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**INTERNATIONAL REMITTANCE AND ECONOMIC GROWTH IN ETHIOPIA: AN  
AUTOREGRESSIVE DISTRIBUTED LAG APPROACH**

**A RESEARCH THESIS SUBMITTED TO DEPARTMENT OF ECONOMICS FOR THE  
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**BY**

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## List of Acronyms

<b>ADF</b>	Augmented Dickey Fuller
<b>AIC</b>	Akaike Information Criteria
<b>ARDL</b>	Auto Regressive Distributed Lag
<b>CUMSUM</b>	Cumulative Sum
<b>CUMSUMSQ</b>	Cumulative Sum of Squares
<b>ECM</b>	Error Correction Model
<b>EPRDF</b>	Ethiopian People’s Revolutionary Democratic Front
<b>EEA</b>	Ethiopia economic association
<b>FDI</b>	Foreign Direct Investment
<b>FPE</b>	Final prediction error
<b>GDP</b>	Gross Domestic Product
<b>HQ</b>	Hannan-Quinn information criterion
<b>IMF</b>	International Monetary Fund
<b>LM</b>	Lagrange Multiplier
<b>MoFED</b>	Ministry of Finance and Economic Development
<b>NBE</b>	National Bank of Ethiopia
<b>NELM</b>	New Economics of Labor Migration
<b>OLS</b>	Ordinary Least Square
<b>PP</b>	Philips and Peron
<b>SC</b>	Schwarz information criterion
<b>UNESCAP</b>	United Nations Economic and Social Commission for Asia and the Pacific
<b>USD</b>	United States Dollar
<b>VAR</b>	Vector Auto Regressive
<b>WB</b>	World Bank
<b>WDI</b>	World Development Indicators

## ABSTRACT

*Having the general objective of investigating the relationship between international remittances and economic growth in Ethiopia, this study used an auto regressive distributed lag (ARDL) model or Bound Testing approach to co-integration. The data used is from Ethiopian economic association, national bank of Ethiopia and World Bank Development Indicators which spans from 1980 to 2016.*

*The outcome of the study revealed that, both the long run and short run growth impact of international remittance during the study period is positive and significant. Apart from this, other growth determinant factors, such as real gross fixed capital formation, human capita and consumer price index are found to significantly and positively affecting growth in Ethiopia. Trade openness has found Negative and significantly impact economic growth. Moreover, the Granger Causality test has confirmed that there is a unidirectional causality which runs from remittance to output. The most important policy implication that comes out of this study is that the government as well as other concerned stakeholders should work on easing the remittance sending process and cost, so as to better extract the economic benefit of international remittance.*

**Key Words:** *International Remittance, Economic Growth, ARDL, Ethiopia*



# CHAPTER ONE

## INTRODUCTION

### 1.1. Background of the Study

Remittances are the sum of workers' remittances, compensation of employees and migrants' transfers. Workers' remittances are current transfers by migrants who are employed in new economies and considered residents there. A migrant is a person who comes to an economy and stays there, or is expected to stay, for a year or more. ; Compensation of employees is the income of migrants who have lived in the host country for less than a year; migrants' transfers are defined as the net worth of migrants who are expected to remain in the host country for more than a year (IMF, 1993). Various writers hold different views regarding the concept of remittances. Remittances are transactions that are initiated by individuals living or working outside their country of birth or origin and related to their migration. (Migration Policy Institute, 2003, Adams and Page, 2003 and Harrison, 2003) and also on the other hand remittances are largely personal transactions from migrants to their friends and families, they tend to be well targeted to the needs of their recipients (World Bank, 2016).

Remittance has become an important discussion topic in the world agenda. This is due to the fact that this monetary flow has increased considerably in recent year which is coupled with the increasing migration of people from developing countries to developed ones. International remittances are becoming increasingly important sources of finance for developing countries. Although it is difficult to calculate the number of migrants worldwide with precision, recent estimations by United Nations global migration statistics reveal that by 2013 nearly 232 million people, or 3.2 per cent of the world's population, are international migrants compared to 175 million and 154 million by 2000 and 1990, respectively Mikias (2014). For many developing countries, remittances constitute a large source of foreign income relative to other financial flows. In 2009, in some countries economic remittances have "become as large as foreign direct

investment” and, in a large group of developing countries, remittances represent a resource inflow that often exceeds a variety of other balance of payments flows (IMF 2009).

Although remittances are accounted for as a component of Physical capital formation, unlike foreign direct investment and Personal income, which tend to be highly volatile, remittances are much more stable and even countercyclical in the face of external economic shocks (Mohapatra et al. 2010,(UNESCAP), 2007, Grabel ,2008).

Moreover, since remittances are largely personal transactions from migrants to their friends and families, they tend to be well targeted to the needs of their recipients. Their ability to reduce poverty and to promote human development is well documented and often reported as beneficial to overall development: “Remittances directly augment the income of recipient households. In addition to providing financial resources for poor households, they affect poverty and welfare through indirect multiplier effects and also macroeconomic effects” (Ratha 2007).

At the macro-economic level, the relationship between economic growth and remittance receipts has come under renewed study. Although the empirical evidence on the impact of remittances on economic growth appears to be mixed, it is nonetheless recognized that, since remittance flows are used either to increase consumption or investment, they have the potential to become an important tool for economic development (Fayissa and Nsiah 2008, (UNESCAP), 2007, Ratha 2007). More recently, it has been noted that “a significant portion of remittance flows are used to service debt, and increase foreign exchange reserves” (Das and Serieux 2010). In other words, such flows can also be used to reduce the impact of external economic shocks.

In relation to the level of migration, amount of international remittance flow is becoming Very huge. For many developing economies, international remittances constitute the single largest source of foreign exchange, exceeding export revenues, foreign direct investment (FDI), and other private capital inflows (Giuliano and Ruiz-Arranz, 2005; Getachew, 2009; World Bank, 2013). During the most recent ten-year period, for instance, remittance flows amounted on average about one third of export earnings, more than twice of private capital flows, almost ten times official capital flows, and more than twelve times official transfers (Barajas et al., 2009).

To overcome the high poverty levels and improve the standard of living in developing countries there is need for a substantial inflow of external resources in order to fill the savings and foreign exchange gaps. This will increase the rate of capital accumulation and growth. One of these external resources is remittances. Remittances are not only a source of foreign exchange but also have become the second largest source of external finance for developing countries after foreign direct investment (FDI) (World Bank, 2009). Remittances have been found to enhance growth through human capital accumulation and can mitigate poverty by increasing the recipient family's income and living standards (Gupita et al., 2009; Mim and Ali, 2012).

In sub-Saharan Africa, international remittances are correlated with higher levels of computer and internet access. Migrant remittances raise domestic savings and improve financial intermediation, which can improve growth prospects for the country overall. Overall, however, the extent to which countries benefit from remittances is closely related to the strength of domestic institutions and the macroeconomic environment MPI (2013).

The trend of international remittances in Ethiopia is likely to continue as more and more Ethiopians are still seeking for work and study opportunities in different locations both at national and international level. According to World Bank (2014) Ethiopia was ranked as one of the top ten remittance receiving countries in sub-Saharan Africa in 2014 .The number of Ethiopians living abroad is estimated to be less than 3 million. Their contributions, according to the National Bank of Ethiopia (NBE), in terms of remittance flows have increased from USD 1.9 billion in 2010 to USD 3 billion in 2014, representing 5.3 percent of the country's GDP between 2010 and 2014. Positive measures have been taken by the Government of Ethiopia (GOE) in order to improve the operations and flow of formal remittances, reduce the costs of transfers and increase access to international remittance services.

Besides the current decade the flow of remittance to Ethiopia was 1.9 billion USD in 2010, 2.4 billion USD in 2012/13, 2.9 billion USD in 2013/14 and 3 billion USD in 2014/15. This massive inflow of remittances contributes by increasing in human and physical capital accumulation, significant impact on real private investment, stabilizing income inequality. This figure, however, only shows the remittance channeled through the official transfer. There is unofficial

transfer that may increase the figure by more than double. For instance, according to Emerta *et al.* (2010), of 1.8 billion USD received from private individuals living in the rest of the world in 2008/09, only 54% is channeled through formal way, while the remaining was directed through informal channel. Similarly, the estimates of World Bank and the IMF indicates that, if remittances sent through informal channels are included, total remittances could be as much as 50 percent higher than the official record (World Bank, 2010a; IMF, 2009).

Therefore, this study examined that impact of remittances on economic growth in Ethiopia as term of aggregate fixed capital accumulation, private investment which increase capital accumulation, reduction in current account deficit, external debt burden and improve education/skills of the households by improving human capital and in general this study wants to consider the impacts of remittance and economic growth in Ethiopia and its impacts on economic growth in both short run and long run in Ethiopia.

## **1.2 Statement of the Problem:**

The sources of economic growth can be traced to a variety of factors, such as Capital accumulation, including all new investments in land, physical equipment, and human resources through improvements in health, education, and job skills; Growth in population and hence eventual growth in the labor force and Technological progress have been and will continue to be primary factors in stimulating economic growth in any society. (Todaro, M., & Smith, S. (2009).

The position of developing countries today is in many important ways significantly different from that of the currently developed countries when they embarked on their era of modern economic growth. These are physical and human resource endowments, per capita incomes and levels of GDP in relation to the rest of the world, Climate; population size, distribution and growth, historical role of international migration, international trade benefits, basic scientific and technological research and development capabilities. (Todaro, M., & Smith, S. (2009). Despite the significant inflow of international remittance to developing countries in general and Ethiopia in particular, the above listed source of economic growth have received considerable attention in the empirical literature of economic growth, the macroeconomic impact of remittances on economic growth has not been adequately investigated,

Resource poor developing countries are constrained by lack of foreign exchange to finance the increasing demand for imports associated with domestic investment requirements. For many of these countries, remittances constitute the larger part of foreign exchange earnings; sometimes larger than aid, foreign direct investments and export revenues. Remittances have recently become the second largest source of foreign exchange both as a percentage of GDP and in absolute terms globally ( Giuliano and Ruiz-Arranz, 2005). Remittances, therefore, become a relatively attractive source of foreign exchange earnings for developing countries in general and Ethiopia in particular. Nevertheless, little attention has been paid to analyze the economic impact of these financial transfers, especially on economic growth. There is also very little effort exerted in some of the developing countries with many migrants to collect as much foreign currency as possible through remittances as their effort through exports. Likewise, despite the gradually increasing level of remittance inflows to Ethiopia, little attention was given to appreciate the impact of remittances on Economic growth. Due to this, the need to study the impact of international remittance on economic growth in Ethiopia is important.

Theoretically there are different conflicting perspectives regarding the impact of remittance on economic growth. These are “migration optimists” and “migration pessimists”. According to migration optimists remittances have a positive effect on economic growth through economic channels such as increased saving, subsequent increase in investment and human capital, creation of extra employment, ease of domestic credit constraint and overall multiplier effects of consumption on aggregate demand and output (Ahortor and Adenutsi, 2008, Giuliano and Ruiz-Arranz, 2005, Adenutsi, 2010; Balde, 2010; Stahl and Arnold, 1986). and migration pessimists, on the other hand, argue that remittances have either negative or no impact (IMF, 2005) on economic growth, as remittance flow can cause adverse behavioral changes at the household level that may lower their developmental impact (Sami and Mohammed, 2012) and a negative effect on economic growth through inflation and moral hazards resulting from reduced labor supply (Haas, 2007 and Chami *et al.*, 2005).

Therefore, Empirically Different studies present the impact of remittance on economic growth in different ways; ( Mikias, 2014 ) used an Auto Regressive Distributed Lag (ARDL) model or Bound Testing approach to cointegration in Ethiopia and (Beatrice et al,2015) used Granger

Causality to investigate the causality between international remittances on economic growth in Kenya and Abdellatif et al(2013) used an ARDL model in Philipines finds that a significant positive effect of remittance on economic growth in the long run. Nonetheless, the impact is negative for the short run model. On the other hand Tassew (2016) used an ARDL model in Ethiopia and Davis and Carr (2010) in Nepal found a negative relationship in the long run and positive in the short run. So, both theoretical foundation and empirical literatures on how remittances impact economic growth of recipient countries are, however, inconclusive. Some researchers believe that remittances have positive growth effects while others emphasize the negative growth effect of remittances. But all these conflicting empirical evidences on the relationship are informed by the available theoretical literature explaining on the channels through which remittances impact economic growth. Thus, although it is difficult to come up with conclusive result regarding the effect of remittance on economic growth as the above paragraphs confirm.

Thus, this study get better the works of the earlier studies by trying to give answer to the issue of how remittances affect growth by adding different explanatory variables on the model and recent macroeconomic data up to 2016/2017 in the case of Ethiopia by using Autoregressive Distributive Lag (ARDL) estimation technique based on time series secondary data collected from Ethiopian Economic Association (EEA),National Bank of Ethiopia, World Bank (WB) database, MoFED and World Development Indicators (WDI) which are perceived to be relevant and reliable ranging from 1980 up to 2016.

### **1.3. Research Questions**

The study examined and addressed the following research questions

- What are the trends of remittances and Ethiopian economic growth seem like?
- Is there remittances have long run impact on economic growth in Ethiopia?
- Is there remittances have short run impact on economic growth in Ethiopia?
- What are the direction of causality between international remittance and economic growth in Ethiopia?

