



**ST. MARRY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES**

**DETERMINANTS OF ECONOMIC GROWTH IN ETHIOPIA:
A TIME SERIES ANALYSIS**

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**Determinants of Economic Growth in Ethiopia:
A Time Series Analysis**

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DEVELOPMENT ECONOMICS**

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Addis Ababa, Ethiopia

DECLARATION

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

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ACRONYMS AND ABBREVIATIONS

ADF	Augmented Dickey Fuller
AIC	Akaike Information Criteria
ARDL	Autoregressive Distributed Lag
EAC	East African Community
ECM	Error Correction Method
EEA	Ethiopian Economic Association
EPDRF	Ethiopian Peoples of Democratic Republic Front
FDI	Foreign Direct Investment
GCF	Gross Capital Formation
GDP	Gross Domestic Product
GDPPC	Gross Domestic Product per Capital
GMM	Generalized Methods of Moments
GNI	Gross National Income
GNP	Gross National Product
GPI	Genuine Progress Indicator
GTP	Growth and Transformation Plan
H-D	Harrod- Domar
HDI	Human Development Index
IMF	International Monetary Fund
LAC	Latin America and the Caribbean's
LM	Langragian Multiplier
MOFED	Ministry of Finance and Economic Development.
NBE	National Bank of Ethiopia
NDI	Net Domestic Income
NDP	Net Domestic Product
NI	National Income
NNI	Net National Income
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least square
PP	Phillips - Perron

PWT	Penn World Table
R& D	Research and Development
RGDP	Real Gross Domestic Product
SSA	Sub Saharan Africa
SSE	Secondary school Enrolment
TPF	Total factor productivity
UNCTAD	United Nation Conference on Trade and Development
VEC	Vector Error correction
WB	World Bank
WDI	World Development Indicator

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ABSTRACT

The purpose of this study is to investigate the major determinants of economic growth in Ethiopia from the period 1974 to 2015. Descriptive statistics and time series econometrics are used in the model to analyse the data. The study employs an Autoregressive Distributed Lag (ARDL) bound test model to co-integration in order to investigate the long run relationship and Error Correction Model (ECM) for short-run relationship between growth of real GDP and gross capital formation, human capital, export, foreign aid, external debt, inflation rate, labor force and financial sector development. The long-run empirical result using the bound test reveals that there is a stable long run relationship between growth of real GDP and its determinants. Gross capital formations (gross fixed investment), human capital (expenditures on education and health, inflation and labor force) have a positive significant impact on the growth of real GDP during the study period while external debt has a negative significant effect. However export and foreign aid have insignificant impact on the long-run with unexpected sign. The financial sector development (broad money supply (M2) as a percentage of GDP) is insignificant with expected sign. The short-run dynamic results show that gross capital formation, human capital and inflation rate have also positive impact on the growth real GDP while foreign aid has negative significant effect. Finally the coefficients of equilibrating Error Term (ECM) suggests that the speed of adjustment (feedback effects towards the long run equilibrium) takes few years for full adjustment when there is a shock in the system. In order to sustain long run growth the government or policy makers should design appropriate policies that results in the efficient use of resources contributing to economic growth and proper management of variables resulting to negative growth (external debt and foreign aid) in order to reverse their effect on output.

Key Words: *Ethiopia, Economic Growth, ARDL, Bound test, ECM, Determinants*

1. INTRODUCTION

1.1. Background of the Study

Finding the best way to boost the economic activity is the subject of intense debate in most of the countries in the world. A nation's ability to provide improving standards of living for its people depends crucially on its sustainable and long-run rate of economic growth. Hence economic growth is one of the most important issues that have received extensive attention in international political economy and one of the major goals of all countries (Mostafa, 2010). So understanding the determinants of growth is not only important from the policy perspective but also is the key component for macro management. It is determined by internal as well as external macro variables of an economy such as investment, employment, money supply, general price level, fiscal deficit, Level of export, foreign capital etc. (Biswas and Kumar, 2014).

Despite the lack of unifying theory, there are several partial theories that discuss the role of various factors in determining economic growth. Two main strands can be distinguished. The first is neo-classical based on Solow's growth model showed that the main sources of economic growth are factor accumulation and total factor productivity. The second is the more recent theory of endogenous growth theory developed by Romer (1986) and Lucas (1988) has drawn attention on human capital and innovation capacity (Arvantids *et al*, 2007).

Ethiopia has passed through three politically distinct regimes with different policy reforms and various changes in economic growth since 1930: The imperial Government (1930-1974), The Derg Regime (1974-1991) and the existing government (1991-present). In the imperial regime (1930-1974) the government established three consecutive five year plans over the period 1957-1974. The first five year plan (1957-1963) focused on industrialization and infrastructural development giving due attention to industries producing light consumer goods for domestic consumption. The second five year plan (1963-1968) was launched with the objectives of building heavy industries that produce chemicals and metals this time shows growth accompanied by increased investment, exports and employment however these two plans ignore agriculture which finally leads to failure. The other was the third five year plan (1969-1974) which favors commercial agriculture and industries. This plan did not give satisfactory result because of poor performance of agriculture and resource

mobilization as well as high domestic transportation cost and natural disasters which leave the economy without transformation (Zerayehu, 2013). The GDP at constant factor cost has grown by 4.6%, 3.8% and 1.9% during 1953-59, 1960-65 and 1966-73 periods, respectively (Alemayehu, 2001).

During the Derg regime, the general growth rate of GDP was 1.6%. During the period 1974-1978 the growth rate was 0.4 due to the civil war and the instability. In 1979-83 growth rate rose to 4.2% - a period characterized by relatively stable and good weather conditions. In 1984-85 growth plummeted to -5.3%. These were periods of severe drought. This rate picked up to 7.9% in 1986-87, only to decline back to 1% and the average per capital GDP growth rate is -2.3% in 1988-89. This was because of intensive internal war that takes place in Ethiopia in order to overthrow the government and to retain power by the ruling government. However, Ethiopia experienced very high growth rate during the Derg regime between the periods of 1986-87 which was 7.9% per annum. This achievement is because of best rains season at the time (Alemayehu, 2001).

Ethiopia began to see accelerated economic progress in 1992 and it shifted to an even higher gear in 2004. Real GDP growth averaged 11.2% per annum during 2003/04 and 2008/09 period, placing Ethiopia among the top performing economies with a double digit in sub-Saharan Africa (SSA). It has experienced impressive growth performance over the last decade with average GDP growth rate of 11% which is about double of the average growth for SSA (NBE, 2013). More recently, Ethiopia has been one of the fastest growing non-oil dependent countries in Africa. It has made remarkable progress in its economic growth, with real GDP growth averaging 10.9% in 2004-2014 (WB, 2016). Notwithstanding the worst drought, Ethiopia registered 8.0% real GDP growth rate in 2015/16 which was much higher than 1.4% average for SSA. The economic growth was broad based with industry growing 20.6% service 8.7% and agriculture 2.3% (NBE, 2015/2016). However Ethiopia needs to modernize the policy framework to further strengthen the foundations of its economy and to achieve its broader goal of becoming a lower middle income country by 2025.

Generally Ethiopian economic history is characterized by ups and downs of economic performance owing to different regimes of ruling governments and their associated policies and objectives for what the government set policies. This can be the reason for the low level of living standards that the present Ethiopia is encountering. So the study of economic

growth and their determinants is interesting and hot phenomena that is to be addressed to have high level of potential growth that lifts out the society from poverty.

The main objective of this study is to investigate the determinants of economic growth in Ethiopia from 1974 to 2015 by using a time series data obtained from different secondary sources. Both descriptive statistics and time series econometrics are used in the model to analyse the data. The study employs an Autoregressive Distributed Lag (ARDL) bound test model to co-integration in order to investigate the long run relationship and Error Correction Model (ECM) for short-run relationship between growth of real GDP and gross capital formation, human capital, export, foreign aid, external debt, inflation rate, labor force and financial sector development. The result reveals that gross capital formation, human capital and general inflation rate have a positive significant effect on economic growth of Ethiopia in both the long run and short run dynamics. Labor force and external debt have a positive and negative effect respectively on it in the long run but both are insignificant in the short run with their expected signs. The study also finds that foreign aid has a negative significant effect on growth of real output in Ethiopia in the short run and negative insignificant effect on it in the long run. However, both in the long run and short run export and financial sector development are insignificant with negative and positive signs respectively.

1.2. Statement of the Problem

Nowadays the diverse economic growth patterns are very common in the world. The process of economic growth and the source of differences in economic performance across nations are some of the most interesting, important and challenging areas in modern social science. So the sources of economic growth is a question of great importance concern for many economists, politicians and policy makers who are interested to know and search for factors enabling some countries to grow and develop while others are suffering from abject poverty (Tewodros, 2015).

The Ethiopian economic growth is characterized by mixed, erratic and averagely poor performance exhibiting positive and negative real GDP growth rates. For example it shows a negative growth rates seven times between 1981 and 2010 (WB 2011). This shows it has been moving back and forth owing to different factors. On the other hand, official report on growth poverty and inequality show that Ethiopia has registered a two digit rate of economic growth in the last decade and has made immense progress in poverty reduction. Many

suspect that the current unprecedented high growth rate is attributed to a combination of pro poor growth policy (since 2003 onwards) and state led development program (since 2005 onwards) (Zerayehu, 2013).

Added to the lowest living standard this stochastic growth is the main problem in Ethiopia. Unless solved, Ethiopia have no any guarantee not to encounter the problems that it has faced in the last three regimes as far as the growth of the economy is concerned. This premise is evidenced by the growth patterns that the nation came across in the last four decades. So research is mandatory on what affects the Ethiopian economic performance over the past periods and what is injected to the promising that, the Ethiopian economy is performing well in the last decade as compared to the past. However some argue that even this growth rate is not enough for small country like Ethiopia to achieve the intended objectives of joining middle income countries and above all lifting the society out of poverty.

There are a number of studies which have examined the determinants of economic growth in many countries around the world. For instance, Barro (2003) for panel countries, Ndambira *et al.* (2012) for SSA, Hui *et al.* (2015) for Singapore, Adhiambo & Were (2015) for East African Community, Permani (2008) for East Asia, Loayza *et al.* (2004) for Latin America and the Caribbean, Mostafa (2010) for Egypt, Pitia (2015) for Sudan, Mbulawa (2015) for Zimbabwe, Patrick Enu *et al.* (2013) for Ghana, Biswas & Kumar (2014) for India, and Mamoundou (2011) for Japan etc. through different methods of analysis at different time by using different determinants of economic growth.

With regard to Ethiopia several studies have been undertaken on economic growth. But these researches are done mostly on impact of one or two variables on economic growth in different time periods rather than examining potential determinants or source of economic growth as general. However, Tadesse (2011) used an aggregate Cobb-Douglas production function and OLS regression analysis to compute the growth contributions of capital, labor and technical progress for Ethiopian economic growth. He found capital labor ratio had positive effect on economic growth in short run as well as long run in Ethiopia during 1981-2009.

Tewodros (2015), in his research model from 1974 to 2013, found that physical capital and human capital had a significant positive relationship with economic growth while external

debt had a significant negative effect on it. He also found export of goods and service, foreign aid and inflation had insignificant effect on economic growth in the long run. However, in his study he did not include some determinants which are area of recent interests in Ethiopian economic growth like labour force and financial sector development. Therefore, the inclusion of such pertinent variables on the model will contribute to the theory. In addition to that much is not done on the determinants of economic growth in Ethiopia as compared to other parts of the world. So it is difficult to generalize the findings of other economies to Ethiopian economy since Ethiopian has different social, political economic and institutional setup that distinguishes it from other countries. This shows that there is mixed evidence on the driving forces of economic growth on one hand and lack of exhaustiveness in at least the main determinants on the other hand. So the researcher is going to analyse the main macroeconomic determinants of economic growth by being exhaustive as much as possible and including the basic factors believed to affect growth like labour force and financial sector development by mixing with the variables used in the past research. A continuous and multi-disciplinary rigorous study is also required to take the policy implications seriously as relevant to Ethiopia. Therefore this study tried to provide a comprehensive more recent evidence to identify the main macroeconomic determinants of economic growth in Ethiopian during the period of 1974-2015 to disprove the main theories related to the issue or to conform it.

1.3. Research Questions

The study critically investigates the following questions regarding to the determinants of economic growth.

- ❖ What are the determinants of economic growth in Ethiopia?
- ❖ Is there a long run and short run relationship between economic growth and its determinants?

1.4. Objective of the Study

1.4.1. General Objective of the Study

The main objective of this study is to provide a comprehensive study and critical overview of the macroeconomic determinates of economic growth in Ethiopian between the periods 1974 to 2015.

1.4.2. Specific Objectives of the Study

The specific objectives of this study are:

- to examine the major macroeconomic determinants of economic growth in Ethiopia
- to analyse the long run and short run relationship between the growth of real GDP and its determinants.

1.5. Significance of the Study

The study gives a modest contribution to the body of empirical knowledge by identifying the potential macroeconomic determinants of real economic growth in Ethiopia. It provides important contribution for different stake holders like researchers, Policy makers, government, scholars or academicians, etc. as an input for the purpose they intended to use. In doing so it serves as a good base for the researchers, scholars or academicians who want to do further research on this area in Ethiopia or elsewhere. By developing a conceptual framework regarding the relationship between growth of real GDP and explanatory variables, this research contributes to the current literature in Ethiopia. The research also use as policy recommendation for policy makers if believed to be important for their purpose to formulate effective policy. It is believed to provide relevant information for policy makers in considering areas of intervention to promote economic growth. Knowing the direct relationship between growth and its determinants is not sufficient by itself, however if proper policy is to be formulated the information is going to play a vital role for designing proper policy and fill the knowledge gap. Moreover, the study may benefit government and other economic agents by providing relevant information regarding the main areas that will be focused to accelerate the current economic practices and drawing lessons.

1.6. Scope and Limitation of the Study

1.6.1. Scope of the Study

The geographical scope of the study is delimited to the political boundary of Ethiopia. It considers only the main macroeconomic factors that affect economic growth in Ethiopia. Therefore, areas and countries other than this boundary are not the subject of this study and it only covers from the period 1974-2015 (Derg regime and EPRDF regime) which consists forty two years of time-series data from different sources on macroeconomic variables that can affect economic growth in Ethiopian because of the limitation of data before 1974. The

variables used in this study include one dependent and eight independent variables. The dependent variable representing growth of real GDP and the eight explanatory variables namely physical capital, human capital, export, foreign aid, external debt, inflation rate, labour force, and financial sector development .

1.6.2. Limitation of the Study

In the process of conducting this research, the researcher has encountered some problems which have an adverse effect on the output, quality and efficiency of this research. The first greater challenge of this study is the one associated with data availability. There is a shortage of data on some variables like foreign direct investment in which the researcher will hope to add it but it is not included in the model. The second challenge while doing this study is the inconsistency of data from different organizations. So as to avoid such inconsistency attempts were made to stick to the same source of data as much as possible. Even the data that are found in the same source is not consistent over time. Thirdly, the main aim of this study is to analyse the macroeconomic determinants of economic growth. However there are also non-economic factors that affect growth like political stability, institutional factors, rules of economic regulations (monetary and fiscal policies) and rules of law (property right) and even economic factors like public service and infrastructural development is not addressed in this study.

1.7. Organization of the Thesis

The paper consists of five chapters with different sections and sub sections. The rest of the paper is organized as follows: the second chapter presents the theoretical and empirical literature reviews related to economic growth. Chapter three gives insight on the methodological aspect of the study which includes source and type of the data used, model specification, estimation procedure and definition of the variables. Chapter four consists of both descriptive and econometric results. It discusses the regression results, main findings and interpretation. Finally, chapter five provides the conclusion and policy recommendation based on the main findings.

2. LITERATURE REVIEW

2.1 Theoretical Literature Review

2.1.1. Definition and Main Concept of Economic Growth

Economic growth is synonym of production of goods and services, creation of jobs and wealth. It is conventionally measured with the percentage of increase in gross domestic product (GDP). Therefore, GDP shows the total market value or monetary value of all finished goods and services produced in a country borders in a specified time period and calculated on annual basis. Measurement of economic growth uses national income accounting. Economic growth typically refers to growth of potential output. It is used as indicator of economic health of a country and also gauges a country's standard of living (Song 2006). It is clear that economic growth is not a panacea for the country's problems, but it facilitates the implementation of public policies that complement the shortcomings of growth. In short the growth is a necessary condition but not sufficient to ensure social welfare (Mamoudou, 2011).

On the other hand, economic development refers to economic growth gone with an improvement in the material well-being of the poor; a decline in agricultures share of national output; increase in the output share of industry and services; an increase in the education and skills of the labor force; and technical advances originating within the country. The economic achievements lead to the improvement of the standard of life, adequate conditions of medical care, improvement of the educational system and a better redistribution of incomes (Muhedin, 2016).

Economic growth can be positive, zero or negative. Positive economic growth is recorded when the annual average rhythms of the macro-indicator are higher than the average rhythms of growth of the population. When the annual average rhythms of the macro-economic indicators, particularly GDP are equal to those of the population growth, we can speak of zero economic growth. Negative economic growth appears when the rhythms of population growth are higher than those of the macro- economic indicators. Economic growth is a complex, long-run phenomenon, subjected to constraints like: excessive rise of population, limited resources, inadequate infrastructure, inefficient utilization of resources, excessive governmental intervention, institutional and cultural models that make the increase difficult, etc. It is obtained by an efficient use of the available resources and by

increasing the capacity of production of a country. It facilitates the redistribution of incomes between population and society. The cumulative effects, the small differences of the increase rates, become big for periods of one decade or more. It is easier to redistribute the income in a dynamic, growing society, than in a static one. There are situations when economic growth is confounded with economic fluctuations. The application of expansionist monetary and tax policies could lead to the elimination of recessionary gaps and to increasing the GDP beyond its potential level. Economic growth supposes the modification of the potential output, due to the modification of the offer of factors (labour and capital) or of the increase of the productivity of factors (output per input unit). When the rate of economic growth is big, the production of goods and services rises and, consequently, unemployment rate decreases, the number of job opportunities rises, as well as the population's standard of life (Petronella, 2012).

