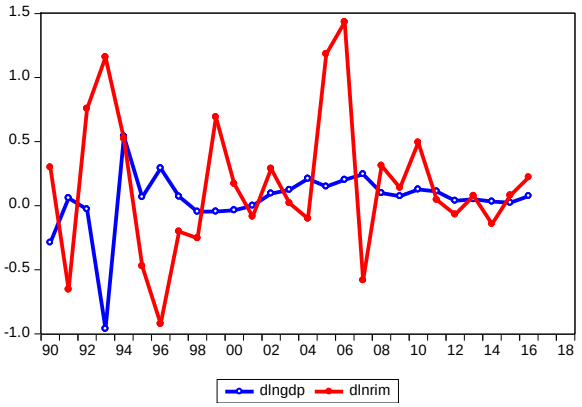
The mapping exercise of Rwandans living in Belgium, the Netherlands, Germany and the United Kingdom was launched in March 2018 by IOM in close collaboration with MINAFFET, under the migration profile project in Rwanda with the support of the Belgian Government (IOM Rwanda, 2018). This exercise was targeted to provide an insight into the Diasporas' socioeconomic profiles, professional skills and expertise, and assess their capacity, interests and motivation to participate in the development process of their country of origin, Rwanda.

The mapping exercise was followed by awareness-raising campaigns by the Rwandan embassies in each country to inform the diaspora on the available opportunities for future engagement, in terms of investments, remittances, skills and knowledge transfer, especially in Technical and Vocational Education and Training (TVET). On the interview with the Diaspora Directorate Mr. Aime Muyombano, one of the priorities of the diaspora directorate office is to establish a harmonized list of Rwandan Diaspora through diplomatic missions and embassies around the world. The project is believed to result an informative diaspora mapping report for each participating country and provide practical recommendations on how to develop a methodology for data collection, analysis, sharing and determination (IOM Rwanda, 2018).

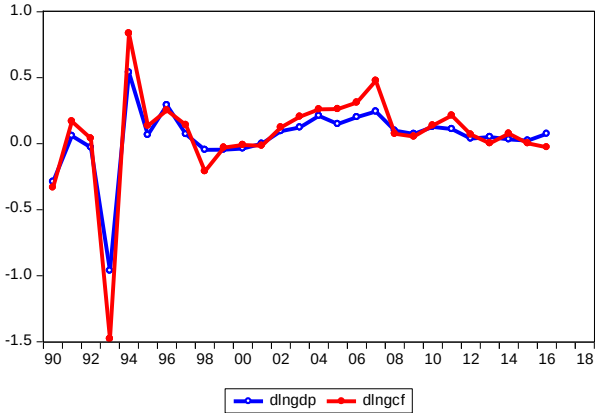
The report with comprehensive data about the profiles of Rwandans living in Belgium, UK, Netherlands and Germany can be considered as a useful evidence base for the formulation of future policies and programmes on diaspora engagement in Rwanda. *"Knowing and understanding transnational communities is crucial to engaging them effectively, and developing the appropriate outreach strategies towards diaspora communities. That is why IOM regularly maps and surveys diaspora communities,"* William L. Swing, Director General IOM