## **1.4. Objectives of the Study**

The general objective of this study was to examine the Impact of remittances on economic growth in Ethiopia using the data for the period 1980 to 2016.

### **1.4.1. The specific objectives of the study**

- To see the trend of international remittance and economic growth in Ethiopia.
- To examine the long run impact of remittances on economic growth in Ethiopia
- To examine the short run impact of remittances on economic growth in Ethiopia
- To identify the direction of causality between remittances and economic growth in Ethiopia.

## **1.5. Significance of the Study**

The link between remittances and economic growth is one of the most debatable issues in modern academic scenario. Some argue in favor of it while others are against it. The inconclusive theoretical foundation along with the diverse empirical findings so far has put policy makers in a dilemma in explaining which way the relationship is working and through which channels.

Thus, the study would contribute in clarifying the impact of remittances on economic growth by incorporating additional important variables on the impact of international remittance on economic growth of the country which have not been incorporated in other previous or recent studies including Mikias (2014) and Tassew (2016) in the case of Ethiopia and the existing literature on the area. This study addressed the trends of remittances and Ethiopian economic growth seems like and its impact on economic growth both in long run and short run in Ethiopia. Besides, the outcome of the study was expected to help policy makers, as an input, in decision making with regard to devising policies about inflow of remittance. The last but not the least importance of this study was that it would pave the way for other researchers to advance their study on the issue.

## **1.6. Scope and limitation of the study**

This study examined the impact of international remittances on economic growth in Ethiopia from 1980 to 2016 fiscal year. The major limitation of the study arises from the absence of accurate data regarding remittance inflow. This is due to failure of applying the standard definition of remittance provided by IMF balance of payment statistics. Most central banks use remittance data reported by commercial banks, but leave out flows through money transfer operators and informal channels. This in turn creates a huge underestimation of remittance inflow and hence data available.

The other main challenge for this work was that there is huge inconsistency of data from different organizations such as NBE, WB and Ethiopian economic association. Of course, huge informal flows of remittances which are not recorded by official authorities have made data inconsistency was a more general problem. In order to avoid such inconsistency, attempt is made to stick to the same sources for the same group of data as much as possible.

## **1.7. Organization of the Paper**

The rest of the paper is organized as follows. Chapter two gives a brief review both on the theoretical and empirical literatures in line with remittance and its impact on economic growth. Subsequently the third chapter explains model specification, the data type used and source along with methodology adopted. The econometric analysis is discussed in chapter four. The last chapter deals with conclusions and policy implications based on findings obtained from the analysis.

# CHAPTER TWO

## LITERATURE REVIEW

### 2.1. Theoretical Review

#### 2.1.1. Definition and concepts of remittances

Based on the IMF's balance of payments manual (1993) and World Bank (2008), remittances are the sum of workers' remittances, compensation of employees and migrants' transfers. Worker's remittances are defined as current private transfers from migrant workers resident in the host country for more than a year, irrespective of their immigration status, to recipients in their country of origin;

Compensation of employees is the income of migrants who have lived in the host country for less than a year;

Migrants' transfers are defined as the net worth of migrants who are expected to remain in the host country for more than a year.

Migrant remittances are broadly defined as the monetary transfers that a migrant makes to the country of origin, i.e., financial flows associated with migration (Getachew, 2009; Barai, 2012). Migration Policy Institute (2003), Adams and Page (2003) and Harrison (2003) as cited in Alemayehu *et al.*, (2011) treat remittances as transactions that are initiated by individuals living or working outside their country of birth or origin and related to their migration.

Workers' remittances are current private transfers from migrant workers who are considered resident of the host country to recipients in their country of origin.

If the migrants live in the host country for a year or longer, they are considered residents, regardless of their immigration status (Alemayehu *et al.*, 2011). If the migrants have lived in the host country for less than a year, their entire income in the host country should be classified as compensation of employees.

Migrants' transfers include financial items that arise from the migration (change of residence) of individuals from one economy to another (Edwards, 2010; Barajas *et al.*, 2009). In general remittances are largely personal transactions from migrants to their friends and families. They

tend to be well targeted to the needs of their recipients (World Bank, migration and fact book, 2011).

### **2.1.2. Motives to remit and remittances' uses**

Because remittances are embedded in a complex reality and driven by different kinds of socioeconomic links between the sender and recipient, there are different motives for remitting.

The most recurrent as cited in Karine Manyonga (2014) are first, 'insurance' motives in which remittances are viewed as potential sources of income to insure households against external shocks (part of a risk spreading strategy); second, 'altruism' motives, which assume that migrants remit because of emotional ties to relatives in home countries (Karpestam, 2009); third, 'self-interest' motives (Agunias, 2006), which cover investment or entrepreneurial purposes as well as personal consumption, considering remittances as means of overcoming the lack of opportunities and a failing financial inclusion; and fourth, often overlooked, the 'contractual arrangements' and 'bargaining power' within a family or household (Stark, 1991), for example, the migrant worker abroad reimburses the debts that the family accumulated to pay for the migration or makes payments based on an agreement made with the family before migrating.

Such differentiation in the motives is important, especially with regards to the prospective uses of the remitted money by migrants and/or recipients. As observed by United Nations Conference on Trade and Development, (2013), the sender's motives may change at different periods of time based on changing needs, from the direct household consumption (food, rent and medicines), to the long-term capacity-building of households (health insurance, education and home comfort), as well as savings or investments.

### **2.1.3 Theories of Remittance**

The outflow of human capital resources from developing to developed countries appear to be somehow beneficial to the world economy today. This is due to the fact that developing countries are earning substantial amount of foreign exchange through migrant remittances whereas the advanced and semi-industrialized are enjoying higher surplus value as a result of employing cheap labor from these developing countries Mikias (2014).

Conceptually, two main schools of thought can be identified with regard to the broad impact of foreign remittances on developing economies. These are remittance-optimistic developmental

and the remittance-pessimistic migrant syndrome schools of thought (Ahortor and Adenutsi, 2010) as cited in Mikias (2014). the ideology of remittance-optimistic developmentalist school is that international remittances have the potential of enhancing the development process via positively contributing to the elimination of production and investment constraints through direct financing of critical developmental projects, raising the average household incomes, lessening balance of payment problems, facilitating debt servicing and narrowing the trade gap of developing countries. From the developed nations' point of view, the emergence of remittances on the global scale has further encouraged international migration to advanced countries resulting in increasing large scale production due to cheap labor from developing economies. This reduces average cost of industrialized countries. On the other hand, the main argument of remittance pessimistic school is that the quest for international remittances leads to international migration which drains native developing countries of highly trained and skilled labor and capital by crowding out domestic production of tradable goods in the brain-drained underdeveloped economy. This implies that the one who gains from international remittance is developed nations via cheap labor, high taxation on migrant earnings, and to some extent, from commissions paid by migrants when transferring remittances to their native countries.

Accordingly, the low wages paid to migrants in advanced economies is not sufficient enough to benefit developing countries substantially in narrowing the developmental gap between advanced and developing nations. For remittance-pessimistic school, international remittance deepens foreign dependent mentality, may promote higher inequality among households and creates macroeconomic instability in the form of inflation through excess demand for consumables relative to deficit in domestic production capacity of developing countries.

#### **2.1.4. Determinants of Remittance**

Understanding the underlying motivations behind remitting is necessary for investigating the economic impact of remittances, for at least two reasons. First, the amount a migrant remits depends on the migrant's underlying reasons to migrate and to remit in the first place. In turn, the size and timing of the remittance flows determine their impact on economic activity in the home country. Second, the intended purposes of remittances through the uses to which recipients put

remittances are an important determinant of their economic impact on the home country as cited in Mikias 2014 of (Chami *et al.*, 2008).

Based on the findings of both theoretical and empirical studies, this section is divided into two parts: (1) microeconomic determinants related to circumstances of migration and the migrant's connection with the home setting, and (2) macroeconomic determinants related to economic conditions and policies both in the home and host country.

## **i. Microeconomic Determinants**

Lucas and Stark (1985) as cited in Mikias, 2014 have identified three different types of motivation behind sending of remittances: *pure altruism*, *pure self-interest*, and *tempered altruism or enlightened self-interest*. In the case of pure altruism, migrants send remittances simply because they care about the well-being of those left behind. Migrant derives positive utility not only from his/her own consumption but also from the consumption of family members at home. This implies that there is a positive relation between adverse conditions of the family left behind and the amount of remittances sent by the migrant.

Remittances may also be motivated by self-interested reasons where the family is considered as a business that enters into Pareto-improving exchanges (Chami *et al.*, 2005). One case is where remitter buys various types of services such as taking care of the migrant's assets (land, cattle) or relatives at home that the family members are used as their trustworthy and well-informed agents (Lucas and Stark, 1985). Another way to think is to consider the case where a migrant remits to demonstrate laudable behavior as an investment for the future or with the hope to inherit either family or community asset.

Tempered altruism or enlightened self-interest explains how the migrant and the household left behind mutually benefit from migration through informal contractual arrangements. The New Economics of Labor Migration (NELM) hypothesize that due to market failures in the home country; a household member migrates and enters a coinsurance agreement with the household left behind (Taylor, 1999). The migrant will send remittances home when the household experiences shocks or economic downturns and at the same time the household supports the migrant by paying the costs of migration.

The same rationale may be used to explain remittances as repayments of loans on investments in education. In this case, the implicit contractual arrangement aims at increasing family income where the family will keep on sending migrants as long as family income is thereby increased. The family invests in the education of the migrant and usually finances the costs of migrating. The repayment of the loan back to the family in the form of remittances comes after the migrant settles in the foreign country and his earnings profile starts rising over (Rapoport and Docquier, 2005).

## **ii. Macroeconomic Determinants**

Apart from the microeconomic motives of sending remittance, there are also other factors that determine the volume of remittance flow at macroeconomic level. Most empirical papers focus on the number of migrant workers, the economic situation in the host and home country, inflation, the relative interest rate between the sending and receiving country, and government policies and political stability in the receiving country as determinants of remittance flows Mikias (2014)

The stock of migrant workers in the host country is an obvious determinant of remittances (World Bank, 2008) because the greater the stock of workers, the greater the volume of remittances. According to Swamy (1981) as cited in Alemayehu *et al.*, (2011), the level of economic activity in the home country is important because negative shocks in the home country may increase the need for remittances to be sent, which may induce current migrants to increase the level of remittances or cause migration in the first place. On the other hand, the economic situation in the host country is important because better economic conditions allow migrants to increase their employment and earnings prospects, which gives them the opportunity to remit more (IMF, 2005).

Remittances are perceived to be responsive to changes in the interest rate differential between the home and host country. Apparently, Elbadawi & Rocha (1992) have found that remittances respond positively to interest rate differentials, as greater potential return to assets in the home

country encourage migrants to invest in the home country and therefore stimulate remittances. Absence of good economic policies and institutions in the home country, like black market premiums and exchange rate restrictions, may discourage remittances and shift remittances from the formal to the informal sector (IMF, 2005).

The views on the role of domestic inflation have been mixed. El-Sakka and McNabb (1999) hold that inflation has a positive relationship with the size of remittance inflow as migrants raise the amount they send in response to inflation in the home country to maintain the consumption of families back home. Elbadawi and Rocha (1992), however, argue that high rate of inflation is a sign of economic instability and, thus, may discourage remittances. On the other hand, greater financial sector development may encourage remittances by making remittances easier and cheaper to send and receive. Political instability and low levels of law and order may also discourage migrants from sending remittances due to the risk of expropriation or theft. Likewise, an unstable political and macroeconomic environment is not conducive for investment purposes and may therefore deter remittances. On the contrary, an unstable environment may create an incentive to migrate and in such times there may also be more need for remittances.

In general as discussed in the above from both Microeconomic and Macroeconomic determinant of remittance its impact is inconclusive. Remittances impact economic growth positively at micro (household) level but at macroeconomic level to say it impact positively or negatively it depends on the number of migrant workers, the economic situation in the host and home country, inflation, the relative interest rate between the sending and receiving country, and government policies and political stability in the receiving country as determinants of remittance.

## **2.1.5. Economic Growth Impacts of Remittances: a multifaceted reality**

The appraisal of remittances' impacts on both national and local level suggests a wide range of multifaceted causal links and presents both positive and negative aspects, which may vary depending on the socioeconomic factors pertaining to each country (Alvarez-Tinajero, S.P., International Migration and Development Training Modules: Facilitator's Guide (Geneva, International Organization for Migration, 2013). Accordingly, more details of the impacts of remittance at national and local level are discussed below.

### **i. Positive impacts of remittances at national level**

Increase national income if remittances are transferred through formal channels; Recipient countries gain creditworthiness in International credit markets and Recipient countries may stabilize national balance of payments accounts.

### **ii. Negative impacts of remittances at national level**

Large remittance flows could lead to currency appreciation, with negative consequences on exports; Destabilization of weak economies; Rise in inflation; Aggravate regional inequalities between receiving and non receiving areas; Contribute to the privatization of services that could/should be delivered through public means.

### **iii. Positive impacts of remittances at Local/household/ individual level.**

Boost local economies by stimulating consumption, demand for local goods or services, fostering job creation; Potentially increase local capital to be reinvested in businesses; Afford basic needs (food, healthcare, education, housing); Face risks (unemployment, disability, accidents, illness); Afford social/family events (town festivities, weddings, funerals); strengthen social networks; gain prestige, power and resources (social or material advantages); Redress relative deprivation (access to what others in the immediate environment have); Partly redress social (class, gender) disadvantages.