There are different measures of national accounts of a certain economy. Some of these are (1) GDP, (2) Gross national income (GNI): GDP plus primary income of residents from the rest of the world minus primary income of non-residents from the economy. (3) Net Domestic Product (NDP): GDP minus depreciation. (5) Net Disposable Income (NDI): net national income at market prices minus taxes. However, most economies used GDP to measure their national accounts (Mankiw, 2010).

There are three methods of measuring GDP: the expenditures approach, the income approach, and the production value-added approach. The expenditures approach measures GDP as the sum of all expenditures involved in taking that total output off the market, while the income approach measures GDP (wages, salaries and supplements, gross operating surpluses, gross mixed income and indirect taxes less subsidies). The production value-added approach differs from the two other methods in that it estimates GDP by taking into consideration the contribution of each economic unit (value-add) by estimating the value of the output of goods and services after the value of inputs used in its production is subtracted. Therefore to calculate GDP using this approach, the gross value-added value of output is added to taxes associated with the product minus subsidies on the product. The most common method of measuring GDP is with the expenditures approach in which GDP is calculated by summing consumer purchases of goods and services, gross investment spending by businesses, government purchases of goods and services and net exports in an open economy. Mathematically it is presented as follows:

$$\text{GDP}_t = C_t + I_t + G_t + (X_t - M_t)$$

Where:

GDP_t = value of gross domestic product at time t ;

C_t = value of private household consumption at time t ;

I_t = value of private investment at time t ;

G_t = value of government expenditure at time t ;

X_t = value of export at time t ; and

M_t = value of import at time t (Heijdra, 2002).

2.1.2 The Stylized Facts of Growth

A convincing theory of economic growth obviously needs to be consistent with the stylized facts of growth that have emerged from historical experience. It was Kaldor (1961) who first set out what he considered to be the main empirical observations with which any growth theory needed to be consistent. According to Kaldor (1961), a satisfactory theory of economic growth would be able to explain the following six stylized facts by which we mean results that are broadly observable in most capitalist countries. The firstly stylized fact states that output per worker shows continuing growth “with no tendency for a falling rate of growth of productivity”. Secondly, capital per worker shows continuing growth. The third stylized fact describes that the rate of return on capital is steady. Fourthly, the capital-output ratio is steady. The fifth stylized fact says Labour and capital receive constant share of total income and finally, there are wide differences in the rate of productivity growth across countries (Heijdra, 2002).

Note that not all these stylized facts are independent. For instance, the first and fourth stylized facts are easily seen to imply the second stylized fact. In a similar fashion, stylized facts four and five imply stylized fact three. Hence, the stated facts are fundamental. Romer (1989) argues that there is evidence which leads him to disbelieve the fifth stylized fact, but the remaining facts can be considered stylized even four decades after Kaldor's original claims. Romer (1989) also suggests another five more stylized facts that growth theorists should be able to explain. According to him the first stylized fact states that in cross-section,

the mean growth rate shows no variation with the level of per capita income. The second is that the rate of growth of factor inputs is not large enough to explain the rate of growth of output; that is, growth accounting always finds a residual. Thirdly, Growth in the volume of trade is positively correlated with growth in output. The fourth stylized fact states population growth rates are negatively correlated with the level of income. The last stylized fact explains both skilled and unskilled workers tend to migrate towards high-income countries. Jones (2001) also adds the other three stylized facts. Those are: (1) there is enormous variation in income per capita across countries. (2) Growth rates for the world as a whole and for individual countries vary substantially over time. (3) The relative position of any country in world distribution of income can change (Snowdon and Vane, 2005).

2.1.3. Theories of Economic Growth

Nowadays, the issues of economic growth are very topical and an overview of these issues is necessary to start from the earliest concepts and theories that stood at the origins of the modern theories of economic growth. The main concepts and theories of economic growth are presented in chronological order.

2.1.3.1. Early Concepts of Growth

Early growth theories were originated during the sixteenth and middle eighteenth centuries by a group of writers who were concerned with the process of nation building appeared in Europe. They wrote essays and pamphlets on international trade that advocated an economic philosophy known as mercantilism. In particular, the advocates of this philosophy appeared in such countries as England, Spain, France, Portugal, and the Netherlands. According to the Mercantilists view a nation become rich and powerful if and only if it could achieve a favorable trade balance (a surplus of exports over imports) through the inflow of precious metals, primarily gold and silver. Hence the nation's economic wealth is depending on the accumulation or holdings of these precious metals (bullion or specie) which are gained from more exports than its imports. Such revenues would contribute to increased spending and rise in domestic output and employment. Thus, the presence of gold and silver coins in circulation was elevated to a necessary fundamental principle of the economic growth, while active trading activity was seen as a prerequisite for such growth. This implies that the main source of a nation's economic growth is the accumulation of this wealth. In order to promote a favourable trade balance, the mercantilists advocated government regulation of trade such as tariffs, quotas, and other commercial policies were proposed to minimize imports in order

to protect a nation's trade position. This situation implied that international trade was a zero-sum game, in which one country's economic gain was achieved at the expense of the other countries (Salavator, 1990).

In the second half of the 18th century, Physiocrats come to replace the mercantilists. Physiocracy (from the Greek for "Government of Nature"), is an economic theory developed by a group of enlightened French economists, who believed that the wealth of nations was derived solely from the value of "land agriculture (products of the soil)" or land development and that agricultural products should be highly priced. The most significant contribution of the Physiocrats was their emphasis on productive work as the source of national wealth. The Physiocratic school of economic thought was the first to see labor as the sole source of value. However, for the Physiocrats, only agricultural labor created this value in the products of society. All industrial and non-agricultural labor was unproductive appendages to agricultural labor. Physiocrats considered the economic life a natural process that has its own internal laws, and established the principle of natural order they opposed to state's intervention in economic processes.

2.1.3.2 The Classical Theory of Economic Growth

Adam Smith's *The Wealth of Nations* (1776) is usually considered to make the beginning of classical economics. The most famous and outstanding representatives of classical school are Adam Smith (1723-1790), David Ricardo (1772-1823), Thomas Malthus (1766-1834), Karl Marx (1818-1883), John Stuart Mill (1808-1873), Jean-Baptist Say (1767-1832) and others. The fundamental message in Smith's influential book was that the wealth of nations was based not on gold, but on trade: As when two parties freely agree to exchange things of value, because both see a profit in the exchange total wealth increases. Adam Smith linked the increase in wealth of people with the improvement of the output of the factors of production (land, labor and capital) which is reflected in the growth of labor productivity and an increase in the size of functioning capital. Hence according to A. Smith (1776) the importance of invisible hand (The force of supply/demand in a competitive market), specialization/division of labor, accumulation of physical capital (investment) and technological progress were the most determinants of economic growth in the long term and hence the prosperity of nations. Smith believed that population growth is endogenous and depends on the available means of subsistence. Investment was also recognized as

endogenous and depended on hardworking and saving of the capitalists and, by savings meant the sum of reserves used not for personal consumption, but for industrial purposes. The output growth from land was lined to geographical discoveries and technological improvements is existing land fertility.

Views of Thomas Malthus (1766-1834) on the economic growth, describing the growth of population and the increase in production turned out to be pessimistic. Writing in his 1798 Essay on the principle of population and drawing on the concept of diminishing returns. Malthus postulated a universal tendency for the population of a country, unless checked by dwindling food supplies, to grow at a geometric rate, doubling every 30 to 40 years. At the same time, because of diminishing returns to the fixed factor, land, food supplies could expand only at a roughly arithmetic rate. In fact, as each member of the population would have less land to work, his or her marginal contribution to food production would actually start to decline. Because the growth in the supplies could not keep pace with the burgeoning population, per capita incomes (defined in an agrarian society simply as per capital food production) would have a tendency to fall so low as to lead to a stable population existing barely at or slightly above the subsistence level. We will face the imminent depletion of the earth, and therefore a bitter struggle for limited resources, the growth of wars, epidemics, hunger, and mass disease and so on. Malthus therefore contended that the only way to avoid this condition of chronic low levels of living or absolute poverty was for people to engage in ‘moral restraint’ and limit the number of their progeny. Hence, we might regard Malthus indirectly and inadvertently, as the father of the modern birth control movement (Todaro & Smith, 2012). His idea of diminishing returns of factors of production was actively used in the 20th century, in the frame of the theory of population growth endogenization. However, he failed to predict the degree of development of scientific and technical progress in the field of agriculture.

David Ricardo (1772 – 1823), a British political economist, was one of the most influential among classical economists. Perhaps his most important legacy is his theory of comparative advantage, which suggests that a nation should concentrate its resources solely in industries where it is most internationally competitive and trade with other countries to obtain products no longer produced nationally. David Ricardo argues the idea of the existence of a natural market wages and assumed that the introduction of new technologies leads to a decrease in labour demand, based on special forms of technological innovations (Salvator, 1990).

A wide range of studies have investigated the factors underlying economic growth. Using different conceptual and methodological viewpoints, these studies have placed emphasis on a different set of explanatory parameters and offered various insights to the sources of economic growth. The broad consensus highlighted in these studies is that a country's growth over a long period is basically determined by these studies is that a country's growth over a long period is basically determined by three factors, namely (1) the efficient utilization of the existing stock of resources (2) the accumulation of productive resources such as human capital and (3) technological progress (Dewan and Hussein, 2001), Ndambiri *et al.*, 2012). Moreover, research and development, economic policy and macroeconomic condition, openness to trade and institutional framework are among the most important determinants of economic growth. These broad categories can be further broken down into various determinants of economic growth. The influences considered here include human capital, physical capital, exports, Aid, government policies, inflation, external debt, government expenditure, financial systems and technological progress.

2.1.3.3 Keynesian and Post-Keynesian (Neo-Keynesian) Growth Theories

Keynesian and Neo-Keynesian growth theories have a considerable list of representatives, which includes John Maynard Keynes (1893-1946), Roy Harrod (1900-1978), Evsey Domar (1914-1997), Joan Robinson (1903-1983), Nicholas Kaldor (1908-1986), Luigi Pasinetti (1930-till now) and James Meade (1907-1995).

The General Theory of employment, interest and Money of Keynes was the basis of all the followers of Keynesian growth theories. A key factor in the Keynesian model is the effective demand. Thus the expansion of aggregate effective demand should contribute to economic growth. These theories have arisen as result of development and critical processing of Keynesian macroeconomic equilibrium. Based on economic values such as national income, consumption, savings and investment, J. Keynes developed a theory designed to explain changes in the level of economic activity. He proved that during the recession and rising of unemployment reduction of income causes decrease in consumption, savings and investments. Therefore, according to John Keynes, in environment where there is no market leverage to increase the aggregate demand for reviving business activity in the economy the government should intervene by implementing macroeconomic, namely, fiscal policy, measures such as: tax cuts or increases in government spending. By reducing the interest rate at which the central bank lends money to commercial banks, the government

sends a signal to commercial banks that they should do the same for their customers. Investment by government in infrastructure injects income into the economy by creating business opportunities, employment and demand and reversing the effects of the aforementioned imbalance. What is the essence of Keynesian growth theories? (1) All of them are based on the main postulate by John Keynes aggregate demand. The decisive condition for balanced economic growth in these theories is the increase in aggregate demand. (2) Investment is considered as the main factor of economic growth that increases income (multiplier effect) or increase under the influence of the accelerator together with income growth. All other production factors, such as increased employment, the degree of equipment use, better organization of production are not taken into account. Keynesian approach considers short-term periods and the specific situation of a depressive economy. However, the followers of Keynes expanded his approach for the long term (Keynes, 1936)

Following the publication of Keynes's General Theory in 1936 some economists sought to dynamize Keynes's static short-run theory in order to investigate the long-run dynamics of capitalist market economies. Post Keynesian(Neo-Keynesian) theory of economic growth has been formulated by American economist of Polish origin Evsey Domar (1946, 1947) and British economist Roy Harrod (1939,1948) were developing the growth model independently that relate an economy's rate of growth to its capital stock. Their results were so close to each other that they subsequently became known in science as the theory of Harrod-Domar (H-D). However, the assumptions and results are basically the same as Keynes. However, Keynes emphasized the impact of investment on aggregate demand while Harrod and Domar emphasized how investment spending also increased an economy's productive capacity (a supply-side effect) (Tewodros, 2015).

The H-D model considers a closed economy in which one homogenous good Y is produced, where Y is gross output. This good may be either used as an investment good, I or as a consumption good, C . The model suggests that the economic rate of growth depends on the level of saving and the productivity of investment (i.e. in order to grow, economies must save and invest a certain portion of their GDP). A major strength of the H-D model is its simplicity. The model assumes an exogenous rate of labour force growth (n), a given technology exhibiting fixed factor proportions (constant capital –labor ration, K/L) and a fixed capital-output ration (K/Y). Assuming a two-sector economy (households and firms), an aggregate production function with fixed technological coefficient was given as:

$$Y_t = \min \left[\frac{K_t}{v}, \frac{E_t}{u} \right] \text{-----} [1]$$

Where Y_t = total output (GDP) at a time t

K_t = physical capital stock at a time t

v = utilized capital-output ratio (constant, i.e. $\frac{K}{Y}$)

E_t = effective labor force at a time t

u = employed effective labor-output ratio (constant, i.e. $\frac{L}{Y}$)

Assuming a two –sector economy (households and firms) we can write the simple national income equation as:

$$Y_t = C_t + I_t \text{-----} [2]$$

Where Y_t = **GDP**, C_t = consumption at time and S_t = saving at time t.

In the H-D growth model, gross investment (I_t) is assumed to be equal to aggregate saving (S_t)

$$\text{That is } I_t = S_t \text{-----} [3]$$

Substituting equation [3] into equation [2] yields equation [4]

$$Y_t = C_t + S_t \text{-----} [4]$$

The evolution of the capital stock over time given by:

$$K_{t+1} = (1-\delta) K_t + I_t \text{-----} [5]$$

Where δ is the rate of depreciation of capital stock by assuming that total saving (S_t) is some proportion (s) of **GDP** (Y_t),

$$S_t = sY_t \text{-----} [6]$$

We know that $v = \frac{K}{Y}$ from this $K = vY$ and $I_t = S_t = sY_t$, it follows that we can rewrite equation [5] as:

$$vY_{t+1} = (1-\delta) vY_t + sY_t \text{-----} [7]$$

Dividing both sides by v , and subtracting Y_t from both sides of equation [7] yields equation [8]:

$$Y_{t+1} - Y_t = \left(\frac{s}{v} - \delta\right) Y_t \text{----- [8]}$$

Dividing both sides of equation [8] by Y_t yields that:

$$\frac{\Delta Y}{Y} = \left(\frac{s}{v}\right) - \delta, \text{ this implies } g_y = \left(\frac{s}{v}\right) - \delta \text{----- [9]}$$

This simply states that the growth rate (g_y) of **GDP** is jointly determined by the savings ratio (s) divided by the capital –output ratio (v). The higher the savings ratio and the lower the capital-output ration and depreciation rate, the faster will an economy grow (Snowdon and R. vane, 2005).

Even if the H-D growth theory is simple it has its own limitations firstly it require a prerequisite for building the analysis within the theory economic growth depends on the growth of investment and this dependence is a liner function; economic growth does not depend on the growth in the use of labor. Secondly the limitations of the theory are explained by historical conditions. Thirdly the theory considers saving as sufficient. Fourthly its rigid assumptions of fixed proportions, no diminishing returns, no factor substitution, not take into account technological progress (Todaro & smith, 2012).

2.1.3.4. Neoclassical Growth Theories and the Exogenous Theory of Robert Solow

One of the most influential neo-classical growth theorist has been that of Noble prize winner (in 1987), American economist Robert Solow. Solow’s theory was outlined for the first time in an article entitled a contribution to the Theory of Economic growth (1956) and then developed in the Technical change and Aggregate production Function (1957).The basic framework of neoclassical growth model which was developed by Robert Solow (1956) and Trevor swan (1956) states that at any point in time the total output of the economy depends on the quality and quantity of physical capital employed, the quantity of labor employed and the average level of skills of the labor force. However once the economy reaches the full equilibrium level, additional growth in the stock of capital per worker will

only take place if productivity increases, either through enhanced capital stock or through improvements in the quality of the labor force (Tewodros,2015).

The basic assumptions of the Solow model include constant returns to scale, diminishing marginal productivity of capital, exogenously determined technical progress and substitutability between capital and labor, and his basic question was "what are the main determinants of economic growth in the long term?" According to him economies will conditionally converge to the same level of income if they have the same saving rate, depreciation rate, and labor force growth rate and productivity growth position (Todaro & Smith, 2012).

2.1.3.5 Theory of Endogenous Economic Growth

A new stage in the development of the theory of economic growth occurred in the mid-1980s which allowed talking about the "new growth theory". For the first time, in formal mathematical and economic models, the American economists Paul Romer (1955-till now) and Robert Lucas (1937-till now) hypothesized about the endogenous character of the most important technological innovations based on investment (contribution) in technological development and in human capital (skill and knowledge) through Research and Development(R&D) and most importantly the scientific and technical progress has been considered as an endogenous, growth factor generated by internal causes. Endogenous growth theory seeks to explain the existence of increasing returns to scale and the divergence of long term growth patterns among countries. The main contribution of this theory is that it emphasis on the link between technical innovation, human capital and institution including government. In this theory the central motive of profit maximization of business firms are considered to determine technological progress as these firms involve in R&D seeking new and better idea.