4.4. Descriptive Analysis of Economic Growth vs other explanatory variables

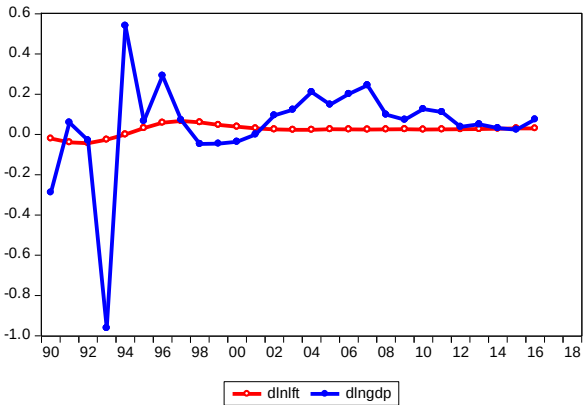
Remittances



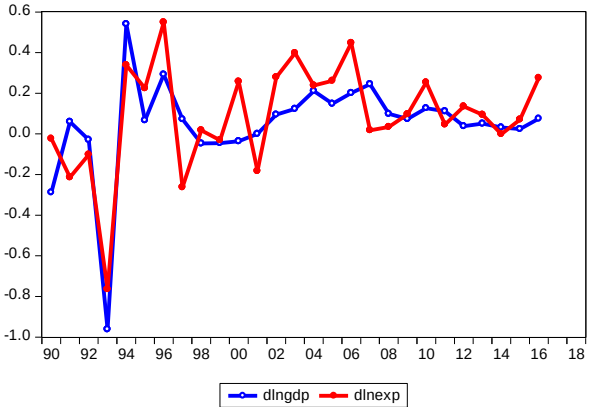
Gross Capital Formation



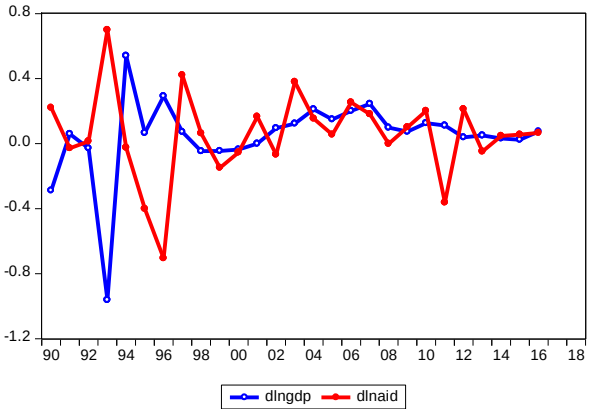
Total Labor Force



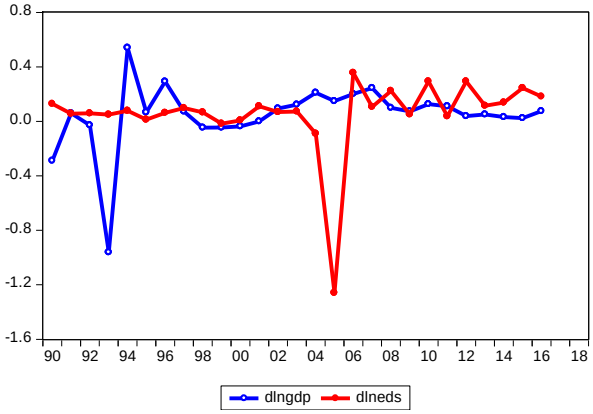
Total exports of goods and service



Net official development assistance



External Debt



General Inflation **Life Expectancy at Birth**

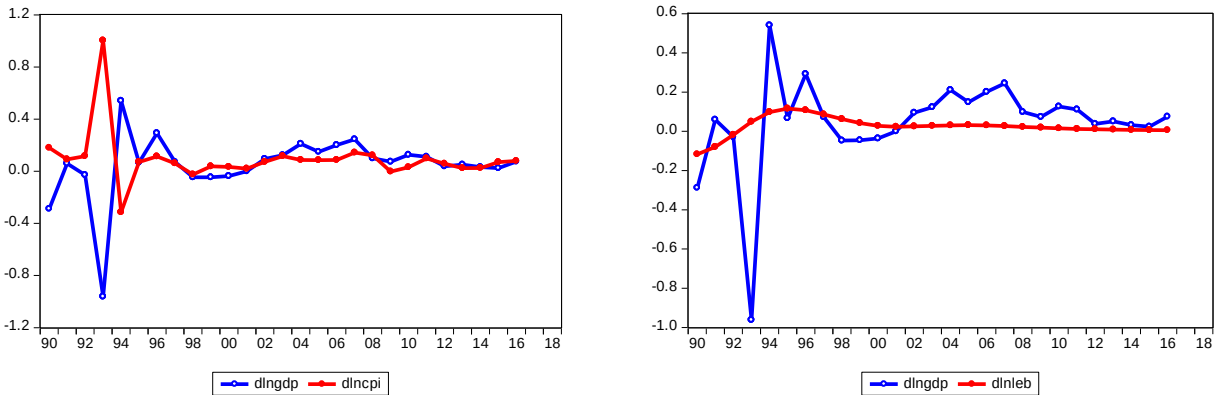


Fig 4.7: Differenced Values GDP Vs Explanatory variables in Rwanda from 1990 – 2017 (Author's analysis based on WDI data from 1990-2017)

Table 4.2. Variables and their hypothesized effects

Variables	Descriptions	Expected sign
Dependent variable		
GDP	GDP per capita	
Explanatory variables		
RIM	Personal Remittances received	+
GCF	Gross capital formation	+
LFT	Total Labor Force	+/-
EXP	Total exports of goods and service	+
AID	Net official development assistance	+
ED	External Debt	+
CPI	General Inflation	-
LEB	Life Expectancy at Birth	+/-

Source: Author's Hypothesis Based on existing theoretical and empirical literature

4.5. Critics and Analysis

The establishment of the Rwandan diaspora policy is indeed a milestone in the country's efforts to tap into the potentials held by their diaspora. The government included the diaspora policy in its major national strategy plans which confirms the integration of diaspora engagement in economic, social and political sectors of the country. Into the bargain, the started diaspora mapping exercises are destined to lead into a well-strategized way of sectioning the wide pool of the diaspora according to knowledge, expertise and business interests. Moreover, creating more knowledge transfer and capacity development platforms such as TOKTEN and MIDA will see tremendous results in improving the human capital.