#### **iv. Negative impacts of remittances at Local/household/ individual level.**

Generate a demand for imported (rather than locally produced) goods; Increase the price of land, property, construction materials; Exacerbate structural inequalities between recipients and non recipients; Foster dependency links between senders and recipients and Put pressure on senders, leading to the deterioration of their living conditions.

To the best of the researcher this study tried to shed some light on the inconclusive aspects of international remittance on economic growth in our country Ethiopia and this study considered both micro and macro level impacts of international remittances on economic growth.

### **2.2. Remittance-Growth Linkage: an Empirical Review**

There are different empirical literatures reviewed on international remittance on economic growth on different countries that determine the impact of remittances on economic growth as listed below in chronological orders.

Ratha and Mohapatra, (2007) conducted study on a note for G8 outreach event on Remittance to identify the macro economic impact of remittances on development and concluded that remittances are the most important source of finance and in most of the under developed countries they are the biggest source of external financing and they also help in reducing poverty as well as they increase standards of living of the people who are receiving the remittance. The effects of remittance on growth are mixed but in the presence of good policy huge remittance can eradicate export competitiveness as well as can play a foreign role in exchange rate.

Abdul et al. (2008) examined the importance of remittances inflows for and its implications for economic growth and poverty reduction in Pakistan by using ARDL approach on the data from 1973-2007 and found that remittance effects economic growth positively and significantly in Pakistan and it also have a strong and statistically significant impacts on poverty reduction thus suggesting that there are substantial potential benefits associated with international migration for poor people in developing countries like Pakistan. So the importance of remittance inflows can

not be denied in terms of growth enhancement and poverty reduction that consequently improves the social and economic condition of the recipient country.

Emerta et al. (2010) explored the impact of international remittances on the Ethiopian economy and on the livelihoods and welfare of households by using the VAR analysis. It uses macroeconomic data and data from the Ethiopian urban household survey. It was found that remittance shocks positively affect macroeconomic variables; the effect remained to be volatile in the very first periods after the shock. However, the impacts tend to sustain in the years after the fifth period. Moreover, through the positive (but inelastic) relationship between growth and poverty, private remittance inflows have an important implication on poverty in Ethiopia. International remittances significantly reduced the poverty incidence among the urban households in the country. It was also found that women are more likely to use remittance more effectively than their male counterparts.

Berhe et.al (2012) studied the effects of international remittances on poverty and inequality in Ethiopia using an urban household survey from 2004 and used a counterfactual estimation technique that takes into account the possible selection into migration and remittance. More specifically, Heckman's two stage selection method is employed. In the first stage, the probability of not receiving remittance is estimated using Probit method and the information is used in the second stage consumption estimation. In order to identify the effects of remittances on poverty and inequality, counterfactual consumption in the hypothetical case of no remittance is estimated in a selection corrected estimation framework. Inequality and poverty values in the hypothetical and actual cases are then compared. There is a significant reduction in poverty while inequality does not change. Remittance recipients have slightly higher average consumption per capita than the non-recipients in the no-remittance scenario indicating that they are on average better-off than the non-recipients even without remittances. Remittances led to a huge increase in the consumption of the recipient households which widens the gap between the recipient and the non-recipient groups much further.

Abu et al (2012) conducted the study on remittance and economic growth: empirical evidence from Bangladesh, India and Sri Lanka by employing the Granger causality test under a Vector

Autoregression (VAR) Framework for the time series data over 25 year period and investigated that there is the causal link between remittances and economic growth in three countries. i.e. growth in remittances does lead to economic growth in Bangladesh. In India there seems to be no causal relationship between growth in remittance and economic growth ; but in Sri Lanka, a two-way directional causality is found ;namely economic growth influences growth in remittances and vice-versa.

Abdellatif et.al (2013) conducted an empirical study of the impact of remittance, educational expenditure and investment on growth in Philippines and found that a positive relationship between the rate of economic growth and remittance as well as educational expenditure by using the ARDL model which enables the researchers to examine long-run as well as short-run relationship between the dependant variable and independent variables, however, the findings show that there is no evidence of a long-run relationship between investment in the Philippines and the rate of economic growth.

Waqas (2013) identified the impact of workers' remittances on economic growth of Pakistan by analyzing time series data of twenty two years from 1991 to 2012. OLS Regression model has been used to identify the relationship between the variables. The results conclude that there exist a significant positive relationship between workers' remittances and economic growth in Pakistan and it has been recommended for policy implication that Pakistan should encourage and motivate the flow of workers' remittances and adopt such policies that insist remitter to send money through proper channels so that these flows can be utilized in a better way for economic growth and development.

Joseph (2014), investigated the link between remittances and economic in Ghana by using Granger –causality and cointegration tests under the Vector Autoregression Framework by using time series data for 33 years on Ghanaian economy and found that a unidirectional link between remittances and economic growth in Ghana and the study also established that remittance have been very useful in promoting house hold welfare and health in Ghana.

Yaekob (2014) examined the impact of migrant remittances on economic growth and poverty reduction in Ethiopia using time series data over the period 1980-2011 by employing modern time series econometric technique such as unit root tests, bound test co-integration approach and error correction techniques within ARDL framework which yields more robust estimates and found that remittance do have a significant impact on economic growth by increasing real private investment and fixed capital accumulation which increase capital accumulation, reduction in current account deficit ,external debt burden and improve education /skills of the house hold by improving human capital.

Mikias (2014) Conducted the role of international remittance on economic growth in Ethiopia, using an Autoregressive distributed lag model or bound test approach with a data set over the period of 1981 to 2012 made to analyze and found that remittances affects growth positively and significantly in the long run. Nonetheless, the impact is negative for the short run model. This is due to the consumption smoothing target of remittance income by receiving households in the short run. On top of that, the causality test applied had showed that there is uni directional causality which runs from remittance to Real GDP.

Abdulazeez et.al (2014) investigated the relationship between remittances and economic growth in Nigeria, using an error correction modeling approach for the period 1981 to 2011 and found that in the long run, remittances impact positively on the economic growth of Nigeria. However, remittances show a significant negative relationship with output in the short run.

Muriel (2015) conducted the study on the impact of remittances on economic growth: Evidence from selected West African countries (Cameroon, Cape Verde, Nigeria and Senegal) for the time series data over the period 2000-2010 by using a liner regression model and found that inflow of remittances to Senegal and Nigeria has a positive effect on these countries' gross domestic product whereas for Cape Verde and Cameroon it had a negative effect

Beatrice et.al (2015) investigated the causality between international remittances and economic growth of Kenya economy by the data used from World Bank's Development Indicators for the period 1993 to 2013. The study used Granger Causality to investigate the causality between

international remittances on economic growth in Kenya. The ordinary least squares estimation was used to determine the effect of international remittances on economic growth. From the discussion of the findings above, it can be concluded that the international remittances indicators are significant factors influencing the economic growth in Kenya. Thus it can be concluded that economic growth in the Kenya is largely driven by international remittances.

Huseyin (2015) examined the study on the relationship between economic growth, remittances, foreign direct investment inflows and gross domestic savings in Turkey over the period 1974-2013 by using Autoregressive Distributed Lag approach and found that remittances, foreign direct investment and gross domestic savings had positive impact on economic growth.

Ahmad (2015) conducted on the workers' remittances and economic growth: evidence from Jordan by using regression analysis (OLS), the study analyzes the effects of other traditional sources of economic growth, such as gross fixed capital formation, foreign direct investment, and labor force. The study shows that there is a positive effect of remittances on economic growth.

Tassew (2016) conducted on assessing the impact of remittances on Ethiopian economic growth on the same data with Mikias Tilahun(2014) over the period 1981 – 2012 by using ARDL model for time series estimation and found that there is a short run significant impact of remittances on economic growth while it affect the economy negatively in the long run.

In general both theoretical foundation and empirical literatures on how remittances impact economic growth of recipient countries are, however, inconclusive. Some study believes that remittances have positive growth effects while others emphasize the negative growth effect of remittances. But all these conflicting empirical evidences on the relationship are informed by the available theoretical literature explaining on the channels through which remittances impact economic growth. Thus, although it is difficult to come up with conclusive result regarding the effect of remittance on economic growth as the above literatures confirm.

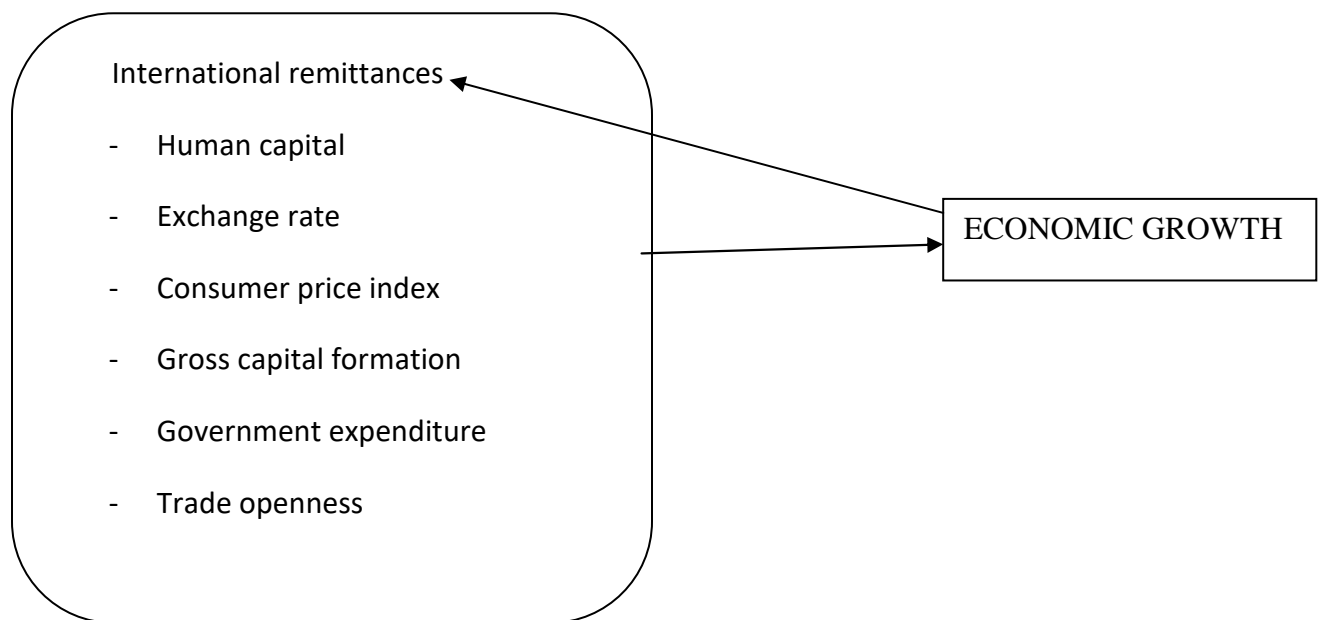
Thus, this study get better works of the earlier studies by trying to give answer to the issue of how remittances affect growth by adding different explanatory variables on the model and recent

macroeconomic data from 1980 up to 2016/2017 in the case of Ethiopia by using Autoregressive Distributive Lag (ARDL) estimation technique.

### 2.3. Conceptual Framework

It is expected that remittances influences economic growth through the following channels. Growth of remittances is expected to determine the direction of economic growth whether positively or negatively.

**Figure: 2.1. Conceptual Framework**



*Source: Owen Design (2018).*

## CHAPTER THREE

### DATA AND METHODOLOGY

#### 3.1. Data Source and Variables

To investigate the impact of remittance on economic growth the following variables was considered. To measure the impact of remittance on economic growth the Real Gross Domestic production (RGDP), remittance (REM), real gross capital formation (RGCF), Consumer price index(CPI), exchange rate(EXCRATE), human capital (HC), Government Expenditure (GOVEXP) and trade Openness (TOP) are considered. The nature of data is time series data that covered over the periods of 1980-2016. The data was collected from different published sources such as books, journals, articles, report, etc. Furthermore the data of macroeconomic variables are obtained from different institutions such as world development indicators, Ethiopian Economic Association and National Bank of Ethiopian (NBE).

##### 3.1.1 Definitions of the Variables

The variables that this study used are described as the following:

**Real GDP (RGDP):** is the market value of the goods and services produced by an economy over time. It is usually measured as the percentage increase in real Gross Domestic Product. Since most economists debate that economic growth can be measured as growth in real GDP

**Personal remittance:-**Comprise personal transfers consist of all current transfers in cash or in kind made or received by resident households to or from nonresident households.”

**Government expenditure:** is also known as government spending, refers to the resources a government allocates to achieve its strategic objectives and satisfy the needs of the members of the nation. Government spent money on health care, education, social security benefits, and infrastructure and defense activities. In this study, the sum of capital expenditure and current expenditure is taken as total government expenditure.

**Real gross fixed capital formation:**-refers to the net increase in physical assets (investment minus disposals) within the measurement period. It does not account for the consumption (depreciation) of fixed capital, and also does not include land purchase.

**Exchange rate:** - is the price of one currency in terms of another currency; it is the relative price of the two currencies. Factors that influence exchange rate include interest rate, inflation rate, trade balance, political stability, internal harmony, high degree of transparency in conduct of leaders and administrators, general state of economy and quality of governance.