In the theories of endogenous growth, technological progress is not the only possible cause of economic growth in the long term. The value of intensive high-quality determinants of economic growth (parameter A in neoclassical theory) is defined in the theories of endogenous growth with the following factors: The quality of human capital, which depends on investment in human development (education, health) creation of the necessary condition and prerequisites for the protection of intellectual property right in the conditions of imperfect competition state support for the development of science and technology .The role

of government in creating a favorable investment climate and attracting new technologies .Therefore the theories of endogenous growth in contrast to neoclassical ones are in favour of state's intervention in the development process.

Thus, endogenous growth theories allowed formalizing the relationship between the mechanisms of economic growth and the process of obtaining and accumulating new knowledge, which is materialized in technological innovations. These theories examine the reasons for the differences in growth rates of different countries the effectiveness of various measures of the state's scientific, technical and industrial policies as well as the impact of the processes of international integration and trade on economic growth (Snowdon and R. Vane, 2005)

2.2 Empirical Literature Review

In connection with the empirical literature numerous researchers have been conducted to examine the source of economic growth for cross country difference, panel data approach and time series data in both developed and developing economies using a wide variety of explanatory variables. However, there are few widely agreed on results.

Anyanwu (2014), investigated the determinants of economic growth in Africa (North and SSA) using an Africa-only sample with five non-overlapping three-year averages of cross-sectional data between 1996 and 2010 and the same for china for the period 1980 to 2010 while discussing recent trade, investment and aid/debt relations between Africa and china. His results suggest that domestic investment, net Official Development Assistance (ODA) inflows, education, government effectiveness, urban population and metal prices positively and significantly affect Africa's economic growth. For china, the key factors driving its economic growth are domestic investment, trade openness, initial income and rural share of the population. Factors driving down china's growth include inflation rate, domestic credit to the private sector, net ODA inflows, population growth, telephone density and oil and agricultural /raw material prices. One key finding is that while Africa is almost twice as open as china, openness does not positively and significantly affect Africa's growth, unlike in china. A principal source is that Africa imports (mainly consumer goods) more than it exports while the reverse is true for china. Moreover, the structure of Africa's exports is biased towards traditional primary commodity exports unlike china that has rapidly shifted

towards manufactures. In addition Chinese domestic investment is about double that of Africa.

Tewodros (2015) used ARDL model to explore the relationship between economic growth and its determinant variables in Ethiopia from the period (1974-2013). His finding indicated that Physical capital and human capital had a significant positive relationship with economic growth while external debt had a significant negative effect on it. He also found export of goods and service foreign aid and inflation had insignificant effect on economic growth in the long run.

Barro (2003) conducted empirical findings for a panel of around 100 countries from 1960 to 1990. He strongly supported the general notion of conditional convergence. For a given starting level of real per capital GDP, the growth rate is enhanced by higher initial schooling and life expectancy, lower fertility, lower government consumption, better maintenance of the rule of law, lower inflation, and improvements in the terms of trade and growth is negatively related to the initial level of real per capital GDP.

Mai (2011) examined South Korea's annual GDP per capital from 1970 to 2005 and compares it with a genuine progress indicator (GPI) constructed for the same time period. An analysis is then conducted to determine if the drivers of economic growth in South Korea also drive the GPI. Variables such as foreign debt, the cost of crime, and air pollution are deemed to have a detrimental impact on genuine progress; moreover, the estimation of an empirical model developed by the study finds that the variables that drive growth in GDP per capita in South Korea are different to the variables that drive growth in GPI per capital. While physical capital research and development, exports, and inflation are all important in determining South Korea's GDP per capita, once social and environmental aspects of economic growth are taken into account, only physical capital is found to have a significant positive effect on genuine progress.

Boots (2011) used a panel of 23 emerging markets for the period 1965-2008 to investigate key determinants of per capita GDP growth in Philippines. Splitting the sample into top performing, moderately growing and slower- growing countries reveals that the Philippines is an outlier in terms of agricultural exports, investment ,research and development ,population growth and political uncertainty. Panel regressions reveal that these factors along with the deficit, inflation, trade openness, the current account balance, and the

frequency of crisis episodes are significant determinants of growth. Separate regressions show considerable heterogeneity among the growth determinants in a group of top-performing countries relative to moderately growing and slower-growing countries.

Drisakis et.al (2006) examined empirically the causal relationship among exports, gross capital formation, FDI and economic growth using a multivariate autoregressive VAR model for Greece over the period 1960-2002. The results of co-integration test suggested that there is only one co-integrated vector between the examined variables, while Granger causality tests showed that there is a unidirectional causal relationship between exports and gross fixed capital formation and also there is a unidirectional causal relationship between FDI and economic growth.

Mehrara & Rezaei (2015) identified the key determinants of economic growth in Iran; using annual time series data from 1974 to 2010. The results of this study indicate that the ratio of oil revenue to GDP is the most important variable affecting economic growth in the Iranian economy. Also the second and third effective variables on growth are respectively the ratio of imported capital and intermediate goods to GDP and labor force which lead to an increase in growth. Endogenous growth factors which are the factors contributing to the formation of human capital not possess a large role in growth process. Therefore the nature of Iran's economy has not endogenous and dynamic features and predominantly economic growth has been made by injecting of exogenous sources (oil revenue, imported capital and intermediate goods, and laobr force).

Basamini & Scarpeta (2001) analysed the driving force of economic growth using panel data evidence from 21 OECD (Organization for Economic Cooperation and Development). They identified accumulation of physical capital, human capital, research and development macroeconomic policy setting, financial development and international trade as the main driving force behind economic growth. The study once again confirms the positive impact of human capital and physical capital accumulation on economic growth. Their finding also supports the notion that the "overall size of government in the economy may reach levels that hinder growth". In addition the finding reveals that expenditure on health, education and research & development sustains living standards. On the other hand higher direct taxes, government consumption and government investment hinder development. Above all the study suggests differences in GDP across OECD countries are largely explained by differences in policy and institutional settings.

Lendyaeva & Linden (2008) empirically examined the determinants of per capita growth in 74 Russian regions during period of 1996-2005 using panel and cross-sectional data. Their finding suggests that the initial level of region's economic development, the 1998 financial crisis, domestic investment, and exports are the most important ones for explaining economic growth in Russia and natural resource availability not contributed significantly to short run economic growth.

Ndamibri *et al* (2012) explored the determinants of economic growth in 19 SSA countries for the years 1982-2000 using a panel data approach. Given that economic growth is essentially seen as a dynamic phenomenon, the study employed the Generalized Method of Moments (GMM) to account for the factors that influence the growth of economies in the region. The stud results indicate that physical capital formation, a vibrate export sector and human capital formation significantly contribute to the economic growth among SSA countries. However, government expenditure, nominal discount rate and foreign aid had a significantly negative impact on economic growth in the region. This indicates that there are contradictions in the findings of some researchers in determinants of economic growth in this area since Ethiopia is part of SSA countries.

Hui *et.al* (2015) investigated the relationship between the economic growth and the independent variables such as government expenditure, goods and service tax, inflation, FDI and export in Singapore from the period 2003 to 2014 by using ordinary least square (OLS) estimation method. The result showed that the determinants or factors of economic growth in Singapore through government expenditure, goods and services tax, inflation foreign direct investment and export has a direct relationship and statistically significant to the economic growth.

Geda *et.al*(as cited in Rahel, 2003) explored the determinants of long run growth by an augmented Solow model that uses coefficients derived from cross country regression based on data from 85 developing countries. Their finding was that Ethiopia's growth has been below the predicted in all periods. However it is mostly explained by initial income level, Investment rate, initial education attainment and the growth rate of population.

Muhedin (2016) tried to identify the major driver of Ethiopian Economic Growth by using systematic approach. A deep literature review was done on12 papers conducted in Ethiopia between year 2011 and 2015. The review result shows that economic growth as measured by

GDP is highly and positively influenced by human capital investment and export in both short and long run. In the same token, public expenditure (for productive sector) private investment, real exchange rate and household consumption are also important in determining economic growth especially in the long run. The study finally recommends that Ethiopia should seriously work in sustaining the current progress in growth hemisphere. For this purpose the country need to promote private and public investment, human capital development and institution capacity building.

Adhiambo and Were (2015) examined the major determinants of economic growth in the East African Community (EAC) which includes Kenya, Tanzania, Uganda, Rwanda and Burundi. The study relied on the endogenous growth theory to assess the major determinants of economic growth using secondary data for the period 2000 to 2013. It investigated the linkage between gross capital formation (GCF), trade, financial deepening proxied by personal remittances (PR) and broad money (M2), technological innovation proxied by FDI, human capital development proxied by secondary school Enrolments (SSE) and economic growth proxied by GDP per capital growth (GDPPC). The unbalanced panel Fixed Effect Method (FEM) across the 5 countries revealed the following results; FDI and M2 were found to have positive significant influence on explaining the cross country different economic growth rates in the region.

Permani (2008) used a panel data from East Asian countries from 1965 to 2000, concludes that panel estimates of the labour-augmenting slow model for East Asian countries show a significant influence of human capital, measured by schooling year, on East Asian economic growth in addition to the importance of investment shares and population growth. Compared to the results based on pre-1997 crisis data, the results show increasing contribution of education, in contrast to less contribution of investment to the economic growth in recent years. This indicates a possibility of education as a long-run policy tool to achieve sustainable growths

Loayza et.al (2004) described the main stylized facts of growth in Latin America and the Caribbean (LAC) countries compared to typical countries in the world over the 1960-2000 periods. They attempt to explain the economic growth performance in LAC countries using the panel data approach consists of linking aggregate economic, political and social variable to growth rates in GDP per capital for a large sample of countries. They focused on the variables that have received most attention like initial level of real GDP per capital,

education, and human capital in general, financial depth, international trade openness, Government burden, public services and infrastructure and governance as major determinants of economic growth.

Mostafa (2010) examined the significance of several economic growth determinants in Egypt by using annual time series for the period 1985-2007, and applies OLS method of estimation with an autoregressive specification. The estimation results revealed that positive and significant effect of gross fixed capital formation, FDI, investment in infrastructure, household consumption expenditure, exports and taxes on international trade on economic growth in Egypt, while the government consumption expenditure shows negative and significant effect on Egypt.

Tricidio, (2006) had investigated the determinants of economic growth through a cross country analysis in emerging economies for the period 1999-2005. He found that both human capital and export capacity are important for economic growth. However, these socio-economic variables increase their explanatory power when associated with two non-income dimensions of development which are also policy indicators (i.e. infant mortality reduction and life expectancy growth) and with good governance, expressed by two World Bank indicators since 1996 such as government effectiveness and political stability. He showed that interaction between these variables explained growth to a greater extent. On the other hand, voice and accountability, together with Government effectiveness seem to explain the HDI better.

Florin (2015) explored the impact of a variety of economic and financial factors represented by certain indicators such as inflation, unemployment exports as percentage of GDP, imports as percentage of GDP, domestic credit as percentage of GDP, Non-Performing Loans (NPL) rate to GDP growth rate, by processing the data for a group of countries of Central and Eastern Europe over the period 2000-2013. The result showed that significantly positive correlations of the economic growth with exports, imports, FDI and the domestic credit provided by financial sector. On the other hand, there were significant negative correlations of GDP growth rate with unemployment, respectively with the NPL rate and the manifestation of the financial and economic crisis.

Upret (2015) identified that the factors affecting economic growth in developing countries through cross-country data for 76 countries for the years 2010, 2005, 2000 and by using

OLS regression. According to this study a high volume of exports, plentiful natural resources, longer life expectancy, and higher investment rates have positive impacts on the growth of per capital GDP during all time periods measured in developing countries.

Dewan & Hussein (2001) used a sample of 41 middle-income developing countries, including Fiji. Both cross country and time variation specifics were used in an attempt to explain determinants for sustained economic growth in developing countries. The results suggest that apart from growth in the labour force, investment in both physical and human capital, as well as low inflation and open trade policies (less trade barriers) are necessary for economic growth. Furthermore, the ability to adopt technological changes in order to increase efficiency is also important.

Partrick Enu *et al.* (2013) studied on Macroeconomic Determinants of economic growth in Ghana by applying the Johansen method of co-integration between the periods 1970 and 2011. The study has found out that physical capital and foreign aid had a positive effect on growth in real GDPPC while military rule had negative impact on growth of it. The study has also found that in the long run, physical capital, labour force, FDI, foreign aid, consumer price index, government expenditure and military rule are the significant determinants of growth in real GDPPC in Ghana and in the short run, FDI and government expenditure are significant determinants of growth in real GDPPC in Ghana.

Biswas and Kumar (2014) estimated the short-run and long-run macroeconomic determinants of India's economic growth by applying Johansen and Juselius Multivariate co-integration test and the Vector Error Correction (VEC) model are used to analyse the annual data from 1980-81 to 2010-11. The empirical findings have confirmed that there were a stable long-run relationship between India's GDP and its determinants. The result has suggested that gross domestic capital formation, employment, export, FDI and money supply have positive effect on India's GDP growth where as inflation and fiscal deficit have negative effect. In the short-run, GDP is significantly influenced by country's gross domestic capital formation. The error correction term is negative and significant. Further generalized variance decomposition assures the prudent impact of export and capital formation on GDP in India.

Hossain (2006), undertaken an empirical investigation of factors that contributed to economic growth in Indonesia for the period 1966 to 2003. A Cobb-Douglas production

function has estimated with a time trend to capture the rate of technological progress within a co-integral and error-correction modelling framework. In the estimated production function, the coefficients on both capital and labor bear a positive sign and are statistically significant. The dynamic behaviour of output growth is examined by estimating an error-correction model of per-capital real GDP, which explains about 83% of the variations of productivity growth over the period 1967 to 2003. Within a Granger-causality framework, the impacts of key indicators of macroeconomic policies and external developments, such as budget deficits, inflation, trade openness, the growth rate of the real exchange rate and the growth rate of the external terms-of trade on per capital output growth are also examined individually for the period 1967 to 2003. The test results suggest that trade openness, the real exchange rate depreciation and changes in the external terms of trade have a feedback causal relationship with per-capital output growth. Inflation and budget deficits however do not have any significant causal effect on productively growth.

Mamoudou (2011) had empirically analysed the determinants of economic growth in Japan during the period 1960-1990 and the causes of its recession (1990-2009), it highlights the methodology of endogenous growth models to identify factors in the growth of Japan. The study shows that the gross capital formation, the labor and technology have a positive impact on Japan's growth over the period 1960-1990. The result also shows that the economy is affected negatively by the discount rates, the financial crisis and the apperception of the yen during the years 1990s and 2000s.

Tadesse (2011) studied an empirical analysis on sources of GDP growth in Ethiopia for the period 1981 to 2009 using aggregate cobb-Douglas production function. The growth equation is estimated with a time trend to capture the rate of technological progress within a co-integrational framework. Assuming constant returns to scale, the intensive production function is estimated with OLS and the regression result showed that input elasticity for capital and labor were 0.43 and 0.57 respectively. And average rate of technological progress was 0.001. These parameters are used to compute the growth contributions of capital, labor and technical progress. Capital, labor and technological progress contributed about 56%, 42% and 2% respectively to GDP growth in Ethiopia the period 1981 to 2009. He found that capital labor ratio had positive effect on economic growth in the short run as well as in the long run in Ethiopia during 1981-2009

Ajide (2014) investigate source of economic growth in Nigeria from 1980 to 2010. A multivariate Regression approach was employed to estimate augmented growth models. The emanated results show that the variables like labour, life expectancy, degree of openness and economic freedom are factors affecting the level of economic growth in both aggregated and disaggregated regressions. The disaggregated components of economic freedom data show that the size of government had negative and freedom to trade internationally positive effects.

Mahmud (2014) empirically analysed factors that affected economic growth in Palestine during the period of 1994-2013 by using Cobb-Douglas production function and had applied OLS and second order auto correlation Techniques. The empirical results of the model indicated that there is a positive relationship between the size of domestic working labour force, real gross domestic capital formation, real domestic capital formation, real domestic exports and RGDP, and a negative relationship between real domestic imports of good and service, and political instability and the real growth of GDP.

Mublawa (2015), used time series data for Zimbabwe (1975-2012) to empirically determine the links between economic growth and four macroeconomic variables (FDI, volume of trade, inflation and capital accumulation) and impacts of these macroeconomic variables on economic growth of Zimbabwe using the VEC approach. His findings showed that inflation and openness had a significant negative and positive impact on economic growth respectively. Inflation converged to long run equilibrium with growth and causal relationships were found among other variables in the short term. The response of economic growth to shocks in gross fixed capital formation, trade openness and FDI was effective even beyond the 30 year period while shocks from inflation were ineffective. The major drive of growth was its previous performance and the rate of inflation in the long term.