Nevertheless, the policy was launched in 2009 and no revisions have been made for a decade now, which makes it unable to capture the present-day realities. This in return affects its capacity to fully address the current needs of the diaspora. Moreover, the author believes that efforts towards the assessment of diaspora engagement are insufficient and are unable to quantify actual statistics due to the lack of periodic and comprehensive progress reports to capture and evaluate efforts and monetary resources flowing into the sector.

Chapter Five: Results and Discussions

5.1. Empirical Results

5.1.1. Unit Root Testing

As discussed in chapter three of this paper, it is necessary to test the nature of stationarity of the variables before using the ARDL model to determine the existence of long run relationship among the variables. This is to avoid the possibility of running a false regression, which makes the result inconsistent and defective. The ADF test results of the variables used in the study is presented in Table 5.1, with the variables in their log forms.

Table 5.1 Results of Augmented Dickey Fuller Test

Variables	ADF t-statistic at level I(0)	ADF t-statistic at first difference I(1)	Order of integration
LNGDP	0.015	-3.534***	I(1)
LNLEB	-6.120***	-10.401***	I(0)
LNLFT	-1.446	-11.309***	I(1)
LNGCP	-0.181	-3.951***	I(1)
LNREM	-0.918	-4.356***	I(1)
LNEXP	0.271	-2.973***	I(1)
LNAID	-1.049	-4.454***	I(1)
LNEDS	-0.931	-3.315***	I(1)
LNCPI	-2.095	-4.282***	I(1)

Note: *** represents significance level at 1%.

: Stationarity is attained with No trend.

Source: Author's computation based on WDI data from 1990-2017

If the ADF test statistics is greater than the critical value, it confirms the rejection of the null hypothesis inferring to the stationarity of the time-series variable. As table 5.1 indicates, the null hypothesis of non-stationarity or having a unit root cannot be rejected for all variables in level

except for LNLEB which is stationary at 1% level of significance. Nonetheless, each of our variables become stationary with intercept when they are first differenced. This indicates that none of the above variables are expected to be integrated of order two, I (2), which is a requirement to use ARDL model (Peasaran *et al.* 2001).

5.1.2. Bounds Test for Long Run Relationship

5.1.2.1. F Statistic Bound Test

The F-test statistics tests the joint null-hypothesis that the coefficients of lagged level variables are zero implying no long-run relationship. If the F-statistic is greater than the upper bound, it can be concluded that there is long-run relationship among the variables. As shown on Table 5.2, the F-value became 4.626026 which is greater than the I(1) bounds. This means the variables are cointegrated and have a long-run relationship.

Table 5.2. Results of F Statistic Bound Test

ARDL Bounds Test
Date: 10/19/19 Time: 12:01
Sample: 1991 2016
Included observations: 26
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	**4.626026**	8

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	1.95	3.06
5%	2.22	3.39
2.5%	2.48	3.7
1%	2.79	4.1

Source: Author's computation based on WDI data from 1990-2017

5.1.2.2. The VAR Lag length selection test

Given the annual nature of the data; it is recommended that the optimal lag length for the ARDL model is maximum two lags. Thus, we run a Lag order test to confirm the selection of the appropriate lag length. Table 5.3 depicts the result of the VAR lag length for this time-series analysis is computed to be 1.

Table 5.3. Results of the VAR Lag length selection

VAR Lag Order Selection Criteria
Endogenous variables: DLNGDP DLNGCF DLNEXP DLNEDS DLNCPI DLNAID DLNLEB DLNLFT DLNRIM
Exogenous variables: C
Date: 10/19/19 Time: 19:30
Sample: 1990 2018
Included observations: 26

Lag	LogL	LR	FPE	AIC	SC	HQ
0	170.0126	NA	3.38e-17	-12.38558	-11.95009	-12.26017
1	366.5658	241.9117*	6.78e-21*	-21.27429*	-16.91934*	-20.02023*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Source: Author's computation based on WDI data from 1990-2017

5.1.3. Diagnostic Tests

The last and most important step in any empirical study is testing the soundness of the model. In this study, the serial correlation test and heterosckedasticity test were conducted to bear the following results.