**Consumer price index (CPI):**-is a measure that examines the weighted average of prices of a basket of consumer goods and services and it is generally the best measure for adjusting payments to consumer when the intent is to allow consumer to purchase at today's prices, a market basket of goods and services equivalent to one that they could purchase in an earlier period. It also reflects changes in cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specific intervals, such as yearly.

**Trade openness:** - is the removal or reduction of restrictions or barriers on the free exchange of goods and on the free exchange of goods between nations. This includes the removal or reduction of tariff obstacles such as duties surcharges, nontariff obstacles, such as licensing rules, quotas and other requirements. In short trade openness is the sum of import and exports to gross domestic product.

**Human capital:**-is the knowledge, skill sets and intangible assets that add economic value to an individual. For example the return on investment on investment of human capital is calculated by dividing the company's total profits by its investment on human capital. Here this study used human capital as proxy for school enrollment, primary (%gross) which means the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. The reason why the researcher opted for this is based on recent World Bank (2010b) survey on remittance receivers in Ethiopia where majority of this income is used for covering tuition fee for education. Moreover, the study mainly focuses on how remittance income is affecting growth through human capital, i.e., income received from remittance is

believed to be spent on education and it increases primary enrollment rate. HC is expected to have positive role in increasing output.

### 3.1.2. Model specification

Given that of experience listed in the literature for different countries experience the functional form of the model is specified as follows.

$$RGDP = (REM, HC, TOP, EX RATE, CPI, GCF, GOVEXPD) \dots \dots \dots (1)$$

Where, RGDP = real gross domestic production is proxy for economic growth

REM = Remittance (personal remittance received)

HC= Human Capital (proxy for primary school enrollment as (% gross.)

EX RATE = Exchange Rate

CPI = Consumer Price Index

GCF = Gross Capital Formation

GOVEXPD = Government Expenditure

TOP = Trade Openness

ARDL is denoted by ARDL (p, q<sub>1</sub>, q<sub>2</sub>, ...q<sub>k</sub>) where p is the lag of the dependent variable and q<sub>i</sub> is the lag of the i<sup>th</sup> independent variable.

To smooth those data which is not uniformly measured logarithm transformation is considered.

The basic form of the ARDL model is given as follows

$$Y_t = \beta_0 + \sum_{i=1}^p \beta_i Y_{t-i} + \sum_{j=1}^k \sum_{i=0}^{q_i} X_{j,t-i} \alpha_{j,i} + \varepsilon_t \dots \dots \dots (2)$$

X<sub>j</sub> and α<sub>i, j</sub> are a vector of explanatory variables and vector coefficients respectively. X<sub>j</sub> may have lag terms or may not and if it has lag terms it is called dynamic regressor and if it hasn't it is called fixed term regressor.

Based on Persan and Shin (1999) and Persan et al (2001) the ARDL model for the above function is presented as follows:

$$\begin{aligned} \Delta LNGDP = & \alpha_0 + \alpha_1 LNGDP_{t-1} + \alpha_2 LNREM_{t-1} + \alpha_3 LNHC_{t-1} + \alpha_4 LNEXRATE_{t-1} + \alpha_5 LNCPI_{t-1} \\ & + \alpha_6 LNGCF_{t-1} + \alpha_7 GOVEXPD_{t-1} + \alpha_8 LNTOP_{t-1} + \sum_{i=1}^p \theta_{1i} \Delta LNGDP_{t-1} + \sum_{i=0}^{q_1} \theta_{2i} \Delta LNREM_{t-1} + \sum_{i=0}^{q_2} \theta_{3i} \Delta LNHC_{t-1} + \\ & \sum_{i=0}^{q_3} \theta_{4i} \Delta LNEXRATE_{t-1} + \sum_{i=0}^{q_4} \theta_{5i} \Delta LNCPI_{t-1} + \sum_{i=0}^{q_5} \theta_{6i} \Delta LNGCF_{t-1} + \sum_{i=0}^{q_6} \theta_{7i} \Delta LGOVEXPD_{t-1} + \sum_{i=0}^{q_8} \theta_{8i} \Delta LNTOP_{t-1} + \varepsilon_t. \end{aligned}$$

.....(3)

Where  $\Delta$  is the first difference operator,  $\theta_{ji}$  short run coefficients for the  $i^{\text{th}}$  lag and for the  $j^{\text{th}}$  variable,  $\alpha_i$  is the long run coefficients for the  $i^{\text{th}}$  variable,  $\alpha_0$  is the drift component and  $\varepsilon_t$  is white noise residual. In order to test the presence of long run relationship between the underlying variables, the above equations are estimated using OLS. To test the significance of lagged levels of the variables in this study, the appropriate test statistics was the familiar F test under the generalized Dickey-Fuller types of regressions in an unrestricted error correction regression.

## 3.2. Method of Data Analysis

Both descriptive and econometric methods of data analysis are used. With regard to the former, the study has applied descriptive statistics such as tables and different types of graphs. The econometric part is analyzed using E-view version 9.5 statistical software packages.

## 3.3. METHODOLOGY

### 3.3.1. Stationary test

Before ARDL data analysis the time series data stationarity should be tested. The stationarity of the data or the existence of unit root was tested based on Augmented Dickey Fuller test and others to identify the order of integration.

The Augmented Dickey Fuller (ADF) unit root test which adjusts the existence of serial correlation by including additional lags as compared to Dickey Fuller.

The hypothesis used to test unit root for all the above tests is stated as follows.

H0= there is unit root (non stationary)



Engle-Granger Approach is a residual based test of co-integration and requires the integration of the same order for all variables in the model. Once the variables are found to have the same order of integration, it takes two steps. The first step is estimating the co-integrating test through OLS. In this step, residual calculated from the estimated equation and then its stationarity is tested. If the residuals are stationary, it implies that the variables are co-integrated (Gujarati, 2004). Estimation of the error correction model is the second step of Engle-Granger approach, where the error correction term is the residual from the co-integrating relationship, lagged once. However, using Engle-Granger method has some weaknesses. For instance, if we have more than two variables, there may be more than one co-integrating vectors. But it can find out only one co-integrating vector. Second, a co-integration test may depend on the direction of the variable put in the left side of the co-integration. That means, the method does not allow the variables in the right hand side to be potentially endogenous (Enders, 1996). In addition, since Engle-Granger's method is a two-step estimation procedure, any error introduced in the first step may carry over into the second step, making the results unreliable.

Johansen (1990), maximum Likelihood co-integration method is developed to solve the shortcomings of Engle-Granger procedure. Basically, it can estimate more than one co-integration relationship, if the data set contains two or more time series. It relies heavily on the relationship between the rank of a matrix and its characteristic roots. However, since Johansen co-integration technique require that all the variables in the system have the same order of integration, the application of the Johansen technique will fail when the underlying regressors have a different order of integration (Pesaran *et al.*, 2001). That means the trace and maximum Eigen-value tests may lead to erroneous co-integrating relations with other variables in the model when integrate of order variables are present in the system (Harris, 1999).

Due to the presence of shortcomings and pre-request that all the variables are of the same degree of integration in the above approaches, the recently developed autoregressive distributed lag (ARDL) approach has become popular method to test the existence of the long - run relationship between variables.

The ARDL model has mainly an advantage of flexibility to apply it when the variables are of a different order of integration. The standard Wald or F-statistics used in the bounds test has a non-standard distribution under the null hypothesis of no co integration relationship between the examined variables, irrespective of whether the underlying variables are integrated of order zero I (0) integrated of order one I (1) or mutually integrated but it is still pre-requisite that the dependent variable is of I (1) in levels and none of the explanatory variables is I (2) or higher order (Pesaran and Pesaran 1997). In addition, the model takes sufficient numbers of lags to capture the data generating process in a general-to-specific model.

Moreover, it can be applied to a small sample size study (Pesaran *et al.*, 2001). It also provides unbiased estimates of the long-run model and valid t-statistic even when some of the regressors are endogenous (Harris and Sollis, 2003).

Furthermore, an Error Correction Model (ECM) can be derived from ARDL through a simple linear transformation (Pesaran *et al.*, 2001). The ECM integrates the short-run dynamics with the long-run equilibrium without losing long-run information. It is also argued that using the ARDL approach avoids problems resulting from non-stationary time series data. 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 cointegration procedure follows the ARDL bounds testing approach which is mainly based on the joint (F-statistic) and the null hypothesis of no cointegration among the variables. The hypothesis stated as follows.

$H_0$ : long run coefficients=0 No co integration

$H_1$ : long run coefficients  $\neq 0$  there is co integration

Two sets of critical values are fundamental for the co integration test of ARDL. The first is lower critical bound which assumes that all the variables are I (0) implies no co integration and second upper critical bound assumes all variables are I(1) implies there is co integration if the F statistics is lower than the lower critical bound value the null hypothesis is not rejected implies there is no co integration and if the F statistics exceeds the upper critical value there is co integration and  $H_0$  is rejected. When F falls between upper and lower bound it is inconclusive. ARDL model is

applicable if there is co integration unless considering other model or including other variable is important.

### 3.3.4. Long Run and Short Run Model Specification

Once the F statistic passes above the upper bound critical value and the existence of long run relationship is confirmed, the long run model can be estimated by OLS.

$$LNGDP = \alpha_0 + \alpha_1 LNGDP_{t-1} + \alpha_2 LNREM_{t-1} + \alpha_3 LNHC_{t-1} + \alpha_4 LNEXRATE_{t-1} + \alpha_5 LNCPI_{t-1} + \alpha_6 LNGCF_{t-1} + \alpha_7 GOVEXPD_{t-1} + \alpha_8 LNTOP_{t-1} \dots \dots \dots (5)$$

After the long run model is estimated, the next duty is to model the short-run dynamic parameters of the function by estimating an error correction model version of the ARDL model in (3) is specified as below

$$\Delta(LNGDP_t) = \alpha_0 + \sum_{i=1}^p \theta_{1i} \Delta GDP_{t-1} + \sum_{i=0}^{q_1} \theta_{2i} \Delta REM_{t-1} + \sum_{i=0}^{q_2} \theta_{3i} \Delta LNHC_{t-1} + \sum_{i=0}^{q_3} \theta_{4i} \Delta LNEXRATE_{t-1} + \sum_{i=0}^{q_4} \theta_{5i} \Delta LNCPI_{t-1} + \sum_{i=0}^{q_5} \theta_{6i} \Delta LNGCF_{t-1} + \sum_{i=0}^{q_6} \theta_{7i} \Delta LNGOVEXPD_{t-1} + \sum_{i=0}^{q_8} \theta_{8i} \Delta LNTOP_{t-1} + \phi ECM_{t-1} + v_t \dots \dots \dots (6)$$

Where  $ECM_{t-1}$  the lag of residual which is obtained from the long run equation of the level data its coefficient shows the speed of adjustment which show the time it will takes to adjust short run disturbance from equilibrium.

### 3.4. Testing Causality

The presence of cointegration alone does not indicate the direction of causality. Hence we need to test whether the relationship between the variables is unidirectional or bidirectional. Since the underlying series (LRGDP and LREMG) are integrated of the same order, the ordinary Granger causality test can be applied to perform causality tests.

The test proceeds in estimating the following equations.

$$LNRGDP_t = \theta_{1t} + \sum_{i=1}^p \theta_{1i} LNGDP_{t-1} + \sum_{i=0}^{q_1} \theta_{2i} LNREM_{t-1} + \varepsilon_{1t} \dots \dots \dots (7)$$

$$LNREMP_t = \alpha_0 + \sum_{i=0}^{q_1} \alpha_{21} LNREM_{t-1} + \sum_{i=1}^p \alpha_{2i} LNGDP_{t-1} + \varepsilon_{2t} \dots \dots \dots (8)$$

The null hypothesis (for equation 7) is that:

H0 :  $\theta_{11} = \theta_{12} = \theta_{13} = \theta_{1i} = 0$  Implying LNREM does not Granger Cause LNRDGP

H1:  $\theta_{11} \neq \theta_{12} \neq \theta_{13} \neq \theta_{1i} \neq 0$  Implying LNREM does Granger Cause LNRDGP

The null hypothesis (for equation 8) can be stated as:

H0:  $\alpha_{11} = \alpha_{12} = \alpha_{13} = \alpha_{1i} = 0$  implying LRGDP does not Granger Cause LREMG

H1:  $\alpha_{11} \neq \alpha_{12} \neq \alpha_{13} \neq \alpha_{1i} \neq 0$  Implying LRGDP does Granger Cause LREMG

The decision is that there is causality from remittance (LNREMG) to economic growth (LRGDP) if the null hypothesis H0:  $\theta_{11} = \theta_{12} = \theta_{13} = \theta_{1i} = 0$  where  $i=1, 2, \dots, k$  can be rejected at least at 10% level of significance in the case of equation 6. Similarly, there is causality from economic growth to remittance if the null hypothesis

H0:  $\alpha_{11} = \alpha_{12} = \alpha_{13} = \alpha_{1i} = 0$  where  $i=1, 2, \dots, k$  can be rejected at least at 10% level of significance in the case of equation 8.