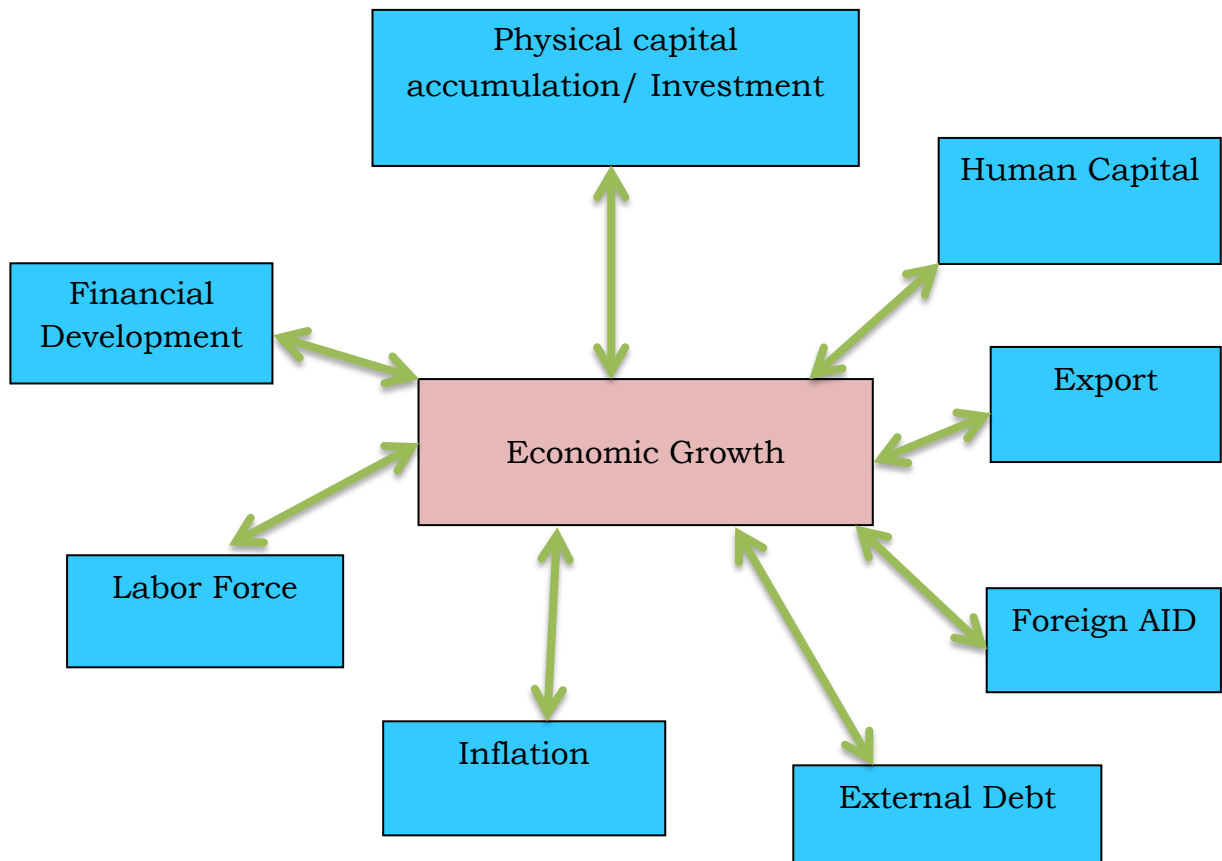
Pitia (2015) had studied the possible factors that determine economic growth in Sudan using OLS estimation method. The study used real GDP to proxy for economic growth with the regressors comprised population, FDI, government consumption expenditure, household per capita consumption expenditure, physical capital(in terms of fixed capital formation), inflation, openness of the economy and financial sector development. The results had revealed that FDI and financial sector development had been significant and carried the expected sign both in the long run and short run models While inflation and openness of the economy had been significant in the long run and insignificant in the short run with

expected signs. Infrastructure used as a proxy gross capital formation had been insignificant in the long run but significant in the short run with its expected sign. Finally, both government consumption expenditure and household consumption expenditure had been significant both in the long run and in the short run but with unexpected signs.

Those which are mentioned above are the most empirical studies conducted on determinants of economic growth in different countries. Some of them are conducted to test the validity of the traditional growth theories and models and others are extensions of the basic models. The studies determine the major source of economic growth and mostly focus on cross-country, time series and panel data basis. Thus according to empirical studies of the those researchers country's economic growth is influenced by several macroeconomic variables like physical capital formation (formally gross investment) labour force, human capital , export level, foreign aid, financial development (money supply and or domestic private credit to GDP) general price level (inflation) government expenditure, external debt, FDI, population growth etc.

2.3 Conceptual frameworks

The study conducts based on the conceptual framework which draws from the above theoretical and empirical literature reviews. This research focuses on studying the major macroeconomic determinants that are critical to economic growth in Ethiopia. From the literature review mention above the study develops the following schematic representation of the conceptual framework/model for this study which shows the relationship among the major macroeconomic variables and economic growth



Source: Derived from empirical and theoretical literatures

Figure 2.1 Conceptual framework of the study

The double arrow from the above diagram shows that the existence of bi-causal relationship between economic growth and mentioned variables. This means that each variable affect economic growth and economic growth also affect these variables in turn. On one hand, the growth of those variables increase or decrease economic growth and the growth of one's economy contribute positively or negatively to other variables on the other hand. However, the ARDL bound test approach to co-integration shows only the uni-directional relationship between economic growth and its determinant variables.

3. RESEARCH METHDODOLOGY

This chapter gives details on how the research activities are carrying out. Therefore, the researcher concentrates on the methods that uses throughout the study to accomplish the research objectives.

3.1. Research Design

The study design employs an explanatory or causal research design in order to achieve its objectives. It is the most appropriate design for identifying the causal relationships between the growth of real GDP and other major macroeconomic variables.

3.2. Data Type and Sources

The data used for this study is a quantitative data type which is based on some measurement of characteristics. It uses quantitative data or quantitative approach because most time series analysis are quantitative in nature and all the variables used in this model are macroeconomic variables which are expressed in quantitative terms.

The study employs secondary data that are collected from National bank of Ethiopia (NBE), Ministry of Finance and Economic Development (MOFED), Ethiopian Economic Association (EEA), International Monetary Fund (IMF), World Development Indicator (WDI), World Bank (WB) dataset, United Nation Conference On Trade and Development (UNCTAD) and Penn World Table (PWT).

3.3. Methods of Data Analysis

The study uses both the descriptive and econometric methods of data analysis. Graphs and tables are descriptive statistical methods used to briefly explain the macroeconomic performances and trends of the variables used in the model and some descriptive statistics summaries such as mean or average values, minimum values, maximum values and standard deviations are also included. The econometrics analysis includes testing of important tests, the estimation of the model and interpretation of results based on econometric model results. To analyse the data, the statistical package of E-views software version 9.0 and satata version 14 are used.

3.3. 1. Model Specification

The neo-classical Solow growth model explains economic growth as resulting from the combination of two elements namely capital and labor. However, Lucas extended the Solow growth model by including one more variable that explains economic growth, which is human capital. Apart from capital and labor, Solow decomposes the growth in output into three components capital, labor and total factor productivity (Solow residual).

Lucas used the Cobb-Douglas production function like Solow and he started from his simple growth equation and specified the model as;

$$Y_t = F(A, L_t, K_t, HC_t) \dots\dots\dots (10)$$

Where Y_t is real **GDP** at time t

L_t is labor force at time t

A total factor productivity /efficiency of factors

K_t is physical capital accumulation at time t

HC_t is human capital at time t

The above equation states that national output is dependent on factor productivity, labor force and physical capital accumulation and human capital in the conventional case human capital indicates the literacy and health conditions of societies in a given country and it is captured by government expenditure on health and education by the government.

However macroeconomic theory has identified various factors that influence the growth of a country from the classical, neoclassical and the new growth theories in addition to labor force, physical capital accumulation and human capital. These factors include natural resources, innovation, technology, economic policies, governmental factors, foreign aid, trade openness, institutional framework FDI, political factors, socio-cultural factors, geography, demography and any others. In order to examine the empirical evidence of the macroeconomic determinants of economic growth in Ethiopia the study will consider most of these factors.

Following broadly the approach of extended neo classical growth model, studies like Patrick enu *et al.* (2013), Biswas and Saha (2014), Pitia(2015) and Tewodros (2015) applied similar economic function to analyse macroeconomic determinants of economic growth in Ghana,

India, Sudan and Ethiopia respectively. These studies did specify their economic growth function to their respective country as Real GDP is a function of physical capital, human capital, exports of goods and service, foreign aid, external debt and inflation. They preferred these variables based on their relevance and data availabilities.

According to Tewodros (2015) the relationship between real GDP and its major macroeconomic determinant in Ethiopia expressed as follows:

$$Y_t = F(GCF_t, EHE_t, EXT_t, AID_t, EXD_t, INF_t) \text{ ----- (11)}$$

Where Y_t represents real GDP at a time t, GCF_t represent for physical capital (formally gross investment) at a time t, EHE_t represents for human capital proxies by expenditure to health and education, EXT_t stands for total export, AID_t represents for foreign aid, EXD_t is for external debt and INF_t for the general inflation rate at time t.

But theoretical and empirical studies show that these are not the only determinants of economic growth. There are also other factors such as labour force and financial development. Therefore this study incorporates these additional variables on the above model. The new model representation is expressed as:

$$Y_t = F(A, GCF_t, HC_t, EXT_t, FAID_t, EXD_t, INF_t, LF_t, FD_t) \text{ (12)}$$

Where Y_t stands for real GDP at time t, A for factor productivity which is constant, GCF_t for gross fixed capital formation at time t, HC_t for human capital at time t, EXT_t for real export at time t, $FAID_t$ for foreign aid by using, EXD_t for external debt, INF_t for general inflation rate at time t, LF_t laobr force of the country at time t and FD_t financial sector development at time t and proxied by broad money supply (M2) as a percentage of real GDP ratio at time t.

Since it is a Cobb- Douglass production function it is specified as:

$$Y_t = F(A, GCF_t^{B1}, HC_t^{B2}, EXT_t^{B3}, FAID_t^{B4}, EXD_t^{B5}, INF_t^{B6}, LF_t^{B7}, FDI_t^{B8}) \text{ (13)}$$

Taking the logarithms on both sides of the above equation, it is reformulated as follows:

$$LY_t = B_0 + B_1 LGCF_t + B_2 LHC_t + B_3 LEXT_t + B_4 LFAID_t + B_5 LEXD_t + B_6 LINF_t + B_7 L LF_t + B_8 L FD_t + E_t \text{ (14)}$$

Where:-

LY_t = Logarithm of real GDP at time t

E_t = error term at time t

B 's= are parameters to be estimated and others are logarithms of explanatory variables which are defined in the above consecutive equations.

Note that since inflation rate and financial development themselves are expressed in percentages no need of taking log form for them. The equation (14) above is expressed in a log-linear form. Thus the interpretation shows elasticities.

3.3.2. Definitions of Variables and Research Hypothesis

3.3.2.1. Definitions of Variables

Real GDP Growth: is the percentage change in real GDP from one year to another.

Gross Fixed Capital formation: refers to the net increase in physical assets (investment minus disposals) within the measurement period. It is used as an indicator of capital used in the aggregate production function. According to the World Bank definition gross fixed capital formation (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drain and so on); plant, machinery and equipment purchases; and the construction of roads ,railways and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Its impact on economic growth is expected to be positive.

Human Capital: is the collective of skills, knowledge, or other intangible assets of individuals that can be used to create economic value for the individuals, their employers, or their community. It is difficult to measure human capital in economics. As a result researchers use different proxy to human capital (i.e. school enrolment like primary, secondary, tertiary level or literacy rate and life expectancy; expenditure to education and health) to indicate as major determinants of economic growth in the long term. Therefore, this study has used expenditure to health and education as a proxy of human capital. The sign is also expected to be positive.

Real Export: refers to the real monetary values of goods and services produced by one country and purchases by citizens of another country. It consists the real values of transactions in goods and services from residents to non-residents. The revenue from exports made the import of inputs possible that are crucial for development purposes there by

playing as an engine of growth to other sectors. Exports are expected to have positive impact on economic growth as it is the main source of foreign currency earnings.

Foreign Aid: is defined as money, food or other resources that one country voluntarily transfers to another, which can take the form of gift, a grant or a loan. It is also defined as the international transfer of capital, goods, or services from a country or international organizations for the benefit of the recipient country or its population. Since Ethiopia is one of the poorest countries in the world, it needs foreign assistance to fill its resource gap and budget deficits. It is also used as a main source of foreign currency earnings. Foreign aid expected to have positive impacts on economic growth as it is a source of additional finance to run capital and recurrent expenditures.

External Debt: is the portion of a country's debt that was borrowed from foreign lenders including commercial banks, international financial institutions like IMF, WB and African Development Bank (ADB) etc. and from the government of foreign nations. These loans, including interest, must usually be paid in the currency in which the loan was made. External debt is expected to have a negative impact on output growth because of debt service repayment cost on loan.

General Inflation Rate (INF): inflation is defined as an increase in the overall price level in the country and measured in percent. It will expected to have a negative impact on the Ethiopian economic growth.

Labor Force: comprises people who are economically active .These are people who supply labor for the production of goods and services during a specific period. In Ethiopian case people who are categorized as labor force are those aged between 15 and 64 years and both the employed and unemployed ones. Labor force has expected to have a positive impact on economic growth.

Financial Sector development: the mostly used parameters used to measure financial sector development are broad money supply to GDP ratio and domestic private credit to GDP. Because of its accessibility the researcher used broad money supply to the percentage of GDP. Broad money supply consists both narrow money and quasi money. Where narrow money contains currency outside the bank and net demand deposits while quasi-money includes both saving and time deposits. Broad money supply is the broadest measure of financial development and it measures the depth of the financial system.it also indicates the

degree of monetization with respect to the real economy. Financial development has expected positive impact on economic growth.

3.3.2.2. Research Hypothesis

The study hypothesized the following:

H0: All physical capital, human capital, export, foreign aid, external debt, inflation rate, labor force and financial sector development do not simultaneously determine the growth of real gross domestic product.

H1: All physical capital, human capital, export, foreign aid, external debt, inflation rate, labor force and financial sector development do simultaneously determine the growth of real gross domestic product.

3.3.3. Estimation Procedure

Many economic and financial time series exhibit trending behaviour or non-stationery in the mean. Therefore, it is necessary to test the stability of the series before identification of the relationship between variables. The regression analysis among the variables would not be consistent and spurious regression problem would occur if unstable data are used. So the data must be transformed to stationary form prior to analysis.

Stationary (Unit Root)

A time series is said to be stationary if its mean and variance are constant over time and the value of covariance between the two periods depends only on the distance or gap or lag between the two time periods and not the actual time at which the covariance is computed (Gujarati, 2004).

Checking the time series properties of the variable is important since it affects the estimation procedures. Time series data for most developing countries such as the Ethiopia are non-stationary. For this reason stationary test shall be conducted. Thus to make sure that stationary condition has been fulfilled a unit root test will be undertaken. The study first investigates the time series properties of the data by using Augmented Dickey-fuller (ADF) and Phillips Perron (PP) tests before any estimation is undertaken.

Diagnostic tests

Diagnostic tests like serial correlation, functional form, normality distribution of the residuals and heteroscedasticity tests are checked because they affect the model's precision.

3.3.4. The Autoregressive Distributed Lag Model (ARDL)

In order to estimate the long run and short run relationship between dependent variable (real GDP) and independent variables (Physical capital, human capital, Export, foreign aid, external debt, inflation rate, labor force and financial development) the study applies the recently developed Autoregressive Distributed Lag (ARDL) model to co-integration and error correction depending on the degree of stationary levels of the variables.

The so called Autoregressive Distributed Lag (ARDL) also deals single co-integration and introduced by Pesaran and Shin (1999) and further extended by Pesaran et al. (2001). This method has certain econometric advantages in comparison to other single co-integration procedures. First ARDL can be applied irrespective of whether the underlying regressors are purely I (0), purely I (1) or mutually co-integrated (Pesaran and Shin 1999). The second advantage of using the bounds test approach to co-integration is that it performs better than Engle and Granger (1987), Johansen (1991) co-integration and Phillips and Hansen (1990) co-integration tests in small samples as the case in this study. Thirdly with ARDL approach it is possible that different variables have different optimal number of lags, while in Johansen type models this is not permitted. Fourthly, in ARDL estimation the long run and short run parameters are estimated simultaneously. Finally, by applying ARDL technique we can obtain unbiased and efficient estimator of the model (Narayan, 2005).

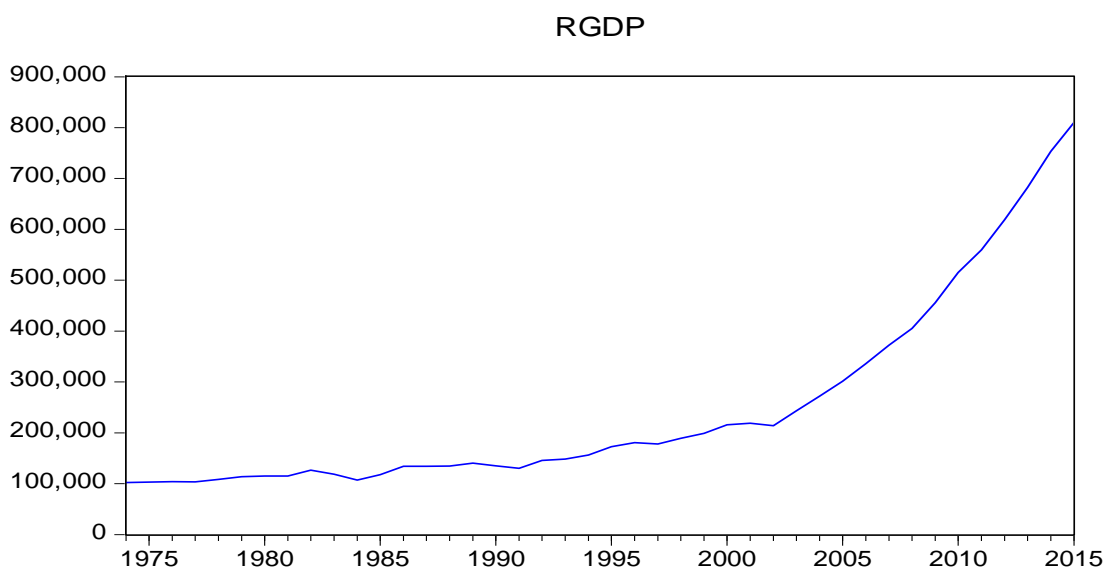
4. RESULTS AND DISCUSSION

This chapter contains both the descriptive and econometrics analysis. Under the descriptive statistics the trends and overall performances of the variables of interest are presented. The statistical tools such as tables and graphs are used to describe the variables used in the model. The econometric analysis begins by testing the necessary tests such as stationary tests, diagnostic tests and bound test .After passed the necessary tests both the long run and short run models are estimated using ARDL and Error Correction respectively. After estimation has been made the interpretation and discussion are continued based on the model results.