5.1.3.1. Test for Serial collinearity

This test checks if there is a serial collinearity (auto-correlation) between two and more residuals with a null hypothesis which assumes the existence of serial correlation among variables. Based on the finding shown on Table 5.4 there is no serial correlation problem on this model since the p-value is greater than 5%,

Table 5.4. Serial collinearity test result

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.238382	Prob. F(2,13)	**0.7913**
Obs*R-squared	0.919795	Prob. Chi-Square(2)	**0.6313**

Source: Author's computation based on WDI data from 1990-2017

5.1.3.2. Heteroskedasticity Test

This test checks the variance nature of the residual i.e. hetroskecedasitcity. The null hypothesis assumes that the error variances are all equal versus the alternative that the error variances are a multiplicative function of one or more variables. A large chi-square would indicate that heteroskedasticity was present (Williams, 2015). In this result, the chi-square value was small, indicating heteroskedasticity was probably not a problem, which also ensures there was no problem caused by a multiplicative function of the predicted values.

Table 5.4 Heteroskedasticity test result

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.701351	Prob. F(10,15)	0.7105
Obs*R-squared	8.283605	Prob. Chi-Square(10)	0.6012
Scaled explained SS	2.873844	Prob. Chi-Square(10)	0.9842

Source: Author's computation based on WDI data from 1990-2017

5.2. Effects of Diaspora engagement on Economic Growth

The first specific objective of this study is to measure the effects of Diaspora engagement on economic growth. As described in Chapter Four of this paper, the ARDL test is used to make the assessment of long term and short term effects of diaspora engagement captured by remittances and gross capital formation on GDP per capita.

5.2.1. ARDL model of long-run effect analysis

Following the unit root test results which confirmed the stationarity of variables integrated in the first order and the confirmation of the long run Cointegration among the variables from the F statistic bound test, it is now possible to proceed to the estimation of the long run coefficients of the model. Table 5.5 presents the results found after running the appropriate ARDL model to find out the long run coefficients.

Table 5.5. Results of ARDL Long-Run effect analysis

ARDL Cointegrating And Long Run Form
Dependent Variable: LNGDP
Selected Model: ARDL(1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 0)
Date: 10/19/19 Time: 16:53
Sample: 1990 2018
Included observations: 25

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGCF	0.352805	0.087160	4.047778	0.0098
LNEXP	0.050113	0.066447	0.754184	0.4847
LNEDS	0.211952	0.058479	3.624416	0.0151
LNCPI	-0.006542	0.174581	-0.037471	0.9716
LNAID	0.233824	0.054524	4.288482	0.0078
LAG1GDP	0.746795	0.266800	2.799085	0.0380
LNRIM	0.108782	0.031555	3.447420	0.0183
LNLFT	-0.311703	0.396936	-0.785274	0.4679
LNLEB	-0.350332	0.336444	-1.041281	0.3455
POLICY	0.006546	0.021898	0.298938	0.7770
C	8.961645	4.734215	1.892953	0.1169

Source: Author's computation based on WDI data from 1990-2017

On the long run analysis results presented on Table 5.5, four of the explanatory variables namely remittances, gross capital formation, external debt and foreign aid proved to be significant and all have positive signs. The focus of this study is to measure the impact of diaspora engagement on economic growth; captured by remittances and possible contributions of diaspora investment in the gross capital formation of the country.

The assessed long-run coefficient for remittances confirms the hypothesis of the study and analysis of Rwandan Diaspora policy assessment that remittances do have a positive and significant influence on economic growth. It shows that a 1% increase in remittances inflow would lead to an average of 0.108% boost in GDP per capita, other things remaining constant. This finding puts forward the belief that a significant portion of remittance inflows is directed to productive investments in the long run. Furthermore, the short-run effect also shows a multiplier effect (as discussed in Table 5.6). This interprets the capability of remittances in inducing an increase in aggregate demand, leading to a rise in national output and subsequent increase in real income growth. This result is consistent with the finding of Fayissa and Nsiah (2008) for 37

African countries that remittances boost economic growth in countries where the financial systems are underdeveloped. This result also confirms the number of statements made by the Rwandan Government about the positive roles and great contributions of remittances on the economic growth of the country as vastly discussed on chapter four of the study.

The other crucial variable of focus for this study which is of undoubtable importance in growth literature is gross capital formation, which captures diaspora investment. As stated on many empirical findings, investment in physical capital as measured by the gross capital formation (GCF) has a positive and statistically significant impact on economic growth. The test shows that a 1% increase in gross fixed capital formation results a 0.35% increment in GDP per capita in the long run. This is again in line with Fayissa and Nsiah (2008) where human capital is found to positively and significantly affecting output.

This study also had an interesting finding of foreign aid and external debts having a positive relationship with GDP per capita. The finding that external debt has a positive relation with growth can be explained by the belief that external debt funds channeled to the value added sectors of the economy can be utilized optimally to affect growth performance in a positive manner (Al Kharusi and Ada, 2018). This is in contrary of the neoclassical view that external debt crowds out private investment and impedes national growth. Similarly, Official development assistance (ODA) or foreign aid is believed to have been an important economic growth factor throughout the history, which is also portrayed in this long-run result. But, in recent times, African economist such as Doyo (2009) argue that in fact, poverty levels continue to escalate and growth rates have steadily declined with growing foreign aid.