Table 3.1: Summary of Variables and their expected signs

Variable	Expected Sign
Dependent Variable	
-Economic growth	
Independent variables	
Trade openness	Positive sign is expected
Gross capital formation	Positive sign is expected
Personal remittance received	Positive sign is expected
Human capital	Positive sign is expected
Government expenditure	positive or negative sign is expected
Exchange rate	Negative sign is expected
Consumer price index	positive or negative sign is expected

## CHAPTER FOUR

### EMPERICAL RESULTS AND DISCUSSIONS

#### 4.1. Descriptive Statistics of Variables

In this section the descriptive statistics for the dependent; LNRGDP and explanatory variables involved in the regression model such as: LNRGCF, LNREM, LNHC, LNGOVEXP, LNEXCRATE and LNCPI are presented. Mean, Median, Maximum, Minimum, Standard Deviation and Jarque-Bera probability values are included in the table below. This figure gives overall description about data used in the regression models.

As Table (4.1) reflects below the descriptive statistics of the variables. The mean value for LNREM was (3.857332) with a standard deviation of (1.641900).The Jarque-Bera test's probability of (0.118458) which is greater than 0.05 i.e. which indicates the data is normally distributed.

The mean value for dependent variable LNRGDP was (12.29850) with a standard deviation of (0.614352). The Jarque-Bera test's probability of (0.113377) which is greater than 0.05 suggesting that the data are normally distributed.

The mean value for LNTOP was (-2.561476) with a standard deviation of (1.163871). The Jarque-Bera test's probability of (0.220571) which is greater than 0.05 suggesting the data is normally distributed.

The mean value for LNRGCF was (10.85982) with a standard deviation of (0.849845). The Jarque-Bera test's probability of (0.187138) which is greater than 0.05 suggesting the data is normally distributed.

The mean value for LNHC was (3.967375) with a standard deviation of (0.470327). The Jarque-Bera test's probability of (0.290692) which is greater than 0.05 suggesting that the data are normally distributed.

The mean value for LNGOVEXP was (9.750406) with a standard deviation of (1.456963). The Jarque-Bera test's probability of (0.213179) which is greater than 0.05 suggesting that the data is normally distributed.

The mean value for LNEXCRATE was (1.728844) with a standard deviation of (0.825895). The Jarque-Bera test's probability of (0.232268) which is greater than 0.05 suggesting that the data is normally distributed.

The mean value for LNCPI was (3.318054) with a standard deviation of (0.841576). The Jarque-Bera test's probability of (0.201668) which is greater than 0.05 suggesting that the data is normally distributed.

Therefore, as we see from the descriptive result table below all variables are normally distributed with the given means and standard deviations. i.e the corresponding Jarque-Bera test's probability of all variables are greater than 0.05.

Besides to these, the descriptive table 4.1 shows us, all variables distributions are positively skewed except exchange rate. As the rule of thumb, when the distribution is symmetric, if mean equal to median, when the distribution is positively skewed if the mean is greater than median and when the distribution is negatively skewed if the mean is less than the median. The other feature from the descriptive result is the peakedness and flatness of the distribution which are measured by kurtosis statistics. Like skewness statistics, as the rule of thumb, Positive and negative kurtosis statistics showed that relatively peaked and flat distributions of the variables. Therefore, all variables distributions are relatively peaked, because all kurtosis statistics are positive.

**Table 4.1: Descriptive Statistics results for the variables**

	LNRGDP	LNTOP	LNRGCF	LNREM	LNHC	LNGOVE XP	LNEXCR ATE	LNCPI
Mean	12.29850	-2.561476	10.85982	3.85733	3.96737	9.750406	1.728844	3.318054
Median	12.10576	-2.562718	10.67047	3.30737	3.90278	9.594051	1.928865	3.143811
Maximum	13.60292	-0.570431	12.64910	6.46449	4.64554	12.70468	3.049551	5.037248
Minimum	11.58265	-4.094430	9.684523	1.65199	3.07639	7.732593	0.727549	2.201614
Std. Dev.	0.614352	1.163871	0.849845	1.6419	0.47063	1.456963	0.825895	0.841576
Skewness	0.763282	0.333045	0.679719	0.48707	0.02199	0.564735	-0.059207	0.654632
Kurtosis	2.297243	1.768239	2.428965	1.65150	1.73475	2.145933	1.628921	2.397527
Jarque- Bera	4.354077	3.023070	3.351815	4.26640	2.47098	3.091248	2.919729	3.202269
Probability	0.113377	0.220571	0.187138	0.11846	0.29069	0.213179	0.232268	0.201668
Sum	455.0445	-94.77461	401.8133	142.721	146.793	360.7650	63.96723	122.7680
Sum Sq. Dev.	13.58742	48.76541	26.00049	97.0501	7.97363	76.41873	24.55568	25.49702
Observatio ns	37	37	37	37	37	37	37	37

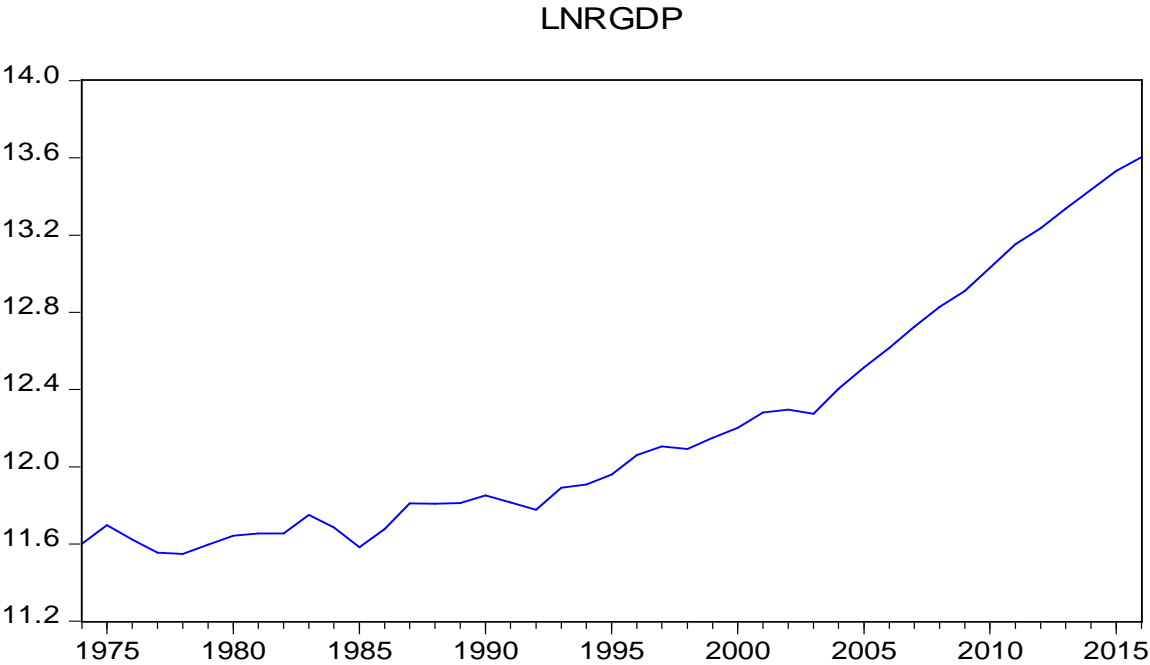
*Source: Own computation (2018) from EViews 9.5 descriptive statistics result.*

### 4.1.1 Trends of Ethiopian real GDP Growth

Figure 4.1 below indicates that an upward and downward trend of real GDP in Ethiopia during the study period, Especially from 1974-1991 the Ethiopian real GDP was at lowest because at that time the country was administered by the socialist (Derg regime) and at this period most of the government expenditure was spent on Ethiopia- Eritrea war and there was also serious drought and political unrests that hit the economy. After the EPRDF comes to the power in 1992 the Ethiopian economy starts to grow even if the degree of growth differs. In addition to this as we can see in the figure below there was ups and downs trends of the Ethiopian real GDP growth rate during 1992-2003 but it was more or less small as we compared with the socialist economic system. But, from 2004-2016 real GDP was not that much highly fluctuated. This is because EPRDF government made overview of the implementation towards the realization of Ethiopia's

vision of becoming lower middle income country by 2025 and planned for rapid, broad based and equitable economic growth, increased investment in infrastructure, human development and institution building to support Ethiopia’s long term transformation. As a result the Ethiopian economy is growing sustainably from 2004-2016 as the figure below shows.

**Figure: 4.1. Trends of real GDP from 1974-2016 in terms of natural logarithm**



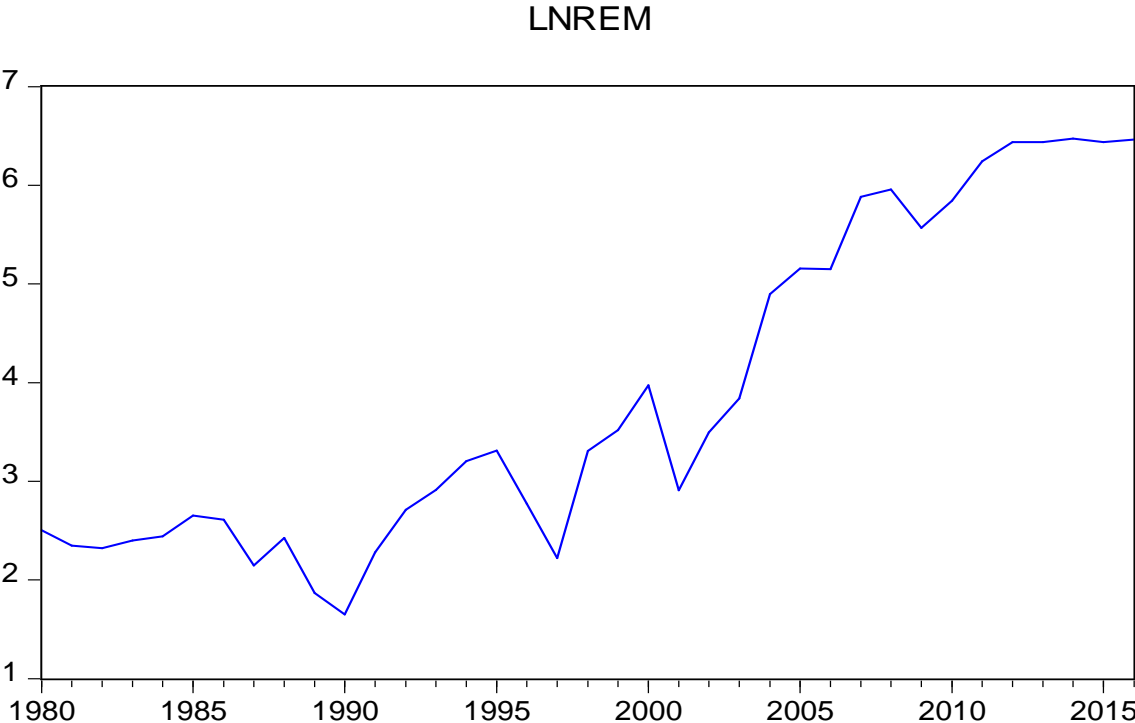
*Source: Own computation from EVIEWS 9.5 descriptive statistics result.*

**4.1.2. Trends of international remittance flows to Ethiopia during the study period.**

As it can be observed from figure 4.1 the total amount of remittance inflow started to show significant increment, mainly since 2002. Between 1980 and 2002 remittance flows have steadily grown from 12 million USD to 33 million USD. By 2003, remittance inflow had over passed 46 million USD. A critical examination of the figure reveals that the inflow of remittances leaps strangely in 2007 which may be associated with the celebration of the Ethiopian Millennium and increments of banking industries to send on formal channels. This continuous increase, however, witnessed a slight decline in 2009 after reaching nearly 387 million USD in 2008 this may be

due to the global financial crisis that occurred due to various market and regulatory failures as well as a macro-economic environment of cheap credit during the period in the western economies, which is the main source of remittance for Ethiopia. Apart from this, the flow of international remittance to Ethiopia continuously increasing and reached around 642 million USD in 2016.

**Figure 4.2. Trends Personal remittance received in terms of natural logarithm**



*Source; own computation from EVIEWS 9.5 descriptive statistics result*

## 4.2. Unit Root Testing

Before running ARDL model and testing the existence of long run co integration in the model it is necessary to check the nature of variables stationarity. This is because it avoids regression with spurious regression which makes the result to be unreliable and inconsistent. The ADF test results of the variables used in the study is presented in the following table.

**Table 4.2: Augmented Dickey Fuller Unit Root test**

Variables	ADF t-statistic at level I(0)			ADF t-statistic at first difference I(1)		Order of Integration
	Intercept (C)	Intercept and trend (C&T)	None	Intercept (C)	Intercept & trend (C&T)	
Lnrngdp	3.1703**	-0.7129	5.6343	-4.3389***	-5.6750***	I(0)
Lntop	0.5704	-2.994180	-2.65263	-5.6559****	-5.735033****	I(1)
Lnrngcf	0.4415	-1.9762	2.2153	-7.6518***	-8.0746***	I(1)
Lnrem	-0.1981	-2.5245	1.2964	-6.2138***	-6.2159***	I(1)
Lnhc	-0.6713	-2.6139	0.6581	-3.1372**	-3.2027	I(1)
Lngovexp	1.9633	-0.5758	6.6326	-5.0505***	-5.7026***	I(1)
Lnexcrate	0.1117	-2.8565	1.3945	-4.0106***	-3.9665***	I(1)
Lncpi	1.1337	-1.0031	4.2230	-5.2760***	-5.5378***	I(1)
<b>Mackinnon (1996) Critical Values</b>						
Mackinnon Critical Values		Intercept	Intercept and trend	None	Significance	
	1%	-3.632900	-4.243644	-2.63921	***	
	5%	-2.948404	-3.544284	-1.951687	**	
	10%	-2.612876	-3.204699	-1.610579	*	

Source: Own Computation from E-views 9.5 output. \*, \*\* and \*\*\* imply statistical significance at 10%, 5% and 1% level of significance, respectively.