4.1. Descriptive Analysis

4.1.1. Trends of real GDP and its growth in Ethiopia from 1974 to 2015

The Ethiopian economic growth has shown various changes in different political regimes. The changes in government structure created a problem of inconsistency in implementing the policies by previous regimes including external and internal wars as well as natural disaster like famine and drought had a depressing effect on the history of economic growth of the country (Tewodros, 2015).



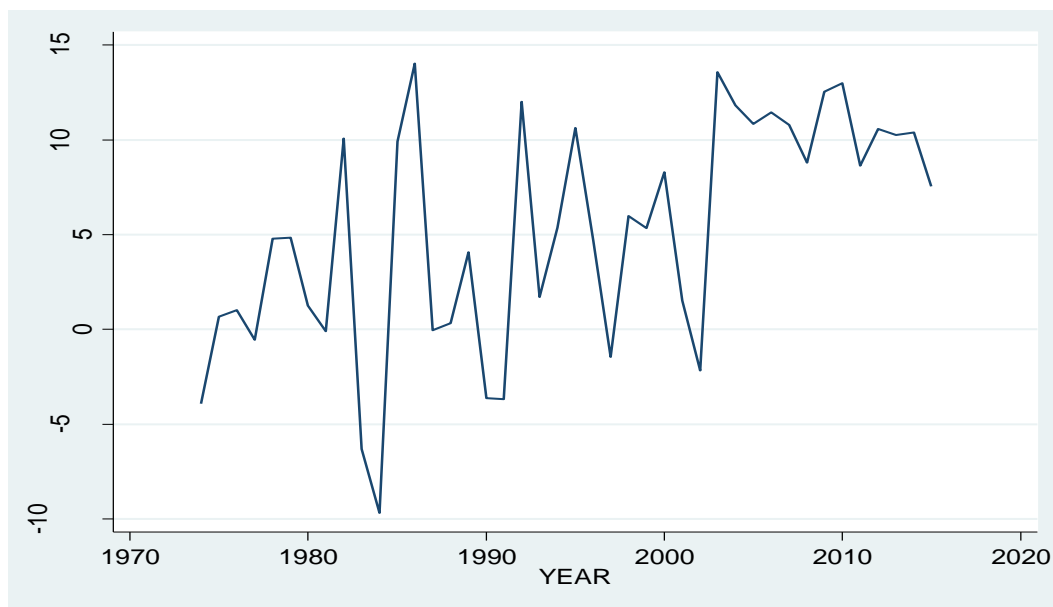
Source: Computed based on NBE data

Figure 4.1 Trends of Total real GDP in Ethiopia From 1974-2015

According to NBE, (2015/2016) the real GDP of Ethiopia was 102,407 million birr in 1974 and it reaches 810,187 million birr in 2015. However, the annual growth rate of real GDP between the two periods was experiencing both negative and positive growths.

The figure 4.1 above shows that some fluctuations of total real output from the beginning up to the year 1990 whereas relatively consistent increment from 1991 onwards. In addition to that from 2002 onwards the graph is sharply upward indicating higher rate of growth. This unprecedented high growth rate is attributed due to a combination of pro poor growth policy (since 2003 onwards) and state led development program (since 2005 onwards) and the present government implementing a development program aimed at poverty reduction through rapid economic growth and macroeconomic stability (Zerayehu 2013).

4.1.1.1. Trends in growth rate of real GDP in Ethiopia



Source: Computed based on NBE data

Figure 4.2 Trends of real GDP growth rate in Ethiopia from 1974-2015

As we observe from this figure 4.2 at the beginning year (1974) the real GDP was negative. During the period 1974-1978 the growth rate was 0.4 due to the civil war and the instability. The growth was positive starting from 1975 to 1977 showing relatively lower rates of growth. It was also experienced a negative growth rate in 1977. This is because of catastrophic drought that kills many people and it also put its hand on the history of Ethiopian economy. In 1979-83 growth rate rose to 4.02% - a period characterized by

relatively stable and good weather conditions. The growth plummeted to -6.3% & -9.69 in 1983 and 1984 respectively. These were periods of severe drought. This rate picked up to 9.9% and 14.4% in 1985 and 1986 due to best rains season at this time. There was also a decline trend in 1988/89-1990. This was because of intensive internal war that takes place in Ethiopia in order to overthrow the government and to retain power by the ruling government.

The economy starts to show relatively higher and positive growth rates starting from 1991 onwards. Ethiopia began to see accelerated economic progress in 1992 and it shifted to an even higher gear in 2003/04. Real GDP growth averaged 12.7% per annum during 2003/04. This happens because of the EPRDF (the existing government) has been adopted the typical structural adjustment policies of market liberalization, which issued a new economic policy in November 1991 by openly a market oriented economic policy and other development initiative programmes (Alemayehu & Befekadu, 2005). However even the existing government experiencing up and down trends of real GDP growth because the majority of the Ethiopian economy depends on agriculture and the agricultural products internally depends on rain fall and other climate changes. For example the decline in real GDP in Ethiopia in 2015/2016 (i.e. 8%) contrary to double digit growth from the previous year is due to El-Nino and severe drought.

Table 4.1 Average rate of real GDP growth by policy changes, regime and total

Time	Average rate of real GDP growth
1974-1984	0.23
1985-1990	4.11
1974-1990	1.6
1991-1999	4.51
2000-2010	9.13
2011-2015	9.49
1991-2015	7.5
1974-2015	5.1

Source: Own computation from NBE data

Table 4.1 above shows the average rate of real GDP growth by policy changes, regime and total in the study period. From 1974-1984 covered the first periods of the Derg regime came

power and started to announce its ideology of being a socialist state. This regime was formulated a ten year perspective plan which was covered the period from 1984/85-1993/94. The major goals of this ten year perspective plan was attainment of self-sufficiency in food, raising per capita and increase in health and education coverage. However, the regime was over thrown by the existing government in 1991 before finishing its ten year perspective plan. So that is why the researcher takes from 1985-1990. The average growth rates between these periods was shown better performance i.e. 4.11 percent than that of 1974-1984 which was 0.23 percent.

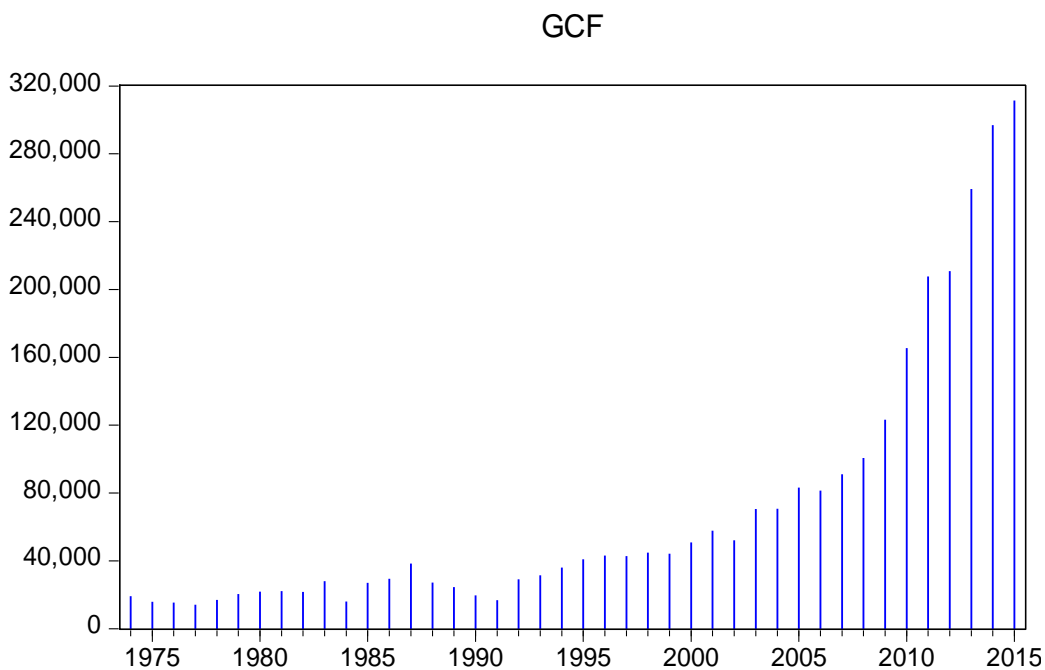
The EPDRF came to power by overthrew the Derg regime since 1991. It has been adopted the typical structural adjustment policies of market liberalization, which issued a new economic policy in November 1991 by openly a market oriented economic policy and other development initiative programmes in order it increase economic growth (Alemayehu & Befekadu, 2005). This makes the country to perform better economic growth than the Derg regime. From 1991-1999 the Real GDP growth averaged 4.51. The existing government further extends its policy reforms and registered average 9.13 percent during the period 2000-2010. Finally the current government introduced the three five year Growth and Transformation Plan (GTP) starting from 2011 to further increase the economic growth and achieve the vision of lower middle income country by 2025 through sectoral transformation. The first, second and third GTP covered the periods from 2011-2015, 2016-2020 and 2021-2025 respectively. During the first GTP the average growth rate of GDP was 9.49 percent which shown some improvements compare to other previous periods.

Exclusively examining the average growth rate of real GDP of the two regimes, the EPRDF is around 4.7 times greater than that of the Derg regime. This is an indication of huge policy gaps between these two regimes.

4.1.2. Gross Capital Formation

It is also called gross physical capital formation or gross physical capital accumulation and proxied or measured by gross investment. According to Mankiw (2010), physical capital accumulation includes machinery, plant and building, means of transport and communication, electricity plants and social overheads like roads, railways, schools, colleges, hospitals etc.

The gross capital formation was 19,176 million birr in 1974 and 311,484 million birr in 2015 (NBE, 2015). However like GDP the rate of capital formation is no consistent throughout the periods. There are ups and downs on the levels of gross capital formation in the country for last forty years. As we seen from the fig.(4) below gross capital formation was at the beginning seems stable for ten years and decline and increase up to 1990.how ever, it starts to increases from 1991 to 2000 and finally it increases at increasing rate starting from 2001 onwards. Even though there are improvements in recent few years the gross capital formation was lower in many years. Based on the gross capital formation the current government is better than the Derg regime.



Source: Computed based on NBE data

Figure 4.3 Trends of gross capital formation in Ethiopia from 1974-2015

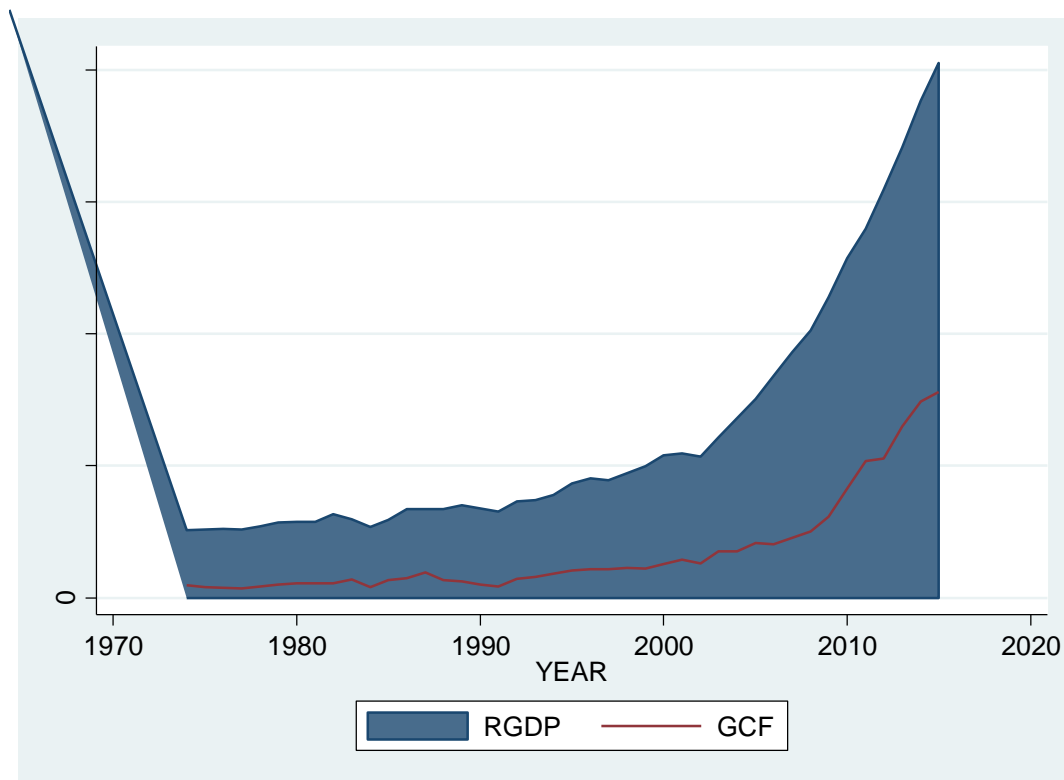
It is important to see the share of GDP that are used capital formation in Ethiopia. According to NBE, (2015) 18.7% in 1974 and 38.5% in 2015 of real GDP were goes to gross capital formation.it was 14.6%in 1990 and 12.9% in 1991 and starts to increase onwards.

Table 4.2 Average gross capital formation to percentage of real GDP

Periods	Average GCF to % RGDP
1974-1989	18.8%
1990-2000	21.1%
2001-2015	30.2%

Source: Own computation from NBE data

As we see from this above table the average gross capital formation as percentage of GDP increases from time to time.



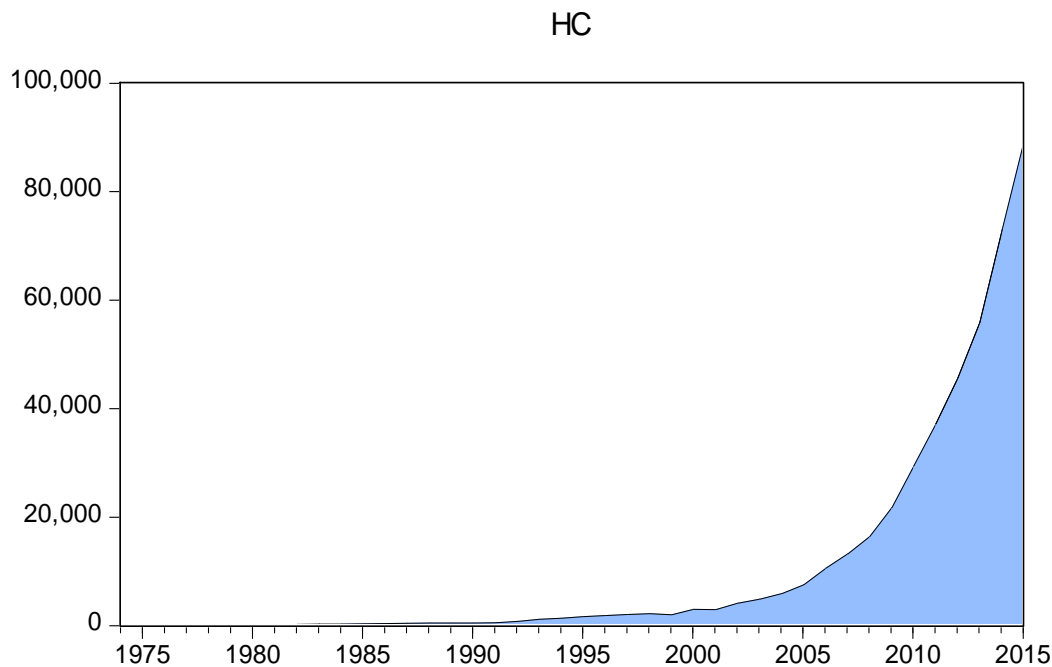
Source: Computed based on NBE data

Figure 4.4 Trends of gross capital formation and real GDP

Figure 4.4 shows the trends of gross capital formation and real GDP. Both have an increasing rate over time but the degree of incensement is different. The growth of real GDP is higher than that of the growth in gross capital formation.

4.1.3. Social Sector Development and Economic Growth

Most of the time expenditures (both recurrent and capital) of health, education and training were employed to measure human capital, which is the major driving force of economic growth. During the military power, the coverage and well distribution of education and health were very low comparing to current government. More over the life expectancy at birth was 44 years in 1974 and 64.8 years in 2015 (WB, 2015).The amount of budget allocated to this sector were insignificant comparing to GDP instead for military force were more. The total budget allocated to health, education and training in 1974 was 208 million birr (i.e. 0.2 percent of real GDP) and reached 717 million birr (0.6 percent of real GDP) in the year of 1991 while military expenditure ratio to real GDP was 5.8% during the same period (WB, 2015).