5.2.2. Error Correction Model (Short Run Effect)

Following the assessment of the long run coefficients, the error correction model is estimated, which is the error correction representation of the long run model. This representation shows the short run dynamics of the model along with the stability of the model.

The ECM analysis of this study (shown in Table 5.6) portrays that Remittances play a significant role in economic growth of Rwanda i.e. a 1% increase in remittances would cause a 0.118% increase in GDP per capita. Similarly, the gross capital formation has a significantly

positive contribution on growth per capita of GDP in which a 1% increase would boost GDP per capita by 0.5%.

Table 5.6. Results of ECM Short-Run effect analysis

ARDL Cointegrating And Long Run Form
Dependent Variable: LNGDP
Selected Model: ARDL(1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 0)
Date: 10/19/19 Time: 16:53
Sample: 1990 2018
Included observations: 25

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNGCF)	0.506785	0.053581	9.458265	0.0002
D(LNEXP)	-0.010935	0.048348	-0.226180	0.8300
D(LNEDS)	0.104689	0.025993	4.027578	0.0100
D(LNCPI)	-0.289487	0.109376	-2.646717	0.0456
D(LNAID)	0.132773	0.043865	3.026855	0.0292
D(LAG1GDP)	0.452241	0.128679	3.514489	0.0170
D(LNRIM)	0.118223	0.035183	3.360248	0.0201
D(LNLFT)	4.384394	1.579741	2.775388	0.0391
D(LNLEB)	-5.730643	1.977081	-2.898537	0.0338
D(POLICY)	0.007114	0.024166	0.294384	0.7803
CointEq(-1)	-1.086793	0.253654	-4.284554	0.0078

Source: Author's computation based on WDI data from 1990-2017

Theoretically, the ECM term indicates the speed of adjustment to restore equilibrium in the dynamic model, and the coefficient that are both negative and statistically significant in ECM shows how quickly the dependent variable converges to equilibrium. The Error Correction coefficient is -1.086 and is significant at a 1% level (Table 5.5). The negative sign proves that the model corrects previous errors in the subsequent period.

The short run model results are consistent with the long run estimates except for labor forces which now became significant and positive According to various growth literatures, labor is considered as a determinant factor for growth and this ECM study shows labor as a positively and significantly affecting output.

Inflation became significant and remained negative. Based on the arguments of Andrés and Hernando (nd), high and volatile inflation undermines the confidence of foreign investors about the future course of monetary policy. Inflation also affects the accumulation of other

determinants of growth such as human capital or investment in R+D; which is known as the accumulation or investment effect of inflation on growth.

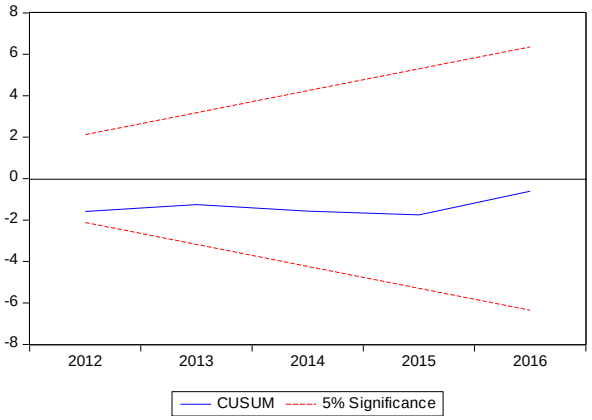
As this study hypothesized that increasing life expectancy may have positive or negative effects on growth, the ECM result showed a negative relation for this model. Comparative studies made by Cervellati and Sunde (2009) discuss both scenarios giving theoretical literatures of Lorentzen, et al. (2008) which used cross-country data to find evidence of higher life expectancy leading to faster economic growth; and, on the contrary, Acemoglu and Johnson (2007), found that improvements in life expectancy lead to some growth in aggregate incomes, but mainly trigger faster population growth, and therefore have a negative causal effect on income per capita. Moreover, the causal relation between GDP per capita and life expectancy would need further assessment as it could potentially be what affected the direction of the variable on this ECM.