Where LNRGDP is the natural log of Real Gross Domestic Product which is proxy for economic growth, LNTOP is the natural log of Trade Openness, LNRGCF natural log of real gross capital formation which is proxy for investment, LNREM is natural log of personal remittance received, LNHC is natural log of human capital proxied by school enrollment primary(% gross), LNGOVEXP is the natural log of government expenditure, LNEXCRATE is natural log of exchange rate, LNCPI is natural log of consumer price index.

If the absolute value of ADF test statistics is less than the critical value, the decision rule is fail to reject the null hypothesis of unit root or non stationarity. In this case the time series variables are non stationary or has unit root. Conversely, in case where the absolute value of ADF test statistics is greater than the critical value indicates rejection of the null hypothesis implying the stationarity of the time series variable.

As table 4.2 above indicates, the null hypothesis of no stationarity (unit root) cannot be rejected for all variables except for LNRGDP which are stationary at level and the others are not stationary at level. The solution to solve non stationarity of the data is first differencing of the data, though, every variable become stationary either with trend or without trend once they are first differenced. This indicates that none of the above variables are integrated of order two (I (2)), which is a pre condition to use ARDL model. Even though the ARDL frame work does not require pretesting variables, the unit root test could inform us whether or not the ARDL model should be used. The results in Table 3 show that there is a mixture of I (1) and I(0) of underlying regressors and therefore the ARDL testing could be proceeded.

Besides the ADF unit root test Pesaran, et al (2001) suggested that PP Unit root test should be performed, so as to ensure the reliability of the result of checking the unit root, the study also applied PP test. It is elaborated in the table 3. Correspondingly, the PP test from table 3 portrays that there is a mixture of order of integration at I (0) and I (1). That is, LNRGDP stationary at level with intercept. However the remaining variables are stationary at first difference (I (1)). Generally, from table 4.2 and 4.3 we can conclude that none of the variables are stationary at second difference. There for according to Pesaran et al. (2001) ARDL co-integration method is

more appropriate in such circumstance in order to check the long run relationship among the variables.

**Table 4.3. Results of Philips- Peron Test for Unit Root**

Variables	Philips- Peron Test statistic at level I(0)			Philips- Peron Test statistic at first difference I(1)		Order of Integration
	Intercept (C)	Intercept and trend (C&T)	None	Intercept (C)	Intercept & trend (C&T)	
Lnrngdp	4.662387***	-0.397213	4.720901	-4.302471***	-7.316466***	I(0)
Lntop	0.505074[0]	-2.311957	-2.31153	-5.690961***	-5.7508867***	I(1)
Lnrngcf	1.701980[0]	-1.802842	3.339208	-7.744051***	-15.14463***	I(1)
Lnrem	0.12097[0]	-2.358508	2.801727	-6.719698***	-10.6764***	I(1)
Lnhc	-0.519287[0]	-1.660149	1.298877	-3.137285**	3.202702*	I(1)
Lngovexp	2.483967[0]	-0.464857	6.489188	-5.043555***	-5.885159***	I(1)
Lnexcrate	0.111725[0]	-2.059335	2.635351	-3.886653***	-3.787875***	I(1)
Lncpi	1.199875[0]	-1.095882	4.343023	-5.282117***	-5.525044***	I(1)
<b>Mackinnon (1996) Critical Values</b>						
Mackinnon		Intercept	Intercept and trend	None	Significance	
n	1%	-3.626784	-4.234972	-2.630762	***	
Critical	5%	-2.95842	-3.540328	-1.950394	**	
Values	10%	-2.611531	-3.202445	-1.611202	*	

*Source: E-views 9.5 output. \*, \*\* and \*\*\* imply statistical significance at 10%, 5% and 1% level of significance, respectively.*

### 4.3. The Optimal Lag Selection

Once the researchers know the order of integration, the next step before running the long run and short run regression analysis is selecting maximum lag structure which incorporated in the model. Unlike other econometrics model ARDL model can select the appropriate lag length by itself, but the main question is how the study limit the maximum lag length. To perform we have

to compare their AIC, LR, HQ, FPE and SC values, then take smallest values of the AIC, HQ, FPE and SC, except LR after regressing the unrestricted VAR model, because we cannot get lag structure option in ARDL model, so that under this situation Pesaran et al. (2001) Suggested unrestricted VAR model should be run before selecting the maximum lag length for more information. Thus from the table below for this study the appropriate maximum lag is two.

**Table:4.4 The Maximum lag selection method based on LR, FPE, AIC, SC and HQ for the model.**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	67.64289	NA	4.57e-12	-3.408165	-3.052657	-3.285444
1	320.7894	376.1034*	1.02e-16	-14.21654	-11.01697*	-13.11205*
2	398.5056	79.93668	8.64e-17*	-15.00032*	-8.956684	-12.91406

*Source: Own computation(2018) from Eviews 9.5*

\* 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

As we can see from table 8 below the optimal lag length that minimizes the FPE and AIC information criteria's is two. After this, we can run the long run ARDL models and perform the residual (normality, serial correlation and heteroscedasticity), coefficients (long run, short run coefficients and co-integration), stability, normality and functional form test. The long run ARDL models are used to perform different tests. After selecting the maximum lag length the ARDL model by itself select the appropriate lag structure. i.e the appropriate optimal lag determined for the ARDL Model on this study is (1, 2, 0, 1, 2, 2, 1, 2)

#### 4.4. Bounds Test for Long Run Relationship

In the ARDL approach to Cointegration, the first step is to test the presence of cointegration or long run relationship among the variables. This test for the long run relationship is done using the F-statistic. Given the annual nature of the data; it is recommended that the optimal lag length for the ARDL model is maximum two lags. Moreover, AIC is used to determine the optimal lag length.

If the F-statistic is greater than the upper bound it can be concluded that there is long run relationship among the variables. On the other hand, 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. However, these are the two extreme cases in which one can conclude with confidence about the long run relationship among the variables. In case where the F-statistic falls between the upper and lower bound critical values, it is difficult to arrive at a conclusion on either the existence or absence of long run relationship. In this situation, it is must to look at the sign and significance of the error correction model to come up with concrete conclusion.

**Table 4.5. Critical values for Upper and Lower Bound**

F-Bounds test	Value	Significance	Lower Bound	Upper Bound
F-Statistic	7.060701		I(0)	I(1)
		10%	1.92	2.89
		5%	2.17	3.21
		2.5%	2.43	3.51
K	7	1%	2.73	3.90

Where, k= is number of regressors

Source own computation from Eviews 9.5

Accordingly, the calculated F statistics (7.060701) is higher than the upper critical value of all at 1%, 2.5%, 5% and 10% level of significance i.e 3.9, 3.51, 3.21 and 2.89 respectively. As a result, it is possible to reject the null hypothesis of no cointegration. In other words, the result implies that the variables are co-integrated in the long run.

## 4.5. Diagnostic Test for the selected ARDL model

### 4.5.1. Serial correlation test

The null hypothesis stated here is that the residuals are not serially correlated against there is serial correlation on the alternative hypothesis. To say the model well done the null hypothesis shouldn't be rejected.

#### **Table: 4.6. Serial Correlation LM Test**

Breusch-Godfrey Serial Correlation LM Test:

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F-statistic	0.849158	Prob. F(2,14)	0.4487
Obs*R-squared	3.786463	Prob. Chi-Square(2)	0.1506

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As serial correlation tests of Breush –Godfrey LM test shows that there is no serial correlation problem in the model i.e probability value of F Statistics is greater than the standard probability value that is 0.05 so; from this the researcher cannot reject the null hypothesis because there is no serial correlation on the model.

### 4.5.2. Heteroskedasticity test:

The null hypothesis stated that the residuals are no heteroskedastic against the alternative hypothesis that the residuals are homoskedastic.

#### **Table: 4.7. Heteroskedasticity test**

Heteroskedasticity Test: Breusch-Pagan-Godfrey

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F-statistic	1.799493	Prob. F(18,16)	0.1216
Obs*R-squared	23.42757	Prob. Chi-Square(18)	0.1747
Scaled explained SS	4.287640	Prob. Chi-Square(18)	0.9996

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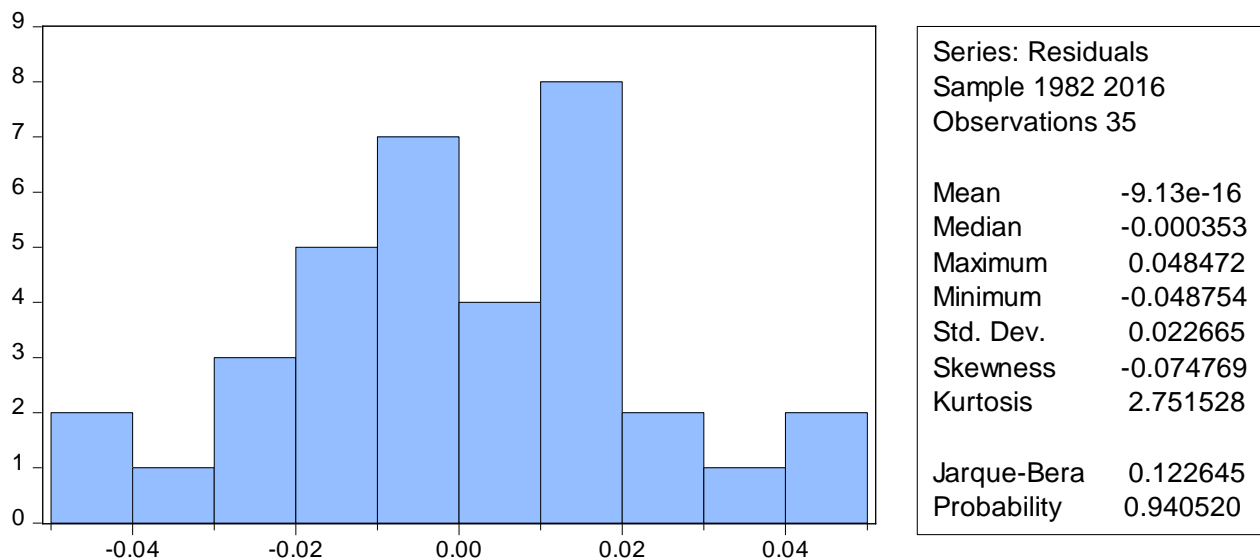
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From the Breusch–pagan-Godfrey Heteroskedasticity Test result shows that there is no the problem of heteroskedasticity i.e. probability value is greater than 5% .so; from this we accept the null hypothesis and reject the alternative hypothesis.

### 4.5.3 Normality test

The selected model should be normally distributed in order to say the model is good. To test normality Jarque bera test is considered and the null hypothesis stated that the residuals are normally distributed against the residuals are not normally distributed. From the graphical distribution of normality test below shows that the residuals are normally distributed. For the reason that, the p value associated with the Jaque-Berra normality test (0.940520) is higher than 0.05 we accept that the error term is normally distributed.