Source: Computed based on MOFED and EEA data

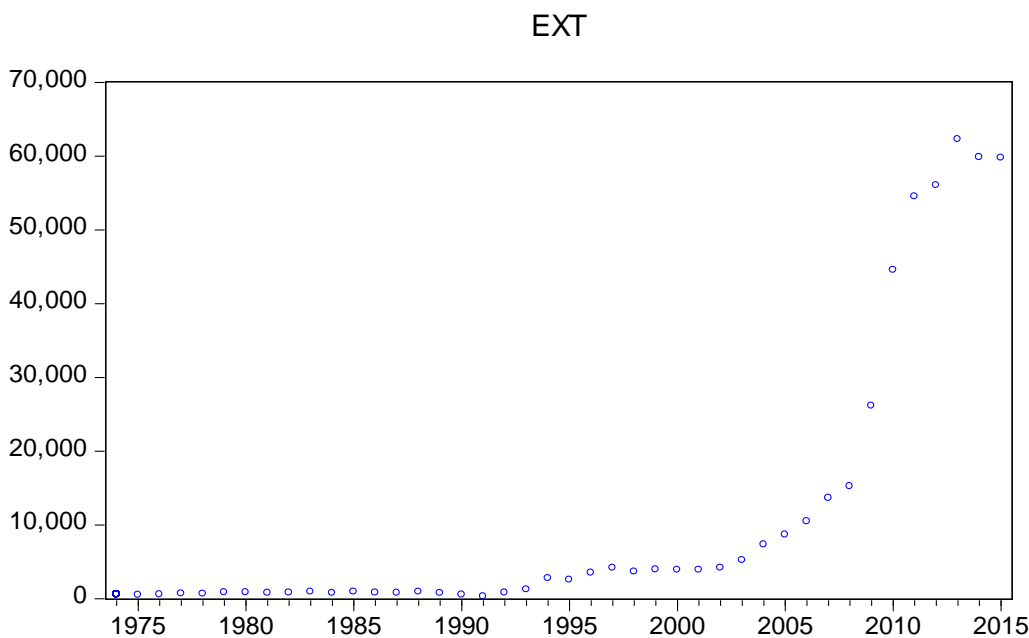
Figure 4.5 Trends of expenditure on education, health and training from 1974-2015

The trend of expenditure in health, education and training at the starting period was very low and starts slightly increase until 2009. After 2009 onwards it was increased by higher rate and it reached its peak in recent years. Post 1992, the Ethiopian government developed 20 years plan of health and education to improve health and education of citizens. To achieve this 20 years plan the government has been doing its homework by investing relatively more budget. The total amount of budget allocated in 1992 was 948 million birr

(0.7 percent of real GDP) and reached 89 billion and 619 million birr which is 11.1 percent of real GDP in 2015.

4.1.4. Real Export

Export sector has played an important role to bring about rapid economic growth in developing countries where there is acute shortage of foreign currency. However, most of them largely depend for their source of currency earning on a single product or a very narrow range of low value products, mostly agricultural commodities and minerals. The Ethiopian export is also characterized by primary agricultural products which are highly vulnerable to natural disaster internally and price fluctuations externally. This puts its hands on the growth of Ethiopian export in terms of income or share of GDP. Theoretically income generated from export is used to finance foreign capitals which embodied foreign R&D and source of new technology. However, this theory is not much applicable in Ethiopia because of the nature of export in the country. This leads the country to depend on other sources of hard currencies. Even though the export sector suffers from such problems it shows some improvements especially during EPDRF period. The growth trends of export in Ethiopia are shown in the graph below.



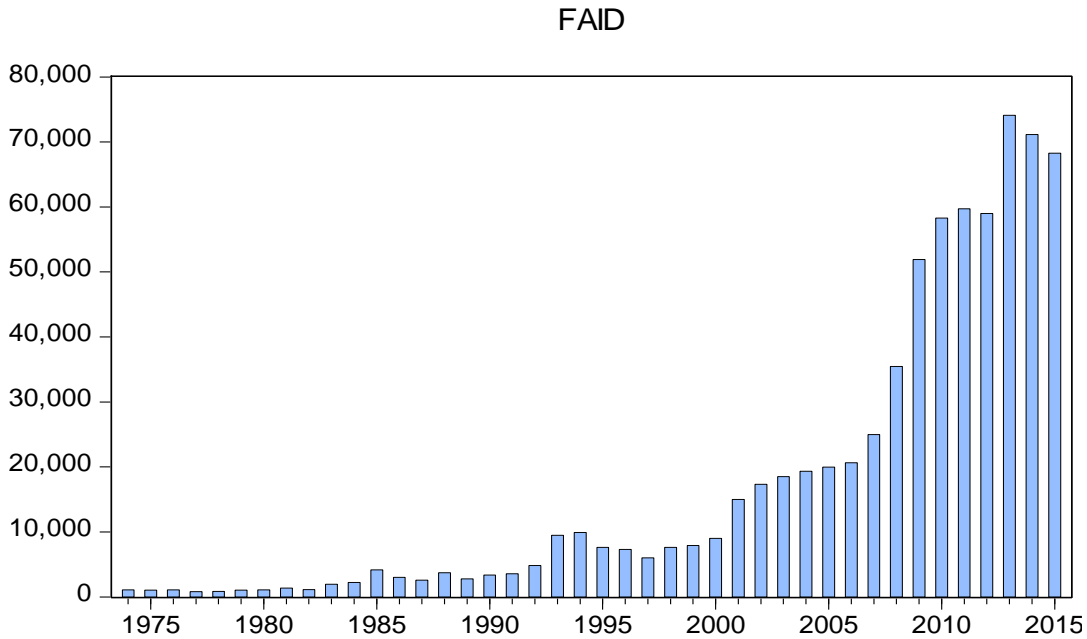
Source: Computed based on NBE data

Figure 4.6 Trends in the growth of real exports from 1974-2015

Figure 4.6 shows that export growth in Ethiopia was almost constant and very lower from 1974 to 1990, a period of the Derg regime. This is due to frequent external and internal wars that hinder the economic growth in general and export in particular. In addition to that during this period there was severe drought which causes for the low performance of export sector. Infrastructural developments are also very low during this regime that is very important to market the produced goods and services to abroad. However, it starts to grow positively after 1990 but at lower rates for some times and shows fastest rates after 2010. The trends of export after 2010 was very impressive owing to improved policy and removal of some hindering factors.

4.1.5. Foreign Aid

Foreign aid is one of the prominent sources of finance for developing countries in Africa in general and Ethiopia in particular. As we know that, Ethiopia is one of the poorest countries in the world, which depend its export sector on agricultural primary commodities (68 percent) that suffers from low levels of domestic saving and insufficient amount of foreign exchange required to purchase capital goods (Tewodros,2015). Not only this but also the country suffers from budget deficit which required external assistance to enhance economic growth. Foreign aid could fix this problem by supplementing domestic saving or foreign exchange reserves. Being a source to fill the gap between domestic resources and investments, foreign aid has played a major role over the past forty years. Ethiopia has received a tremendous amount of foreign aid over the past few decades. Foreign aid donated to Ethiopia from different donors increased during the study period starting from 1,089 million of birr in 1974 and reached to 68,256 million in 2015 (WB,2015).



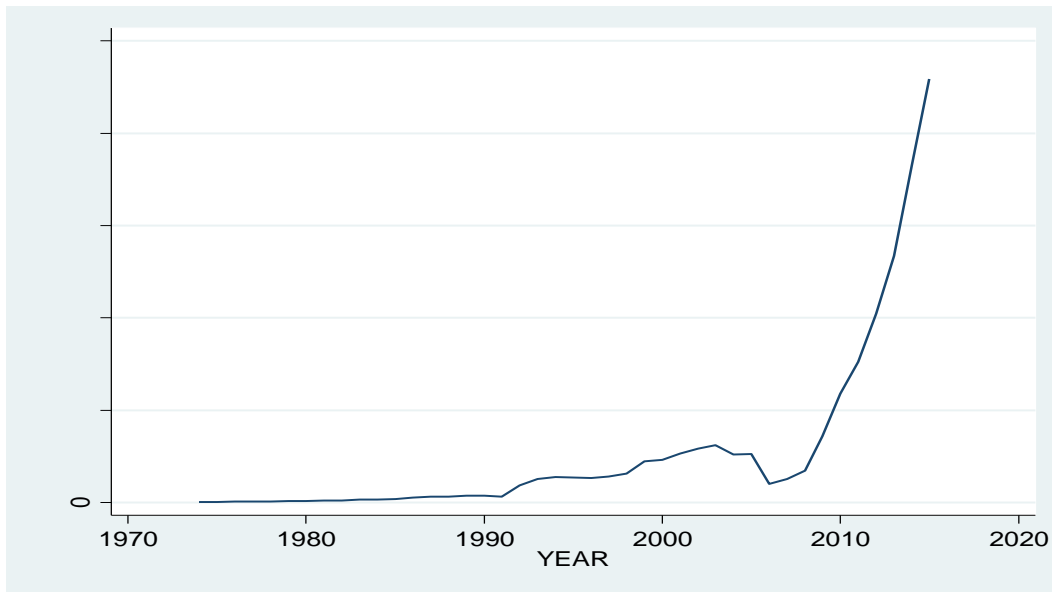
Source: Computed based on WB data

Figure 4.7 Trends of foreign aid assistance received by Ethiopia from 1974-2015.

As depicted from this above figure 4.7 the amount of aid has received was very low from the starting period (1974) i.e. about 1089 birr million up to 1984 (3395 million birr). However, in recent years of the study period the amount of foreign aid is very high compared to the Derg regime. The highest amount of foreign aid receipt was registered in 2013 which accounts 74,096 million Ethiopian birr.

4.1.6. External debt

It is the other source of finance for the countries when there exhibits budget deficit. It is money owed by foreign countries, multinational companies or others to other countries to finance their resource gap. The Ethiopian external debt stock has shown significant change in its size over the years under consideration. The trend of external debt is given in the following graph:

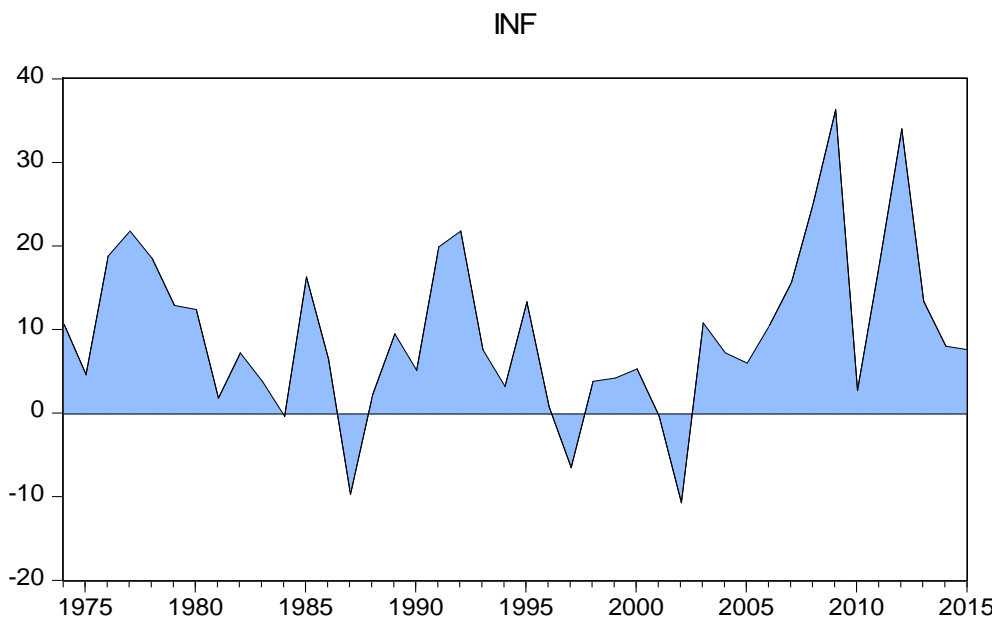


Source: Computed based on NBE data

Figure 4.8 Trends of external debt in Ethiopia from 19974-2015

The external debt was look like constant from 1974 to 1990 and it is steadily increasing started from 1991to 2004, decreases in 2005 and increasing at increasing rate after 2005 and onwards.

4.1.7. General inflation rate



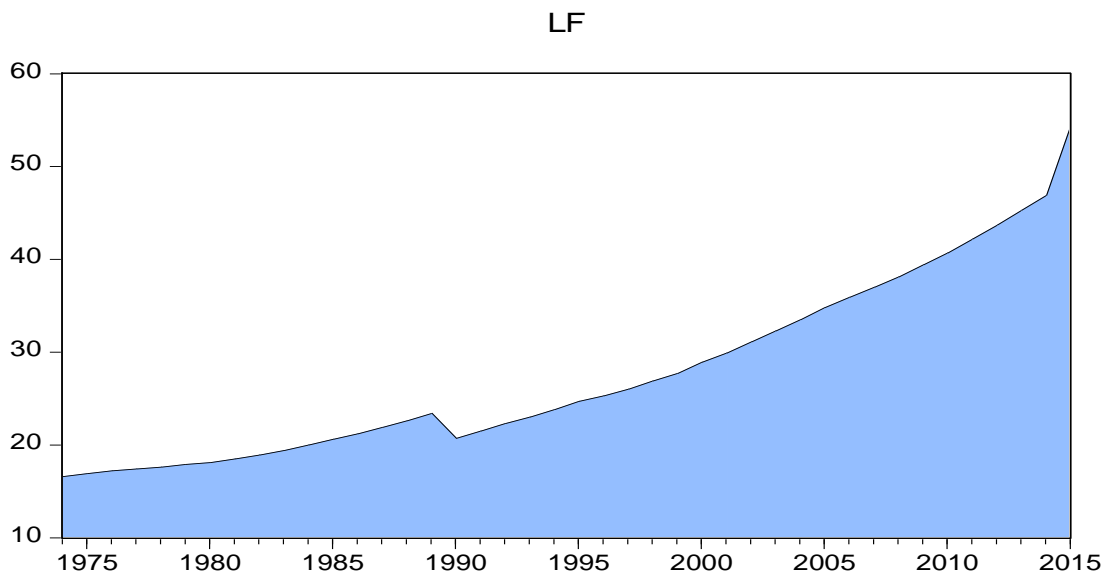
Source: Computed based on NBE data

Figure 4.9 Trends of general inflation rate

In Ethiopian history inflation was not a problem of economic growth however; relatively it was high from the starting period of the Derg regime and the beginning of the current government as we clearly observed from figure (10). Inflation remained at reasonable low level rate before 2000/03. However, post 2003/04 shows sharp increases despite the rapid economic growth during the same period and in 2008/09 it was a serious problem. This is a period when the financial crisis was happened due to oil price increase or shock. In addition the sharp increasing of general inflation was primarily caused by food inflation which is the effect of food demand triggered and international price hike. According to NBE (2015/16), the official headline inflation during 2008/09 stood at about 36.4 percent with food inflation being about 49 percent.

4.1.8. Labor force

According to world economic outlook, (2016) the total population in Ethiopia is 99.4 million. Ethiopia is one of the labor abundant countries in the world with total labor force of 54.7 million (WB, WDI, 2015). Economic theorist give heavy hand to economic growth of a country as it depends on labor force availability. The labor force in Ethiopia grows continually owing the fast growth of population. According World Bank development indicators the total labor force in Ethiopia was 16.7 million in 1974 and reaches 54.7 million in 2015.

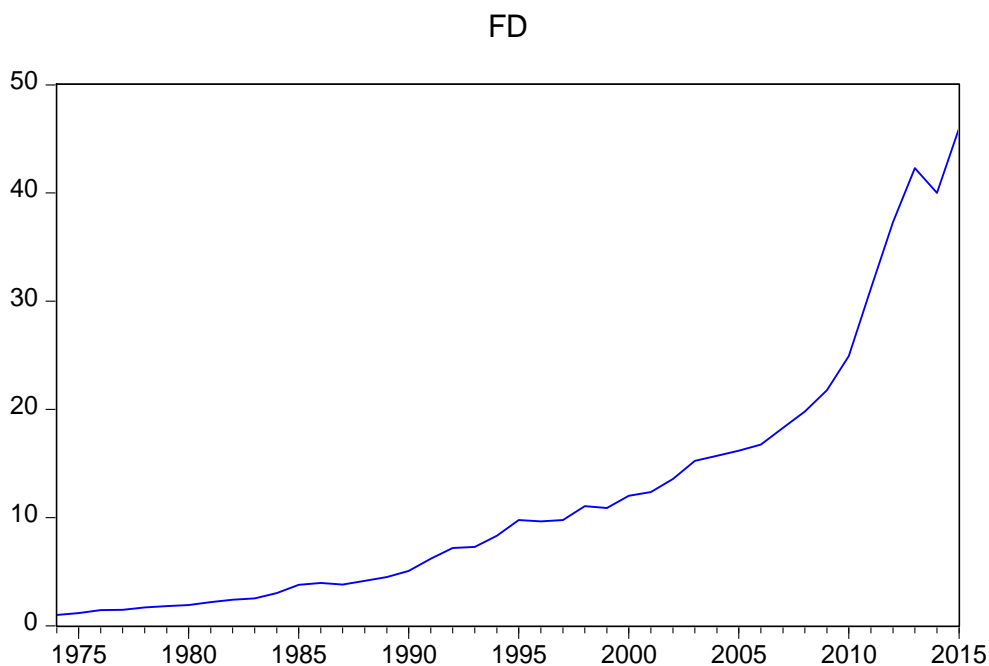


Source: Computed based on WB and UNCTAD data

Figure 4.10 Trends of labor force growth in Ethiopia from 1974-2015

4.1.9. Money Supply

Broad money supply to GDP ratio is a proxy measure of financial development through financial deepening. The financial system in developing countries faces several difficulties that prevent it from operating efficiently. These countries usually suffer from financial crises due mainly to increases in interest rates and increases in uncertainty. But as the figure (12) indicates there are some improvements in financial depth in Ethiopia from time to time relatively with constant increasing rate until 2010 and increase by increasing rate onwards. This is due to the proper management of and better policy of the existing government compare to the previous one.