5.3. Stability of the estimated relationship between Economic Growth and Diaspora Engagement

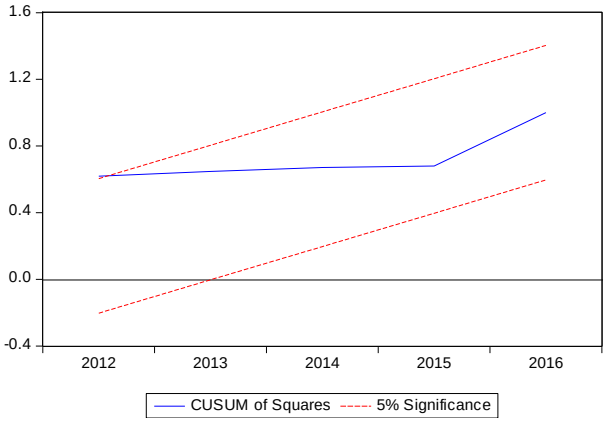
For the stability test the graph plots both the cumulative sum and the 5% critical lines. And, if the cumulative sum remains inside between the two critical lines or bounds back after it is out of the boundary lines, the null hypothesis of correct specification of the model cannot be rejected. But, if the cum sum goes outside between the two critical bounds, it would mean that there exists series parameter instability problem. Figure 5.1 shows the plots of Cumulative Sum of Recursive Residuals (CUMSUM), Cumulative sum of Squares of Recursive Residuals (CUMSUM of squares) and Recursive Residuals respectively.

Figure 5.1. Plots of Stability test (CUSUM, CUSUM test of squares, Recursive Residuals)

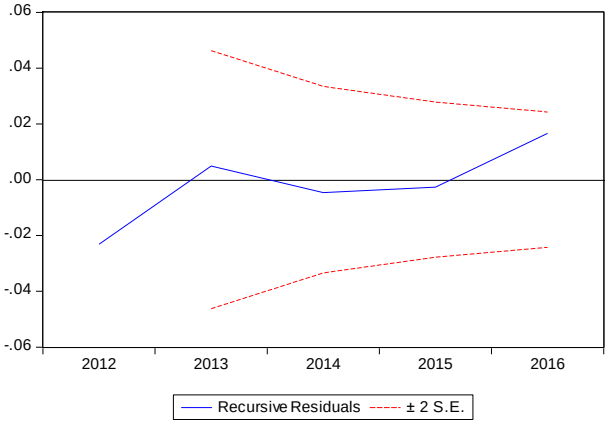
a. CUSUM test



b. CUSUM test of squares



c. Recursive Residuals Test



Source: Author's computation based on WDI data from 1990-2017

The plots of CUMSUM, CUMSUMSQ and Recursive Residuals stay within the lines which confirms correct specification of the equation and the stability of the model. Furthermore, the result shows that there is no structural instability in the model during the sample period. From this, the model appears to be robust in estimating short run and long run relationship between gross domestic product per capita and the included regressor, hence can be used for forecasting.

Chapter Six: Conclusion and Recommendation

6.1. Conclusion

Africans in the diaspora have both the capacity and will to meaningfully take part in the economic, social and political revival of the African continent. The African Union has been at the forefront of continental initiatives to formally involve diaspora Africans in developments in Africa as the "Sixth Region" of the African Union (AU, 2012). It is with this understanding of the importance in meaningfully engaging the diaspora that related deliberations are woven throughout the African Union's various programs, as the organization seeks to translate its mission into effective operations. In recent times, many African countries are giving special attention to the untapped potentials of their diaspora.

This research attempted to examine the impact of diaspora engagement captured by remittances on Rwanda's economic growth using a time series data from 1990 to 2017. The data for the study is obtained from World Bank development indicators data base. The econometric part of this study had employed the autoregressive distributed lag model or bound test approach as well as CUSUM stability test to achieve the specific objectives. The model is adopted to investigate the existence of short run and long run relationship between GDP per capita and the eight selected explanatory variables hypothesized to affect the Rwandan economy, namely; life expectancy at birth (LNLEB), total labor force (LNLFT), gross capital formation (LNGCF), remittances (LNRIM), export of goods and services (LNEXP), Net Development assistance and foreign aid (LNAID), external debt (LNEDS), and general inflation (LNCPI).

The result of the econometric analysis proved that there is a long run relationship between economic growth and the explanatory variables. It is found that Remittances and Gross Capital Formation affect economic growth positively and significantly both in the short run and long run models, which is in line with the theoretical foundation of the study. The outcome of the analysis achieved the objective set by the study to demonstrate diaspora engagement as a driver of economic growth.

Furthermore, the estimated long-run relationship between the diaspora engagement indicators and Economic growth captured by GDP per capita was proven to be stable, which makes the

model fairly useful for forecasting. This could be used as a basis for future studies and predictions on development programs and strategies.

Diaspora engagement through remittances and investment has proven to have a positive impact in a country's development and socio-economic welfare which verifies the eminence of the diaspora sector for development, hence augmented efforts on introducing ease of remittance transfers, incentivizing development sectors, and putting forth policies and institutions to catalyze conducive environments of diaspora investment would bear fruitful results.