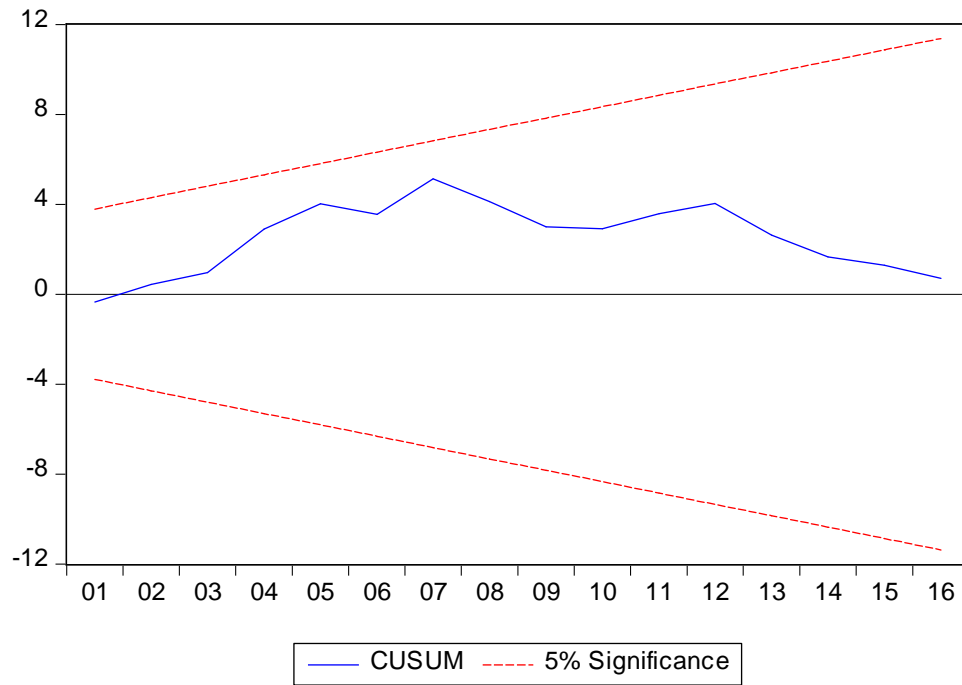
**Figure: 4.3. Normality Test**



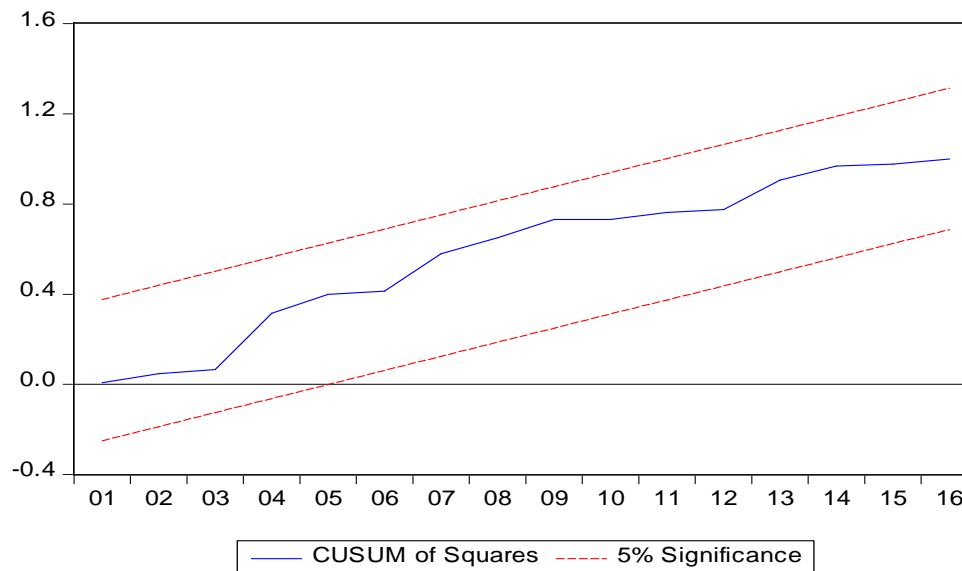
### 4.5.4. Stability test:

After the models is selected and have satisfied the above test the final test should considered is stability test. From the stability checking of Graphical Representation of cumulative sum and cumulative sum square graph shows below do not cross the lower and upper critical limits and it is generally with in the 5% significance level i.e. there is no structural breaks in the model during the sample period So, we can conclude that long and short runs estimates are stable. Hence the results of the estimated model are reliable and efficient.

**Figure:4.4. Stability testing by CUSUM**



**Figure:4.5. Stability testing by CUSUM Square**



#### 4.5.5. Ramsey's RESET test

As the test result indicates that we have not any evidence to reject null hypothesis of the Ramsey's test, which means that the model is correctly specified, all models F-statistics probability is greater than standard significant level of 0.05. Therefore, We could not reject the null hypothesis test for Ramsey's RESET test, which is used to test whether the model suffers from omitted variable bias or not.

#### Table:4.8. Ramsey's RESET test

Omitted Variables: Squares of fitted values

	Value	Df	Probability
t-statistic	1.253781	15	0.2291
F-statistic	1.571968	(1, 15)	0.2291

#### 4.6. Long-Run Model Estimation:

Based on the confirmation obtained from the unit root test about the absence of a variable which is integrated of order two, given the F statistic result which indicated the existence of long run co-integration among the variables and various diagnostic test checking for the reliability and efficiency of the model it is now possible to proceed to the estimation of the long run coefficients of the model. In doing so, the Akaike information criteria is chosen with two maximum lag order and found the ARDL (1, 2, 0, 1, 2, 2, 1, 2) equation.

The R-squared value of the estimated model smoothes 99.86 percent of the variation in GDP is substantially explained by the variables included in the model. The following table presents the results found after running the appropriate ARDL model to find out the long run coefficients. The figures in bracket are number of lag chosen by the model for each variable.

**Table:4.9. Estimated Long Run Coefficients using the ARDL Approach.**

ARDL (1, 2, 0, 1, 2, 2, 1, 2) selected based on Akaike Information Criterion (AIC)

Dependent Variables: LNRGDP

36 observations used for estimation from 1980 to 2016

Variables	Coefficient	St.error	t-statistics	Probability
LNTOP	-0.449375	0.133671	-3.361802	0.0040***
LNRGCF	0.185136	0.070517	2.625399	0.0184***
LNREM	0.116457	0.042709	2.726780	0.0149***
LNHC	0.485485	0.133724	3.630509	0.0022***
LNGOVEXP	0.151862	0.116429	1.304332	0.2106
LNEXCRATE	-0.036751	0.079513	-0.462203	0.6502
LNCPI	0.529759	0.131834	4.018367	0.0010***
C	3.648194	1.195065	3.052715	0.0076***
R-Squared	.9986	Durbin Watson stat.	1.8701	
Adjusted R- Squared	0.9970	Prob(F.Stat.)	0.0000	

*Source: Own computation(2018) from Eviews 9.5 ARDL (1, 2, 0, 1, 2, 2, 1, 2) model estimate result. \*, \*\* and \*\*\* indicates that the series are significant at 10, 5 and 1 percent respectively.*

In the above estimated long run model results show that all the variables which are entered in the model are significant in the long run at 1% significant level except LNGOVEXP and LNEXCRATE which are insignificant in the long run.

In connection with the coefficient of the variables real gross capital formation, personal remittance received, human capital and consumer price index have the expected result and signs and they have positive effects on economic growth with their respective significance levels all at 1% while, both government expenditure and exchange rate have expected positive and negative signs respectively on economic growth but their effect on economic growth is insignificant in the long run. The other unexpected and surprising results on this study are the result of trade openness which has negative and significant effects on economic growth.

The more discussion and interpretation of each variable result seems like the following;

The estimated coefficient of trade openness on the long-run relationship shows that negative and statistically significant impact on the economic growth at 1 percent. Figuratively speaking, a 1 percent increase in trade openness holding other things remains constant decreases economic growth by 44.9 percent. This might be due to the multiplier effect of the negative trade balance that the Ethiopian economy faces because of import dependent nature of the country. The other rational behind this result is a decline in export value due to vulnerability to international commodity price fluctuations and few commodity choices for export market leads the relationship between growth and trade openness negative in Ethiopia. One reason also may be that trade openness affects growth positively if the value of export as a result of the increase in production outweighs that of import but the fact implies that the economy is import dependent than export promoting.

The estimated coefficient of real gross capital formation on economic growth is positive and statistically significant at 1%. Figuratively speaking, a 1 percent increase in real gross capital formation holding other things remains constant increases economic growth at 18.5 percent. This result is consistent with different theoretical arguments and empirical studies. Gross capital formation is positively and significantly affected economic growth, this result is in-line with the theory of economic growth which states that capital formation is the major determinants of economic growth (Solow theory of economic growth in 1956). This result revealed that an increase in growth of real capital formation leads to an increase in economic growth in the long-run. This is due to the economic essence of investment is attached to capital formation and if there is the greater the production and employment of capital goods, the greater the capacity to produce goods and services and also a larger stock of capital goods will allow greater production, and greater production will generate potentially larger surplus to be saved in capital goods and as a result investment increases and it also increases economic growth.

The estimated coefficient of personal remittance received is one of the determinants for this study and it is the central idea for this study. The estimated long run coefficient for remittance shows that remittance has positive and significant effect on economic growth during the study period. Other things being unchanged, a 1 percent increase in remittance income leads to an

average of more than 11 percent boost in real GDP. What the finding suggests is that a significant portion of remittance inflows is directed to productive investments in the long run. In other words, remittance income is capable of inducing an increase in aggregate demand, leading to a rise in national output and subsequent increase in real income growth. The other reason for this result is that it increases national income if remittances are transferred through formal channels; Recipient countries gain creditworthiness in International credit markets and Recipient countries may stabilize national balance of payments accounts. This result is consistent with the finding of Mikias (2014) for Ethiopia, Fayissa and Nsiah (2008) for 37 African countries that remittances boost economic growth in countries where the financial systems are underdeveloped. Likewise, Giuliano and Ruiz-Arranz (2005) found a positive effect of remittances on growth, specifically for countries with lower financial development and also Huseyin (2015) for Turkey and Ahmad (2015) on evidence from Jordan found that remittances had positive impact on economic growth on the long run.

Primary school enrolment (proxy to measure human capital) is the other variable in this study that found positive and statistically significant at all probability level with positive impact on economic growth. Holding other things remain constant a one percent increase in primary school enrollment has resulted in 48 percent increase in real GDP. This can be explained by the fact that a highly skilled workforce promotes productivity and efficiency which in turn increases output. Besides, the recent huge expansion in education sector, particularly in primary education can be taken the reason behind the positive role of human capital on output in the long run. The result is in line with the outcome found by Mikias (2014) Fayissa and Nsiah (2008) where human capital is found to positively and significantly affecting output.

The consumer price index is one of the determinant variables for the study that impacts economic growth positively and statistically significantly at 1% level in the long run. Other things being constant a 1% increase in consumer price index increases economic growth by 52 percent. The reason behind this result is that an increase in the CPI represents an increasing cost of living, which is related to inflation. Inflation, as measured by an increase in the CPI, means that for example the government can sign contracts to pay employees or purchase materials in current dollars or birr and then pay them back in inflated dollar or birr; that is the amount of

dollar or birr now is more than the amount which pay you back with thus, this indicates that CPI increases government income and as a result it increase economic growth. As discussed in the above CPI increases sustained economic growth by mobilizing the resources of a country.

The estimated long run equation is as follows with figures in the parenthesis indicating calculated “t” values can be presented as follows:

$$\begin{aligned} \text{LNRGDP} = & 3.6482 - 0.449375\text{LNTOP} + 0.185136\text{LNRGCF} + 0.116457\text{LNREM} + \\ & (3.052715) \quad (-3.361802) \quad (2.625399) \quad (2.72678) \\ & 0.485485\text{LNHC} + 0.151862\text{LNGOVEXP} - 0.036751\text{LNEXCRATE} + 0.529759\text{LNCPI} \\ & (3.630509) \quad (1.304332) \quad (-0.462203) \quad (4.018367) \end{aligned}$$

#### **4.7. Short run dynamics: Error Correction Model.**

After confirming the existence of long run relationship of the variables and long run coefficient estimations the next task is checking estimation of error correction model which is the error correction representation of the long run model.

The term ECM indicate the speed of adjustment to restore equilibrium in the dynamic model and the coefficient of the ECM which should be both negative and statistically significant, shows how quickly the dependent variable converge to equilibrium.

The coefficient of error correction  $\text{CointEq}(-1)^*$  has negative sign and statistically significant at 1% level and indicating that there is evidence for the results of the bounds test for co-integration. The estimated coefficient for the error correction term is -0.90 showing that there high speed of adjustment to the long run equilibrium after the short run shock has been occurred. Therefore almost more than half of the disequilibrium caused by shocks in the previous period converges to the long run equilibrium.

Regarding the short run model’s goodness of fit, as the table 8 shows, the regression result imply that real gross domestic product is moderately explained by the explanatory variables

incorporated in the model. The R-squared reveals that 86% of the short-run variation in real gross domestic product is explained by the explanatory variable.

### **Table 4.10. ARDL Error Correction Regression**

ARDL (1, 2, 0, 1, 2, 2, 1, 2) selected based on Akaike Information Criterion

Dependent variable is dLNRGDP

35 observations used for estimation from 1980 to 2016

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNTOP)	-0.267318	0.053889	-4.960551	0.0001***
D(LNTOP(-1))	0.134473	0.046214	2.909827	0.0102
D(LNREM)	0.075219	0.016121	4.665999	0.0003***
D(LNHHC)	0.527428	0.087624	6.019234	0.0000***
D(LNHHC(-1))	0.509266	0.100604	5.062089	0.0001
D(LNGOVEXP)	-0.187517	0.049949	-3.754170	0.0017***
D(LNGOVEXP(-1))	-0.234719	0.064086	-3.662540	0.0021
D(LNEXCRATE)	0.370068	0.079085	4.679374	0.0003***
D(LNCPI)	0.133042	0.048103	2.765750	0.0138***
D(LNCPI(-1))	-0.238051	0.062866	-3.786655	0.0016
CointEq(-1)*	-0.900300	0.092214	-9.763169	0.0000***
R-SQUARED=0.861983				
Adjusted R-Squared=0.804476				
Durbin –Watson stat=1.870142				

*Source: Own computation (2018) from Eviews 9.5 out put*

As table 8 reveals that like the long run model, in the short run personal remittance received has significant and positive effect on output growth for the period under consideration. Despit that the elasticity coefficient of remittance 0.11 in the long run is greater than 0.075 in the short run. The reason for positive result of remittance is that it Boost local economies by stimulating

consumption, demand for local goods or services, fostering job creation; Potentially increase local capital to be reinvested in businesses; Afford basic needs (food, healthcare, education, housing); Face risks (unemployment, disability, accidents, illness); Afford social/family events (town festivities, weddings, funerals); strengthen social networks; gain prestige, power and resources (social or material advantages).

Another interesting result like long run results in the short run model is positive and significant effect of human capital which is proxy for gross primary school enrollment on the output. The reason behind this might be that the know a day's students may used half day for learning and half day for other profitable business related works which increases the house hold incomes and country's economy.