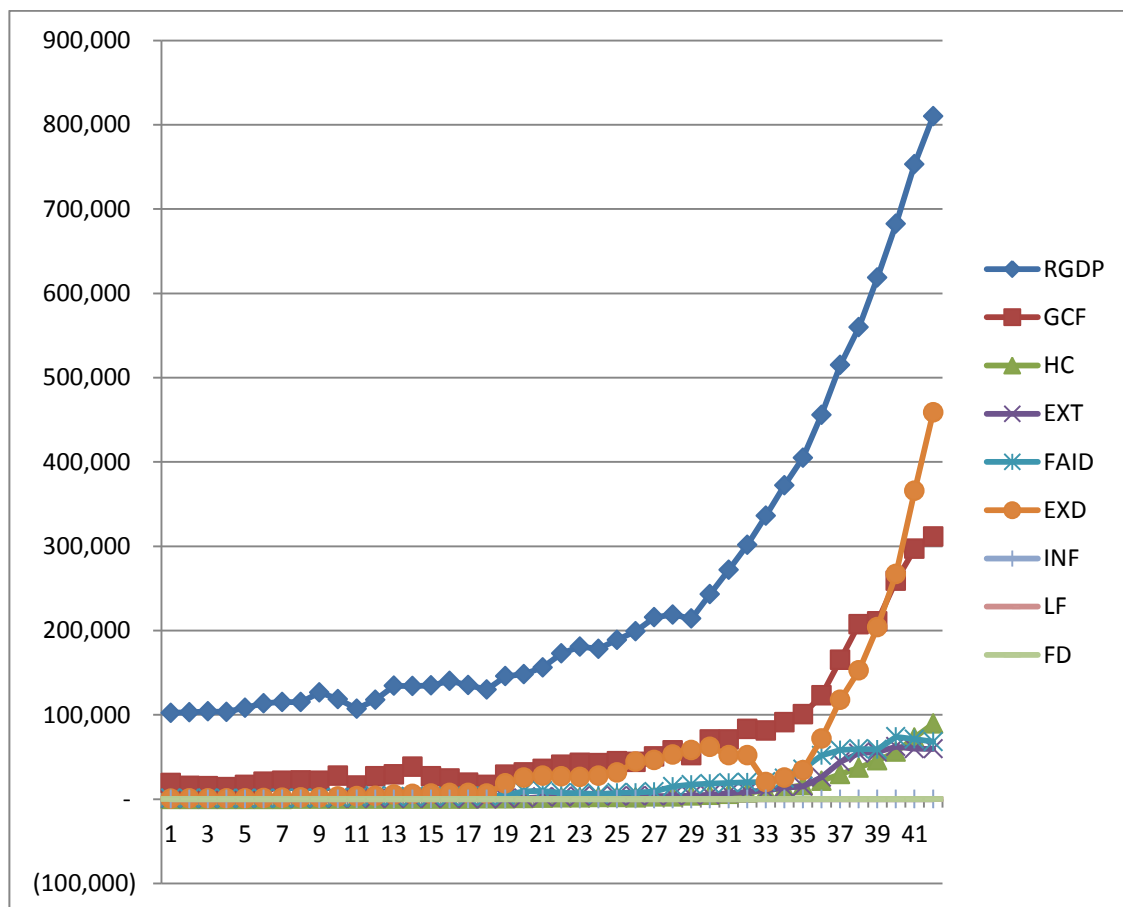
Source: Computed based on NBE data

Figure 4.11 Trends of broad money supply as a percentage of GDP

4.1.10. Summary Statistics

The following figure 4.12 depicts the trends of all variables which are used in the model together. From the figure RGDP represents for real GDP, GCF for gross capital formation, HC for human capital, EXT for real export, FAID for foreign aid, EXD for external debt, INF for inflation, LF for labor force and FD for financial sector. General inflation rate and financial sector development measured in percent, labor force is expressed in millions of working age population and all the remaining variables are measured in millions of birr. The Y-axis represents all variables used in this study and the X-axis represents time ranging

from 1974-2015. The result shows real GDP has higher value than the remaining variables during the study period while external debt and gross capital formation follows it with greater difference. However, other variables such as human capital, export and foreign aid are relatively in their infant stage in Ethiopia. As we observed from figure 4.12 the trends of all variables used in the model are different from one another with different increasing or decreasing rate at different time periods. Even if some variables are measured in different units like general inflation rate, financial sector development and labor force which are not expressed in millions of birr unlike real GDP and other remaining variables, the researcher depicts these variables in this summary statistics since they are considered as determinants of economic growth.



Source: Based on NBE, MOFED, EEA, WB and UNECTAD data bases

Figure 4.12 Summary statistics

4.2. Econometrics Results

4.2.1. Unit Root test

Most macroeconomic time series are trended and therefore in most cases are non-stationer. If non-stationary of the macro variables is not corrected, it would lead the problem of spurious regression (false relationships among the variables). So before to utilizing the data in estimating ARDL, it is imperative to check the time series properties of each series. When a series contains unit root, it is common to transform the variables through differencing so as to make it stationary. In order to determine the degree of integration, a unit root test is carried out using the standard Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests. Moreover in applying ARDL model all of the variables should not be integrated of order two (I (2)). But they should be a mixture of integrated of order zero (I (0)) and integrated of order one I (1).

When the ADF or PP test statistic is larger than the critical value in absolute terms and lower, Mackinnon (1996) one sided p values, the null hypothesis of unit root test is rejected; and if the absolute value of ADF or PP test statistic is lower than that critical values or higher Mackinnon (1996) one sided p values, we fail to reject the null hypothesis.

Table 4.3 shows the results of ADF for unit root. The test was done for two alternative specifications. First it is tested with constant but no trend and then it is tested with constant and trend. All variables except INF and FD are in logarithmic forms. Since FD represents a ratio of broad money supply as percent of GDP and INF (inflation rate) expressed in percentage under normal condition.

Table 4.3 ADF unit root test results

Variables (at level and 1st difference	t-stat (with intercept but no trend)	Mackinnon(1996) One sided p values	t-stat (with intercept and trend	Mackinnon(1996) One sided p values
LRGDP	2.677	1.000	0.363	0.998
D(LRGDP)	-2.051	0.265	-6.671***	0.000
LGCF	2.788	1.000	-2.129	0.515
D(LGCF)	-7.999***	0.000	-4.609***	0.004
LHC	3.840	1.000	-0.450	0.982
D(LHC)	-2.530	0.117	6.440***	0.000
LEXT	0.504	0.985	-1.725	0.721
L(EXT)	-5.683***	0.000	-5.755***	0.000
LFAID	0.869	0.994	-4.421***	0.006
LEXD	-0.195	0.931	-2.299	0.425
D(LEXD)	-5.292***	0.000	-5.233***	0.001
INF	-2.118	0.239	-2.189	0.482
D(INF)	-8.666***	0.000	-8.549***	0.000
LLF	2.490	1.000	-0.213	0.991
D(LLF)	-4.764***	0.000	-5.643***	0.000
FD	4.609	1.000	2.694	1.000
D(FD)	2.207	1.000	-5.118***	0.001

Source: Model result

Note *** represent significance level at 1%.

L= represents logarithm

D= represents the first difference and all the others are variables mentioned before this chapter.

Note that the rejection of the null hypothesis is based on Mackinnon (1996) critical values. Akaike Information Criteria (AIC) is used to determine the lag length while testing the stationarity of all variables. The sign *** indicates the rejection of the null hypothesis of non-stationary at 1% significant level. The results from this test show that eight variables are non-stationary in their levels (for both types of specifications) and foreign aid is stationary in its level with intercept and trend. On the other hand in their first difference all of the variables are stationary. The results indicate that, with intercept and trend eight of the variables are I (1) and one variable I (0). The Phillips Perron test is also tested and according to its results two variables (foreign aid and inflation) are stationary at their level and the remaining variables used in the model are stationary at their first difference. The PP test

result is presented in the appendix part of this study (refer Appendix B). Such result of stationarity test would not allow the researcher to apply the Johansen approach of co-integration. This is one of the main justifications for using ARDL approach (bounds test approach of co-integration) developed by Pesaran et al. (2001).

4.2.2. Diagnostic Tests of the Model

Before any estimation is undertaken, model diagnostic tests should be tested. To check the verifiability of the estimated long run model some diagnostic tests are undertaken. These includes serial correlation test (Brush and God fray LM test), functional form (Ramsey's RESET) test, normality (Jaque-Berra test) and hetroscedacity (Breusch-Pagan-Godfrey).

Table 4.4 Diagnostic tests for the long run ARDL Model

Test stastics	LM version	F-version
Serial correlation	CHSQ(1)=0.443(0.506)	F(1,27)=0.295(0.591)
Functional form	CHSQ(1)=1.234(0.228)	F(1,27)=1.523(0.228)
Normality	CHSQ(2)=0.143(0.931)	Not applicable
Hetroscedasticity	CHSQ(12)=14.144(0.292)	F(12,28)=1.229(0.313)

Source: Model result

From Table (4) the test for serial correlation is the Langrangian Multiplier (LM) test for autocorrelation, the test for functional form is Ramsey's RESET test, the test for normality is based on a test of skewness and kurtosis of residuals and the test for a hetroskedasticity is based on the regression of the squared residuals on square fitted values.

Table (4) indicates that the long run ARDL model estimated in the study passes all the diagnostic tests. This is because the p-values associated with both the LM version and the F version of the statistic was unable to reject the null hypothesis specified for each test.

The first test is answers the question is there an interdependence/correlation between two and more residuals. This is called an autocorrelation test. The null hypothesis of Brush God Fray LM test is fail to reject for the reason that the p-values associated with test statistics is greater than the 5% standard significance level(i.e. $0.506 > 0.05$).This implies that there is no problem of autocorrelation problem in the model.

Secondly the null hypothesis of Ramsey's RESET test, which tests whether the model suffers from omitted variable bias or not. It says the model is correctly specified. As the test result confirms we cannot reject it.

The third test is about the nature of distribution of the residual. The null hypothesis is suggested that the residual is normal distributed. Since the p-value associated with the Jaque-Berra normality test is larger than the standard significance level (i.e. $0.931 > 0.05$), we fail to reject the null.

The last diagnostic test deals about the variance nature of the residual i.e. hetroskecedasitcity test. The null hypothesis is constant variance of the residual or homoskecedasitcity. As we observed from the above table the p-value of the test statistic is higher than the associated significance level (i.e. $0.292 > 0.05$), then we fail to reject the null hypothesis.

4.3. Long Run ARDL Bounds test for co-integration

After checking the stationarity of the variables, the next step is checking the bound test for co-integration. The first task in the bounds test approach of co-integration is estimating the ARDL model specified in equation (14) using the appropriate lag length selection criteria. A maximum lag of order 1 was automatically chosen for the conditional ARDL model. Because according to Pesaran and Shine (1999) for the annual data are recommended to choose a maximum of one or two lag lengths. In addition the stationarity of the results confirmed that all variables were of order 0 and 1 and according to Wooldridge, (2000) the more lags we include, the more initial values we lose.

The F-test through the Wald test (Bound test) is performed to check the joint significance of the coefficients specified in equation (14) .the Wald test is conducted by imposing restrictions on the estimated long run coefficients of real GDP, gross capital formation, human capital, export, foreign aid, external debt, inflation rate, labor force and financial development. The computed F-stastic value is compared with the lower bound and upper bound critical values.

As it is depicted in table below, the calculated F-stastics i.e. 5.946 is higher than the upper bounds of the critical values at all significance levels. This implies that we reject the null hypothesis of $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = 0$ (there is no long run

relationships the dependent and explanatory variables) and we should accept the alternative hypothesis of $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 \neq 0$ (there is long run relationships).

Table 4.5 ARDL bound test result

Test statistic	Value	k	Critical value bound		
			Significance level	10 bound	11 bound
F-statistic	5.945719	8	10%	1.95	3.06
			5%	2.22	3.39
			2.5%	2.48	3.7
			1%	2.79	4.1

Source: Model result

Note: Null Hypothesis is: No long run relationship exists

4.4. ARDL Long Run Model Estimation

After testing the bound test for co-integration the next step is long run model estimation. The results of the bound test indicates that the existence of a long run relationship between real GDP and gross capital formation, human capital, export, foreign aid, external debt, inflation, labor force and financial sector development. The estimated long run ARDL model is presented in table 4.6 below.

Table 4.6 Estimated long run coefficients using ARDL(1,0,0,0,1,0,1,1,0)

Dependent variable(LRGDP)			
Regressors	Coefficients	Standard Error	T-ratio
LGCF	0.28***	0.073	3.816
LHC	0.15**	0.066	2.346
LEXT	-0.01	0.026	-0.312
LFAID	-0.05	0.043	-1.271
LEXD	-0.04**	0.018	-2.147
INF	0.01***	0.002	3.812
LLF	0.66**	0.240	2.725
FD	0.01	0.003	1.354
CONS	6.78	0.725	9.344

Source: Model result

Note: *** and **, * represents the significance of coefficients at 1% and 5% and 10% significance levels, respectively.

As we seen from table (6) above the estimated coefficients of gross capital formation, human capital, external debt, labor force and financial development have the expected signs while export, foreign aid and inflation have unexpected signs. In addition the estimated coefficients of gross capital formation, human capital, external debt, inflation and labor force are all statistically significance while export, foreign aid and financial development are statistically insignificance irrespective of sign changes in some variables.

Since the researcher has specified the growth model in a log-linear form, the coefficients of the dependent variable is interpreted as elasticity with respect to real GDP. The long run model result indicates that gross capital formation (proxied by gross investment) is statistically significant at 1% significance level. Thus, holding other things constant a one percent increase in gross capital formation brought a 0.28 percent increase in real GDP. Therefore it is the most significant variable that positively affects the growth of real output. The result is consistent with Tewodros (2015), Basamini and Scarpeta (2001), Nadmibri *et al.* (2012), Adhiambo and Were (2015), Permani (2008), Mostafa (2010), Mamoudou (2011), Patrick Enu *et al.* (2013) and Mahmud (2014) etc.

Next to gross capital formation human capital (proxied by expenditure in health and education) has significant long run impact on the Ethiopian economy. *Citreois paribus*, a one percent increase in expenditure of education and health has resulted 0.15 percent increase in real GDP. The findings of this research is concerning the long run positive impact of human capital on real GDP is consistent with the endogenous growth theories (mainly, advocated and/or developed by Lucas (1988), Romer (1992)) which argue that the improvement in human capital (skilled and healthy workers) leads to productivity improvement that enhances output and other studies like Muhedin (2016), Permani (2008) and Basamini and Scarpeta (2001). With respect to this research made in Ethiopia the finding of this research is also similar to Tewodros (2015).

External debt has a negative significant impact to the Ethiopian economy in the long run. This is due to the costs incurred for interest and loan repayments. From this finding a one percent increase in external debt the real GDP has decreased by 0.04 percent. The result is also in line with Teklu *et al.* (2014) and Mulugeta (2014) had investigated that external debt had a negative significant impact in the long run on economic growth and negative insignificant impact in the short run on in Ethiopia due to debt overhang and crowding effect while Tewodros (2015) and Wessene (2014) had investigated that external debt has A

negative significant Impact on economic growth in Ethiopia both in the short run and in the long run.

In this study the researcher found that inflation rate has positive impact on the Ethiopian economy. The sign change of inflation rate is consistent with Tewodro's (2015) finding. However in his finding inflation rate is insignificant with positive sign. The positive impact of inflation may due to lower inflation (single digit) or normal inflation will initiate the economy to boost. Since our inflation is demand pull inflation, this excess demand will increase price under certain levels of supply. This means in opposite to Says law demand creates its own supply. On the supply side the increase of price will initiate producers to produce more. Regarding to theories that supports the positive impact of inflation on output Phillips curve, suggested that one could not achieve low level of unemployment unless maintaining high level of inflation and Robert Lucas also developed an alternative theory of the Phillips Curve and the money driven business cycle under the assumption of rational expectation. He showed that a positive relationship between output and inflation due to the imperfect information regarding the aggregate level of price (Mankiw, 2010).

In connection with this Admasu (2014) had identified the threshold level of inflation in Ethiopia by using quarterly time series data from the period 1991-2003. The result confirmed that the threshold (moderate) inflation level is 10 percent. According to his findings inflation rate up to 10 percent has a positive effect on economic growth while inflation rate above 10 percent had a negative effect on it. Millik and Chowdhury (2001 as cited in Admasu ,2014) found the positive long run relationship between inflation and economic growth for four Asian countries namely Bangladesh, India, Pakistan and Sirilanka .As the above result indicates the real GDP in Ethiopia has increased by 0.01 percent as inflation increases by one percent other things remains constant.

The other most important variable which has a significant positive impact to the Ethiopian economy in the long run is labor force. As we observed from the above table model results other things remains constant as labor force increases by one percent real GDP has increased by 0.66 percent. This implies that labor force has important role in the growth of Ethiopian economy. The finding is in line with the Solow growth model which states that economic growth is a function of labor and capital and other studies like Mahmud (2014), Mamoudou (2011), Patrick Enu *et al.* (2013), Hossain (2006) and Mehrara and Rezaei (2015).

Finally the long run estimated model is presented as follows with figures in the parenthesis indicates the calculated t-value.

$$\text{LRGD} = 6.78 + 0.28\text{LGCF} + 0.15\text{LHC} - 0.01\text{LEXT} - 0.05\text{LFAID} - 0.04\text{LEXD} + 0.01\text{INF} + 0.66\text{LLF} + 0.01\text{FD}$$

(9.34) (3.82) (2.35) (-0.31) (-1.27) (-2.15) (3.81) (2.73) (1.35)

4.5. Short Run Error Correction Model (ECM)

After the acceptance of long run coefficients of the growth equation the short run Error Correction Model (ECM) is estimated. ECM indicates the speed of adjustment to restore equilibrium in the dynamic model. It is one lagged period residual obtained from the estimated dynamic long run model. The coefficient of error correction term indicates how quickly variables converge to equilibrium. Moreover it should have a negative sign and statistically significant at standard significant level. (I.e. p- value should less than 0.05).