As discussed in many studies including this one, diaspora expatriates are in a good position to invest in their homeland through remittances, specialized knowledge transfers and entrepreneurial investment. Commendably, some African governments are greatly increasing incentives to attract their citizens abroad to contribute to domestic investment and capacity building in their homelands. The Rwanda online business registration which only takes less than a day could be used as an excellent example of attracting business investments from the diaspora and investors from all around the world. The Rwanda Development Board and the Private Sector Federation are illustrations of institutions put in place to facilitate the enhancement of the business sector translating into highly engaging diaspora.

The main challenge this study identified was lack of recorded data on diaspora investment. The study recommends the formation of a check and balance system along with a dedicated database to document contributions of the diaspora on the country's development could be useful to capture the immense efforts being put, to prove the prominence of the diaspora sector and assess ways of improvement.

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Appendices

Appendix 1: Unit-root test (Augmented Dickey-Fuller test); with intercept &no trend

Gross Domestic Product per capita

```
. dfuller dlngdp, drift regress lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        25
```

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		Z(t) has t-distribution		
Z(t)	-3.534	-2.508	-1.717	-1.321

p-value for Z(t) = 0.0009

D.dlngdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dlngdp						
L1.	-1.138332	.322088	-3.53	0.002	-1.806302	-.4703625
LD.	-.0506212	.2046959	-0.25	0.807	-.4751346	.3738922
_cons	.0690562	.0535308	1.29	0.210	-.0419599	.1800724

Life Expectancy at Birth

```
. dfuller dlnleb, drift regress lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        25
```

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		Z(t) has t-distribution		
Z(t)	-10.401	-2.508	-1.717	-1.321

p-value for Z(t) = 0.0000

D.dlnleb	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dlnleb						
L1.	-.2365169	.0227408	-10.40	0.000	-.2836785	-.1893554
LD.	.7902518	.0387716	20.38	0.000	.7098445	.8706591
_cons	.006978	.0011827	5.90	0.000	.0045253	.0094307

Total Labor force

```
. dfuller dlnlft, drift regress lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        25

                                 ------------ Z(t) has t-distribution ------------
                       Test          1% Critical       5% Critical      10% Critical
                  Statistic              Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -11.309              -2.508            -1.717           -1.321
------------------------------------------------------------------------------
p-value for Z(t) = 0.0000
```

D.dlnlft	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dlnlft						
L1.	-.24798	.0219278	-11.31	0.000	-.2934556	-.2025045
LD.	.7822439	.0485628	16.11	0.000	.6815309	.882957
_cons	.0070659	.0007674	9.21	0.000	.0054744	.0086573

Gross capital formation

```
. dfuller dlngcf, drift regress lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        25

                                 ------------ Z(t) has t-distribution ------------
                       Test          1% Critical       5% Critical      10% Critical
                  Statistic              Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -3.957               -2.508            -1.717           -1.321
------------------------------------------------------------------------------
p-value for Z(t) = 0.0003
```

D.dlngcf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dlngcf						
L1.	-1.315058	.3323722	-3.96	0.001	-2.004356	-.62576
LD.	.0640042	.2084605	0.31	0.762	-.3683164	.4963248
_cons	.1019233	.0814823	1.25	0.224	-.0670607	.2709073

Remittances

```
. dfuller dlnrim, drift regress lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        25

                                 ------------ Z(t) has t-distribution ------------
                       Test          1% Critical       5% Critical      10% Critical
                     Statistic          Value             Value             Value
------------------------------------------------------------------------------
 Z(t)                -4.356            -2.508            -1.717            -1.321
------------------------------------------------------------------------------
p-value for Z(t) = 0.0001

------------------------------------------------------------------------------
    D.dlnrim |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      dlnrim |
         L1. |  -1.098927   .2522638    -4.36   0.000    -1.62209   -.5757643
         LD. |   .3001726   .1927057     1.56   0.134    -.0994745    .6998197
             |
       _cons |   .2084059   .1152282     1.81   0.084    -.0305627    .4473745
------------------------------------------------------------------------------
```

Export of Goods and Services

```
. dfuller dlnexp, drift regress lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        25

                                 ------------ Z(t) has t-distribution ------------
                       Test          1% Critical       5% Critical      10% Critical
                     Statistic          Value             Value             Value
------------------------------------------------------------------------------
 Z(t)                -2.973            -2.508            -1.717            -1.321
------------------------------------------------------------------------------
p-value for Z(t) = 0.0035

------------------------------------------------------------------------------
    D.dlnexp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      dlnexp |
         L1. |  -.8556594   .2878322    -2.97   0.007    -1.452587    -.258732
         LD. |    -.13775   .2065154    -0.67   0.512    -.5660366    .2905367
             |
       _cons |   .0954506   .0601976     1.59   0.127    -.0293917    .2202928
------------------------------------------------------------------------------
```