Unlike the long run result the government expenditure in the short run have negative and significant impacts on economic growth. As the result in the short run indicates that government expenditure affects economic growth negatively .The reason behind this may be that the government expenditure is spent on unproductive sector and is particularly characterized by its wasteful nature in the short run. The other reason behind the negative impacts of government expenditure on economic growth may be that the return from spending on roads, educations, health care, social security benefits, infrastructure and defense activity may not be effectively used and the return from those investments may not be as much as the government expect in the short run because it takes a lot of times to show the exact effect of government expenditure on economic growth. The other reason for the short run effect may be is the government spending on consumption affects growth negatively.

An interesting and unexpected result from the short run model is the positive and negative sign of trade openness including its one period lag, which are both significant. Trade openness is one of other determinant variable which affects economic growth negatively in both long run and short run. This shows that, holding other things remain constant a one percent increase in trade openness has 26 percent decreases in economic growth. The reason behind this is that as we know trade openness means that it is the sum of import plus export as percentage of real GDP. Thus, in my opinion in the short run there may not be import and export which affects significant positive impacts on output. The other reason is in the short run firm who import and export items

may not be profitable due to financial instability on their business and the benefits of international trade are mainly derived from the external environment , appropriate trade strategy and structure of trade patterns thus, in the short run there may not be good external environment, appropriate trade strategy and there may not be well organized structure of trade patterns as a result trade openness affects economic growth negatively.

The other significant and positive sign determinant of economic growth in the short run is exchange rate. As shown in the table above holding other things remain constant a one percent increase in official exchange rate has 37 percent increases in economic growth. The reason behind positive impact of exchange rate on economic growth in the short run is that as countries exchange rate increases the country may appreciate foreign investors who invest in home country with cheap investment cost and there may be a lot of exporter from abroad with cheap price and can sell in our county with expensive price as a result this increases output of the country.

The last but not the least determinant variable in the short run model in this study is consumer price index. This shows that, holding other things remain constant a one percent increase in consumer price index increases output by 13.3 percent at 1% significance level. The rationale behind this result is that moderate inflation which is measured by consumer price index is an inevitable consequence of sustained economic growth and it can enhance economic growth by mobilizing the resources of a country.

As the long run effect can be captured by ECM term, therefore, it can be concluded that in the long run LNTOP, LNREM, LRGCF, LNHC, and LNCPI granger cause LNRGDP. This further confirms causality run interactively through ECM from the explanatory variables to LNRGDP. The following table shows the results from Granger Causality test.

**Table: 4.11.Granger Causality Test Results**

<b>Null Hypothesis:</b>	<b>Obs.</b>	<b>F-Stat.</b>	<b>Prob.</b>
LNREM does not Granger Cause LNRGDP	35	7.31302	0.0026***
LNRGDP does not Granger Cause LNREM		2.21828	0.1263

*Source: Own computation (2018) from E-views 9.5 output result.*

As the granger causality test results shows that there is unidirectional causality between remittance and economic growth. Therefore we reject the null hypothesis of LNREM does not Granger Cause LNRGDP at 1% level of significance (0.0026 is less than 0.05). However, since the probability (0.1263) is greater than 0.05, we fail to reject the null hypothesis of LNRGDP does not Granger Cause LNREM in the second scenario which means that there is no causality which runs from LNRGDP to LNREM.

## CHAPTER FIVE

### CONCLUSION AND POLICY IMPLICATIONS

#### 5.1. Conclusion

The objective of this paper was to investigate the impact of remittance on economic growth using a sample of time series data on Ethiopia from 1980-2016 by collecting data from national bank of Ethiopia, MoFED, Ethiopian Economic Association ,World Bank (WB) database and World Development Indicators (WDI). The econometric part of this study had employed the more recently developed autoregressive distributed lag model or bound test approach. The small sample size of the data and the mixed order of integration of the variables under the study are the justifications for applying this model. The model is adopted to investigate the existence of short run and long run relationship between LNRGDP which is used as dependent variable and LNTOP, LNRGCF, LNREMG, LNHC, LNGOVEXP, LNEXCRATE and LNCPI which are the independent variables. The result of the econometric analysis indicated that there is a long run relationship between economic growth and the explanatory variables. The augmented dickey Fuller and Phillips- Perron test was undertaken to stationary test and all the variables are stationary at first difference.

Regarding LNREM, the result confirmed that it affects growth positively and significantly in both long run and short run. On top of that, the causality test applied had showed that there is uni directional causality which runs from LNREM to LNRGDP.

The result of LNTOP affects economic growth negatively and significantly in both long run and short run. This might be due to the multiplier effect of the negative trade balance that the Ethiopian economy faces because of import dependent nature of the country. The other rational behind this result is a decline in export value due to vulnerability to international commodity price fluctuations and few commodity choices for export market leads the relationship between growth and trade openness negative in Ethiopia. One reason also may be that trade openness affects growth positively if the value of export as a result of the increase in production outweighs

that of import but the fact implies that the economy is import dependent than export promoting. The other reason for negative sign of openness on economic growth could be due to trade is more likely based on imports of consumption goods. The other important variable in this study is gross fixed capital formation which impacts economic growth positively and significantly on long run. The rationale behind this is the role of investment is a vital one. The economic essence of investment is attached to capital formation and if there is the greater the production and employment of capital goods, the greater the capacity to produce goods and services and also a larger stock of capital goods will allow greater production, and greater production will generate potentially larger surplus to be saved in capital goods and as a result investment increases and saving increases and it also increases economic growth.

LNGOVEXP have also found to positive and insignificantly affecting growth in the long run and have negative and significant impact on the short run. The reason behind this may be that the government expenditure is spent on unproductive sector and is particularly characterized by its wasteful nature in the short run

The surprising result that the study has is the result of LNHC which is the proxy for gross primary school enrollment and it have found to positive and significant impact on economic growth in both long run and short run. This can be explained by the fact that a highly skilled workforce promotes productivity and efficiency which in turn increases output. Besides, the recent huge expansion in education sector, particularly in primary education can be taken the reason behind the positive role of human capital on output in the long run.

LNEXCRATE have found negative and statistically insignificant impacts on growth in the long run and significantly and negatively in the short run. Finally, the results of the study have revealed that consumer price index impacts economic growth positively and significantly both in long run and short run. This is because consumer price index is an inevitable consequence of sustained economic growth and it can enhance economic growth through inflation by mobilizing the resources of a country.

## 5.2. Policy Implications

Based on the findings of the study, the following recommendations for policy makers and other concerned bodies were forwarded:

In particular to the remittance, as the study showed it has a positive role in promoting growth both in the long run and short run. Hence, in order to sustain this role the issue is that the financial sector should be further modernized in terms of remittance products provided and through branch expansion in addressing wide range of customers and through giving special treatment to the receivers of remittance in formal ways by sending loto numbers on their mobile that awards them . Moreover, government, banks, and remittance service providers should work collaboratively in diverting the remittance flow through the informal channel towards the formal way, through decreasing the transaction cost of transferring the remittance through formal channel, so that the economy will be able to extract benefit of remittance to economic growth in a better way. The finding of this study also suggests that international migration of labor has substantial potential benefits for poor people in developing countries like Ethiopia. Finally, Ethiopian government should make policies that encourage and motivate the inflow of remittances through proper channel because some remittances are still sent through informal channels. Ethiopia should utilize these inflows of remittances efficiently for economic growth and development.

In relation to the impact of trade openness on economic growth has found negative impact in the long run in connection with this to remove the negative impact of trade openness on economic growth the government of Ethiopia should make conducive environment for international trade which are mainly derived from the external environment , appropriate trade strategy and structure of trade patterns thus, in the long run the government of Ethiopia should make appropriate trade strategy and trade structure that remove the negative multiplier effect of trade balance that Ethiopian economy faces because of import dependent nature of the country and the government of Ethiopia should make large commodity choices for export markets.

The government of Ethiopia should make policies which appreciate gross domestic saving and gross domestic investment which makes gross capital formation good and as well as economic growth to grow and also the government has to create a more investment-friendly environment

both for domestic and foreign investors so that the capital stock and, hence, the production capacity of the country will improve. This could also improve the efficiency of the country as a whole as private investments are more efficient than public investments due to competition driven by profit motive. Regarding the role of human capital on economic growth the education sector should be further strengthened both in terms of coverage and quality. This is because; the output of the sector has a direct implication in human capital formation and hence economic growth.

### **5.3. Area for Future Research**

To examine the impact of international remittance and economic growth in Ethiopia there are other determinants factors that affect Economic growth in Ethiopia (i.e. labor force, foreign direct investment, inflation and population) that could not included in this study, because the inclusion of these variables may give another insights about the impact of international remittance and economic growth in Ethiopia . Moreover, the use of the economic growth indicators those used in this study may not show the full direction of economic growth. So for the future area of research the inclusion of the above untouched variables on this study may more show the full direction for future researchers.

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## APPENDIXES

*Appendix 1; the estimated unrestricted ARDL model (1,2,0,1,2,2,1,2) after selecting maximum lag for the model.*

*Dependent variable: LNRGDP*

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNRGDP(-1)	0.099700	0.204129	0.488415	0.6319
LNTOP	-0.267318	0.097428	-2.743747	0.0144
LNTOP(-1)	-0.002780	0.093138	-0.029851	0.9766
LNTOP(-2)	-0.134473	0.083859	-1.603560	0.1284
LNRGCF	0.166678	0.067949	2.452980	0.0260
LNREM	0.075219	0.028007	2.685749	0.0162
LNREM(-1)	0.029627	0.019943	1.485568	0.1568
LNHC	0.527428	0.186286	2.831272	0.0120
LNHC(-1)	0.418921	0.220328	1.901353	0.0754
LNHC(-2)	-0.509266	0.178656	-2.850538	0.0116
LNGOVEXP	-0.187517	0.094370	-1.987047	0.0643
LNGOVEXP(-1)	0.089519	0.076281	1.173549	0.2578
LNGOVEXP(-2)	0.234719	0.096222	2.439351	0.0267
LNEXCRATE	0.370068	0.124363	2.975715	0.0089
LNEXCRATE(-1)	-0.403156	0.141169	-2.855837	0.0114
LNCPI	0.133042	0.112622	1.181320	0.2547
LNCPI(-1)	0.105848	0.090085	1.174980	0.2572
LNCPI(-2)	0.238051	0.107333	2.217874	0.0414
C	3.284469	1.321502	2.485406	0.0244
R-squared	0.998624	Mean dependent var	12.33565	
Adjusted R-squared	0.997076	S.D. dependent var	0.611020	
S.E. of regression	0.033039	Akaike info criterion	-3.679288	
Sum squared resid	0.017465	Schwarz criterion	-2.834956	

Log likelihood	83.38754	Hannan-Quinn criter.	-3.387825
F-statistic	645.1494	Durbin-Watson stat	1.870142
Prob(F-statistic)	0.000000		

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\*Note: p-values and any subsequent tests do not account for model selection.

### ***Appendix 2: Long Run Auto Regressive Distributed Lag Coefficient Estimation Result***

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Levels Equation

Case 2: Restricted Constant and No Trend

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNTOP	-0.449375	0.133671	-3.361802	0.0040
LNRGCF	0.185136	0.070517	2.625399	0.0184
LNREM	0.116457	0.042709	2.726780	0.0149
LNHC	0.485485	0.133724	3.630509	0.0022
LNGOVEXP	0.151862	0.116429	1.304332	0.2106
LNEXCRATE	-0.036751	0.079513	-0.462203	0.6502
LNCPI	0.529759	0.131834	4.018367	0.0010
C	3.648194	1.195065	3.052715	0.0076

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*Appendix 3: Long Run bounds co-integration result*

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		Null Hypothesis:	No levels		
F-Bounds Test		relationship			

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Test Statistic	Value	Signif.	I(0)	I(1)	
F-statistic	7.060701	10%	1.92	2.89	
K	7	5%	2.17	3.21	
		2.5%	2.43	3.51	
		1%	2.73	3.9	

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**Appendix 4: short Run error correction result**

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ECM Regression

Case 2: Restricted Constant and No Trend

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNTOP)	-0.267318	0.053889	-4.960551	0.0001
D(LNTOP(-1))	0.134473	0.046214	2.909827	0.0102
D(LNREM)	0.075219	0.016121	4.665999	0.0003
D(LNHC)	0.527428	0.087624	6.019234	0.0000
D(LNHC(-1))	0.509266	0.100604	5.062089	0.0001
D(LNGOVEXP)	-0.187517	0.049949	-3.754170	0.0017
D(LNGOVEXP(-1))	-0.234719	0.064086	-3.662540	0.0021
D(LNEXCRATE)	0.370068	0.079085	4.679374	0.0003
D(LNCPI)	0.133042	0.048103	2.765750	0.0138
D(LNCPI(-1))	-0.238051	0.062866	-3.786655	0.0016
CointEq(-1)*	-0.900300	0.092214	-9.763169	0.0000

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R-squared	0.861983	Mean dependent var	0.055665
Adjusted R-squared	0.804476	S.D. dependent var	0.061008
S.E. of regression	0.026976	Akaike info criterion	-4.136431
Sum squared resid	0.017465	Schwarz criterion	-3.647607
Log likelihood	83.38754	Hannan-Quinn criter.	-3.967689
Durbin-Watson stat	1.870142		

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\* p-value incompatible with t-Bounds distribution.