Table 4.7 Error correction representation for the selected ARDL

Dependant variable D(LRGDP)			
Regressors	Coefficient	Standard Error	t-Statistic
D(LGCF)	0.17***	0.035	4.839
D(LHC)	0.10**	0.047	2.011
D(LEXT)	-0.01	0.016	-0.312
D(LEXAID)	-0.07***	0.025	-2.969
D(LEXD)	-0.02*	0.012	-1.921
D(INF)	0.002***	0.001	3.970
D(LLF)	0.07	0.189	0.355
D(FD)	0.003	0.002	1.177
Cointeq(-1)	-0.61***	0.109	-5.645
Cointeq = LRGDP - (0.28*LGCF + 0.15*LHC - 0.01*LEXT - 0.05*LFAID - 0.04*LEXD + 0.01*INF + 0.66*LLF + 0.01*FD + 6.78)			
R-squared	0.9986		
Adjusted R-squared	0.9980		
F-statistics	1695.514		
Prob(F-statistics)	0.000		

Source: Model Result

Note: the sign ***, ** and* denotes the coefficients are statistically significant at 1 %, 5% and 10% respectively.

The error correction coefficient, estimated at -0.61 is highly significant and has the correct negative sign. This shows that there is a very high speed of adjustment to equilibrium. The

highly significant error correction term further confirms the existence of a stable long run relationship (Tewodros, 2015). The coefficient of the error term implies that the deviation from long run equilibrium level of real GDP in the current period is corrected by 61 % in the next period to bring back equilibrium when there is a shock to a steady state relationship. In other sense approximately 61 percent of the disequilibrium from the previous year's shock converges back to the long run equilibrium in the current year.

The coefficient of determination (R-squared) is high explaining that about 99.86% of the variation in the real GDP is attributed or explained by the variations of the variables that are used in the model. In addition the F-statistics is significant that shows the model is good to explain the relationship between the variables in the short run.

As we seen from the above table (7) result similar to the long run gross capital formation in the short run is statistically significant even at 1% significance level. Other things remains constant a one percent increase in gross capital formation or fixed gross investment leads a 0.17 percent increase in real GDP in the short run. This result is consistent with the classical and neo-classical foundations in the theory of economic growth. Other empirical studies like Biswas and Kumar (2014) and Tewodros (2015).

Investment in human capital is also very significant factor in Ethiopian economy even in the short run. Other things being constant a one percent increase in human capital will lead a 0.10 percent increase in real output.

Foreign aid is also negative like in the long run but statistically significant in the short run even though its sign is unexpected. The negative sign of foreign aid may come because it creates dependency on foreign donors rather than working hard. The foreign country donors is not simply giving the aid they can get better opportunity and use their aid away of strengthening their relationships and try to gain some precious natural resources. Most foreign donor countries have the principle of give and take away. The other reason is the mismanagement or the use of foreign aid for unintended purpose rather than putting it into the economy by government officials. As the model result indicates that a one percent increase in Foreign aid will result a 0.07 percent decrease in real output of the economy. Some economists like Friedman (1958) and Bauer (1972) called end in aid, arguing that it is not the necessary requirement for economic growth of the country rather it may actually undermine it. Both Friedman and Bauer assert that foreign assistance to governments is

dangerous because it increases the powers of elite in the receipt governments, leads to corruption and hinders economic growth. It also discourages private sector investments by encouraging public sector led-growth (Haile, 2015). Mallik (2008), examined the effectiveness of foreign aid on economic growth from 1965-2005 in the six poorest highly aid dependent African countries namely Central Africa Republic, Malawi, Mali, Niger, Sierra Leone and Togo. His estimated result showed that five out of six countries foreign aid is a significant negative effect on economic growth exception of Togo due to its relatively proper management of aid. The finding is also similar with Nadmibri *et al* (2012) for SSA countries.

External debt is still negative and significant at 10% significant level but insignificant in the standard level of significance (i.e. 5% significance level). So external debt is in the short run it has not that much negative influence. The grand cost comes in the long run but there may also short-term loan repayments in the short run.

Export is insignificant both in the short run and in the long run with unexpected sign. The insignificant of export is due to Ethiopia's export commodities nature. Since Ethiopia exports primary agricultural products and those primary products are dependent on natural shocks in one side and price inelastic in the foreign markets on the other. Due to these reasons export in Ethiopia is not help the GDP well.

Inflation is also positively significant in the short run. A one percent increase in inflation will result a 0.002 percent in real GDP by holding other things remaining fixed. Despite its positive impact the magnitude of increment in real GDP due to the changes in inflation is low.

Unlike the long run labor force in the short run is positive and insignificant. This because in the Ethiopian case there are more unemployed or over employed in the short run. The unemployed people are unproductive and if there is over employed the marginal productivity of labor diminishes in the short run.

Financial development proxied by broad money supply as a percentage of GDP has positive sign but it is insignificant both in the short run and in the long run. This implies that the financial development is still not well developed.

5. CONCLUSION AND POLICY RECOMMENDATIONS

5.1. Conclusion

The main objective of this study is to investigate the determinants of economic growth in Ethiopia ranging the time from 1974 to 2015. The study have investigated the long run and short run relationships between real GDP and other economic variables such as gross capital formation, human capital, export, foreign aid, external debt, inflation, labor force and financial sector development by using Autoregressive Distributed Lag (ARDL) bound test approach to co-integration and error correction. Before applying the ARDL model, all variables are tested for their time series properties (stationary properties) using ADF and PP tests. ADF test result shows one variable (i.e. foreign aid) is stationary at level and the reaming variables are stationary at their first difference and the PP test indicates that inflation and foreign aid are stationary on their level while all the remaining variables are used in the model are stationary at their first difference. This confirms the reason why the researcher uses ARDL model.

In order to make the estimators efficient the model diagnostic tests are tested. The result shows that no evidence of serial correlation, no functional form problem (i.e. the model is correctly specified), the residuals is normally distributed and no evidence of hetroskedacity problem. The presence of long run relationships between real GDP and its determinants used in the model is tested by using bound test. The result revealed that F-calculated or F-statistics is greater than the upper bound critical value at standard significance level. As a result we reject the null which says there is no long run relationship between the dependant and independent variables.

After checking all the necessary tests and accepting the results, next the researcher has estimated the long run ARDL model and short run error correction model. The results of the model have shown that gross capital formation proxied by gross physical investment and human capital proxied by investments in education and health are statistically significant both in the short run and in the long run. These are the main engines of economic growth. As we have seen from the finding part a one percent increases in gross capital formation will increase real GDP by 0.28 percent and 0.17 percent in the long run and short run respectively during the study period. Similarly one percent increase in human capital will result the increase of real GDP by 0.15 percent and 0.10 percent in the long run and short

run respectively during the study period. Therefore, the endogenous growth model is applicable in Ethiopia. Inflation is also statistically significant in both the short run and long run irrespective of its sign change. If inflation increases by one percent real GDP will increase by 0.01 percent and 0.002 percent in the long run and short run respectively. Export has also unexpected sign but it is insignificant. External debt and laborforce are both significant in the long run with expected signs. A one percent increase in external debt will lead to decrease Real output by 0.04 percent while a one percent increase in labour force will tend to increase the real output by 0.66 percent. Foreign aid is insignificant in the long run but statistically significant in the short run and a one percent increase in foreign aid will lead a 0.07 percent decrease of real GDP in the short run. The other variable which has no influences on real GDP both in the short run and in the long run is financial development even if it holds its expected positive sign.

The short run error correction model (ECM) formulation reveals that there is convergence towards equilibrium in the long run and the adjustment is fairly strong(61%) per annum and statistically significant.

5.2. Policy Recommendation

Based on the finding of the study, the following policy recommendation made:

- Since gross capital formation or investment in physical asset is very significant factor for Ethiopian economy. So the government of Ethiopia should give greater attention by continuing the current trend to investment on infrastructures such as roads, telecommunication, hydro powers, railways, and industries etc. which are the engines for economic growth.
- In order to enhance the contribution of human capital the government of Ethiopia should allocate adequate finance in order to increase both the quantity and quality of education and to provide basic and improved health services to the society. This will bring the technological transfer, innovation and efficiency since education and health are the two main complementary pillars for development.
- Export sector is not still help the Ethiopian economy. So the government should give special emphasis and treatment on the sector to develop it from its infant stage and save foreign currencies.

- Regarding with foreign aid and external debt both has a negative effect on the Ethiopian economy. But for developing countries like Ethiopia, where capital is scarce it is inevitable to depend on alternative sources to finance its mega projects and to fill its resource and budget gaps. So the government and other concerning bodies should set a clear cut policy that will lead to the proper management of foreign aid and external debt received by allocating them to the intended purpose.
- The impact of inflation and its sign is unexpected for this research. But moderate or low inflation is important for economic growth because it increases or creates supply of goods and services. So the government should keep it as much as possible. The researcher recommends the one who will has interest to do further research on the area in order to investigate the effect of inflation on economic growth in Ethiopia by including other relevant variables.
- Ethiopia is labor abundant and capital scarce country. So in order to grow faster it should have used the abundant resources properly (uses labor intensive technology).the finding reveals that the positive impact of labor on the Ethiopian economy growth. Therefore, in order to increase the contribution of labor to growth, the government should upgrade the knowledge and skills of labor force so as to increase their efficiency.
- Finally, the financial sector in Ethiopia does not properly play its role. Finance is very important to facilitate either investment or the day to day activities as a whole. So the government should have a proper expansionary monetary policy to increases broad money supply so as to facilitate business activities and enhance the economic growth by developing the financial sector.

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LIST OF APPENDEXS

Appendix A: Descriptive summary statistics of the variables used in the model

Variables	Observation	Mean	Std. Dev.	Min	Max
RGDP	42	249752.6	192199.9	102407	810187
GCF	42	69992.17	77934.98	14116	311484
HC	42	10631.5	20613.83	208	89619
EXT	42	11209.31	19338.76	279	62243
FAID	42	17148.74	22418.96	801	74096
EXD	42	55559.76	98432.16	648	458850
INF	42	9.611905	9.941958	-10.6	36.4
LF	42	27.82381	9.801339	16.7	54.7
FD	42	12.11571	11.95937	1.08	45.83

Source: Stata 14.0 results

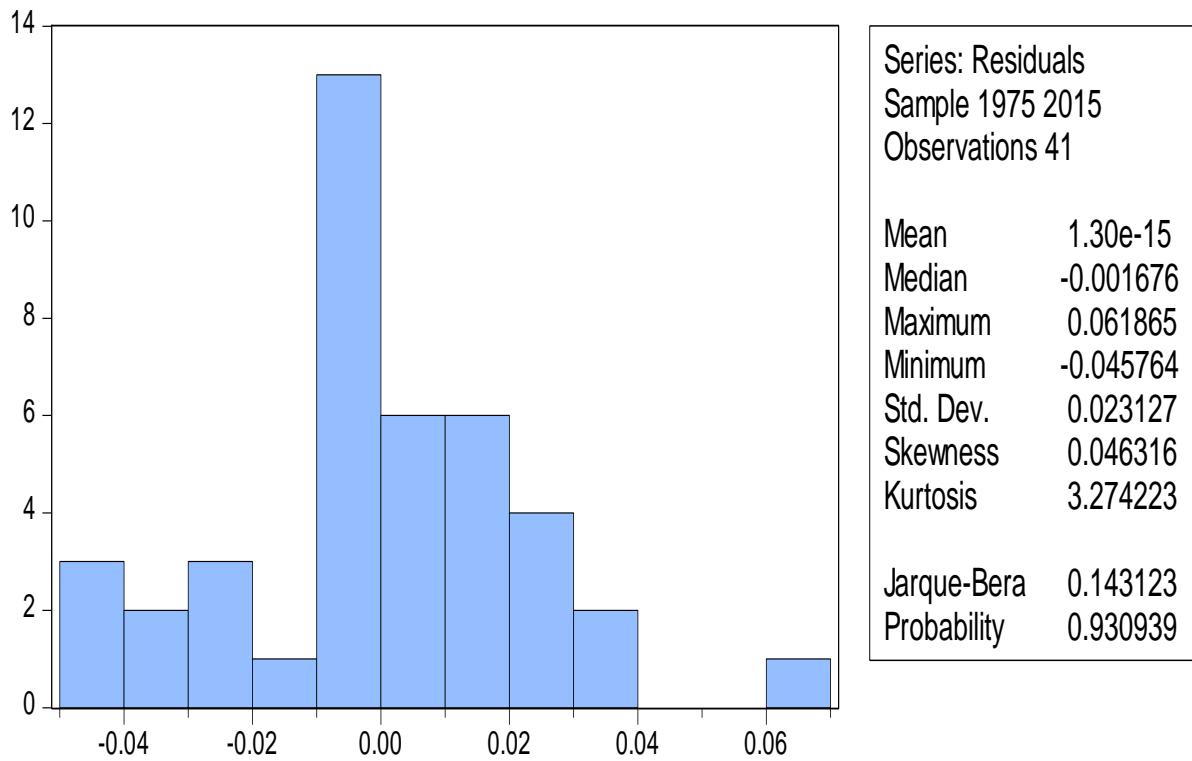
Appendix B: Phillips Peron Unit Root Test Results

Variables (at level and 1 st difference)	t-stat (with intercept but no trend)	Mackinnon(1996) One sided p values	t-stat (with intercept and trend)	Mackinnon(1996) One sided p values
LRGDP	5.580	1.000	0.255	0.998
D(LRGDP)	-4.484 ^{***}	0.001	-6.225 ^{***}	0.000
LGCF	2.410	1.000	-2.085	0.539
D(LGCF)	-8.370 ^{***}	0.000	-12.586 ^{***}	0.000
LHC	3.974	1.000	-0.450	0.982
D(LHC)	-5.010 ^{***}	0.000	-6.440 ^{***}	0.000
LEXT	0.416	0.981	-1.851	0.661
L(EXT)	-5.694 ^{***}	0.000	-5.725 ^{***}	0.000
LFAID	0.132	0.964	-3.626 ^{**}	0.040
LEXD	-0.292	0.917	-1.842	0.666
D(LEXD)	-5.287	0.000	-5.227	0.001
INF	-4.253 ^{***}	0.002	-4.245 ^{***}	0.009
LLF	3.326	1.000	0.267	0.998
D(LLF)	-4.758 ^{***}	0.000	-5.450 ^{***}	0.000
FD	7.084	1.000	2.258	1.000
D(FD)	-3.668 ^{***}	0.009	-5.106 ^{***}	0.001

Source: E-views 9.0 software result

The sign ***, **, and * indicates statistically significance at 1%,5% and 10% significance level

Appendix C: Normality condition of the residuals



Source: E-views 9.0 result

Appendix D: Real data entered to the regression (INF and FD are measured in percent, LF in millions of working age people and all other variables are measured in millions birr)

YEAR	RGDP	GCF	HC	EXT	FAID	EXD	INF	LF	FD
1974	102,407	19176	208	556	1089	648	10.7	16.7	1
1975	103,100	15866	209	498	1042	766	4.7	17	1.18
1976	104,155	15407	220	581	1091	901	18.9	17.3	1.44
1977	103,567	14116	219	689	801	995	21.9	17.5	1.47
1978	108,533	16959	255	634	865	1060	18.6	17.7	1.7
1979	113,795	20453	275	858	1062	1294	13.0	18	1.8
1980	115,224	21880	325	852	1067	1489	12.5	18.2	1.9
1981	115,111	22075	392	778	1367	1895	1.9	18.6	2.18
1982	126,707	21632	418	810	1139	2107	7.3	19	2.41
1983	118,729	28002	444	930	1932	3183	3.9	19.5	2.53
1984	107,221	16067	492	745	2222	3395	-0.3	20.1	30.3
1985	117,837	27052	512	924	4157	3910	16.4	20.7	3.78
1986	134,380	29350	566	795	3030	5386	6.5	21.3	3.95
1987	134309	38448	602	774	2599	6176	-9.6	22	3.8
1988	134767	27202	654	903	3733	6491	2.3	22.7	4.16
1989	140248	24516	670	737	2795	7257	9.6	23.5	4.5
1990	135165	19684	650	543	3364	7498	5.2	20.8	5.06
1991	130177	16754	717	279	3549	6551	20.0	21.6	6.2
1992	145799	29027	948	801	4848	18779	21.9	22.4	7.19
1993	148276	31469	1346	1239	9486	25722	7.7	23.1	7.27
1994	156247	35958	1563	2732	9907	27732	3.3	23.9	8.32
1995	172839	40856	1865	2539	7620	27088	13.4	24.8	9.77
1996	180911	43065	2031	3486	7308	26510	0.9	25.4	9.64
1997	178301	42821	2241	4143	6005	27917	-6.4	26.1	9.78
1998	188990	44834	2382	3637	7631	31566	3.9	27	11.05
1999	199102	44195	2181	3958	7903	44648	4.3	27.8	10.87
2000	215630	50811	3166	3867	9015	46269	5.4	29	12.01
2001	218897	57784	3112	3864	15009	52994	-0.3	30	12.36
2002	214166	52050	4307	4142	17316	58282	-10.6	31.2	13.56
2003	243234	70593	5055	5177	18494	62188	10.9	32.4	15.25
2004	271981	70719	6078	7331	19335	52094	7.3	33.6	15.72
2005	301449	83153	7726	8685	19957	52337	6.1	34.9	16.19
2006	335983	81346	10761	10458	20621	20215	10.6	36	16.74
2007	372231	91086	13416	13649	24985	25455	15.8	37.1	18.29
2008	404996	100693	16634	15218	35467	34451	25.3	38.2	19.8
2009	455826	123118	21941	26115	51916	71800	36.4	39.5	21.78
2010	515079	165380	29652	44526	58300	117963	2.8	40.8	24.93
2011	559622	207608	37446	54495	59711	152631	18.1	42.3	31.18
2012	618842	210908	45976	56014	59011	204194	34.1	43.8	37.33
2013	682359	259173	56157	62243	74096	267201	13.5	45.4	42.29
2014	753230	296901	73092	59860	71146	365622	8.1	47	40
2015	810187	311484	89619	59726	68256	458850	7.7	54.7	46
sources	NBE	NBE	MOFED& EEA	NBE	WB	MOFED	NBE	WB & UNCTAD	NBE