Foreign Aid

```
. dfuller dlnaid, drift regress lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        25

                                 ------------ Z(t) has t-distribution ------------
                       Test          1% Critical       5% Critical      10% Critical
                     Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)                -4.454            -2.508            -1.717           -1.321
------------------------------------------------------------------------------
p-value for Z(t) = 0.0001
```

D.dlnaid	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dlnaid						
L1.	-1.329019	.2984092	-4.45	0.000	-1.947882	-.7101559
LD.	.2581503	.2039808	1.27	0.219	-.1648799	.6811806
_cons	.0672408	.0575759	1.17	0.255	-.0521642	.1866459

External Debt

```
. dfuller dlneds, drift regress lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        25

                                 ------------ Z(t) has t-distribution ------------
                       Test          1% Critical       5% Critical      10% Critical
                     Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)                -3.315            -2.508            -1.717           -1.321
------------------------------------------------------------------------------
p-value for Z(t) = 0.0016
```

D.dlneds	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dlneds						
L1.	-1.047402	.3159243	-3.32	0.003	-1.702589	-.3922152
LD.	-.0168536	.2159557	-0.08	0.939	-.4647184	.4310112
_cons	.056804	.0628597	0.90	0.376	-.0735591	.1871671

General Inflation

```
. dfuller dlncpi, drift regress lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        25
```

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		Z(t) has t-distribution		
Z(t)	-4.282	-2.508	-1.717	-1.321

p-value for Z(t) = 0.0002

D.dlncpi	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dlncpi						
L1.	-1.454871	.3397444	-4.28	0.000	-2.159458	-.7502839
LD.	.1228417	.2107689	0.58	0.566	-.3142662	.5599496
_cons	.1291709	.0516893	2.50	0.020	.0219737	.236368

Appendix 2: Long Run Auto Regressive Distributed Lag Estimation Result

Dependent Variable: LNGDP
Method: ARDL
Date: 10/21/19 Time: 17:49
Sample (adjusted): 1992 2016
Included observations: 25 after adjustments
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): LNGCF LNEXP LNEDS LNCPI LNAID LNLFT LNLEB LNRIM POLICY LAG1GDP
Fixed regressors: C
Number of models evalulated: 1024
Selected Model: ARDL(1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNGDP(-1)	-0.086793	0.253654	-0.342170	0.7461
LNGCF	0.506785	0.053581	9.458265	0.0002
LNGCF(-1)	-0.123359	0.145327	-0.848841	0.4347
LNEXP	-0.010935	0.048348	-0.226180	0.8300
LNEXP(-1)	0.065398	0.047124	1.387793	0.2239
LNEDS	0.104689	0.025993	4.027578	0.0100
LNEDS(-1)	0.125659	0.042135	2.982270	0.0307
LNCPI	-0.289487	0.109376	-2.646717	0.0456
LNCPI(-1)	0.282378	0.144202	1.958207	0.1075
LNAID	0.132773	0.043865	3.026855	0.0292
LNAID(-1)	0.121345	0.029353	4.133951	0.0091
LNLFT	4.384394	1.579741	2.775388	0.0391
LNLFT(-1)	-4.723151	1.596106	-2.959171	0.0315
LNLEB	-5.730643	1.977081	-2.898537	0.0338
LNLEB(-1)	5.349905	1.782675	3.001054	0.0301
LNRIM	0.118223	0.035183	3.360248	0.0201
POLICY	0.007114	0.024166	0.294384	0.7803
LAG1GDP	0.452241	0.128679	3.514489	0.0170
LAG1GDP(-1)	0.359370	0.076495	4.697947	0.0053
C	9.739450	5.546237	1.756047	0.1394

R-squared	0.999932	Mean dependent var	21.88317
Adjusted R-squared	0.999674	S.D. dependent var	0.727960
S.E. of regression	0.013145	Akaike info criterion	-5.834990
Sum squared resid	0.000864	Schwarz criterion	-4.859889
Log likelihood	92.93737	Hannan-Quinn criter.	-5.564538
F-statistic	3873.671	Durbin-Watson stat	3.130635
Prob(F-statistic)	0.000000		

DECLARATION

I, the undersigned, declared that this thesis is my original work and it has not been presented for a first degree or master's degree in any other university, and that all source of materials used for this thesis have been duly acknowledged.

Declared By:

Name: Bitania Lulu Berhanu

Signature: _____

Date: _____

Confirmed by Advisor:

Name: Kidist G/Sellasie (PhD)

Signature: _____

Date: _____

Place and Date of Submission_____