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THE DETERMINANTS OF ECONOMIC GROWTH IN ETHIOPIA:

A TIME SERIES ANALYSIS

BY

TEWODROS GEBRU

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The Determinants of Economic Growth in Ethiopia:

A Time Series Analysis

Tewodros Gebru

A thesis submitted to the Department of Economics in Partial fulfillment of the requirements for the Degree of Master Science in Economics (Economic Policy Analysis).

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This is to certify that the thesis prepared by Tewodros Gebru, entitled: *The determinants of Economic Growth in Ethiopia*: *A Time series Analysis* and submitted in partial fulfillment of the requirements for the Degree of Master of Science in Economics (Economic Policy Analysis) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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ABSTRACT

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

Tewodros Gebru

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The main objective of this study is to investigate the determinants of economic growth in Ethiopia during the period 1974-2013. The Autoregressive Distributed Lag (ARDL) Approach to Co-integration and Error Correction Model are applied in order to investigate the long-run and short run relationship between the dependent variable (real GDP) and its determinants. The finding of the Bounds test shows that there is a stable long run relationship between real GDP, Physical capital, human capital, export, aid, external debt and inflation.

The empirical results reveal that both physical capital and human capital are found to have positive impact on economic growth while debt affects economic growth negatively and statically significant at 1 percent. However, the study found out that export of goods and service, foreign aid and inflation have statistically insignificant impact on economic growth in the long run. This study has also an important policy implication. The findings of this study imply that economic growth can be improved significantly when the physical capital and human capital increases. Hence policy makers and /or the government should strive to increase capital formation (investment) which is believed as a back bone of growth and has allocate adequate finance for human capital, which will help to work on quality of education and providing basic health services to the society. In addition to its effort, there should be a close monitoring and consistent debt management strategies, which is used to avoid misallocation and mismanagement of external debt problem.

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ACRONYMS

ADF	Augmented Dickey Fuller
AFDB	African Development Bank
AIC	Akaike Information Criterion
ARDL	Autoregressive Distributed Lag
BGP	Balance Growth Path
CSA	Central Statistical Agency
ECM	Error Correction Method
ECT	Error Correction Term
EEA	Ethiopian Economic Association
EPRDF	Ethiopian People Revolutionary Democratic Front
GCF	Gross Capital Formation
GDP	Gross Domestic Product
GMM	Generalized Method of Moment
GTP	Growth and Transformation Plan
HDI	Human Development Index
HIPC	Highly Indebted Poor Countries
IMF	International Monetary Fund
KPSS	Kwiatkowski Phillips Schmidt Shin
MDGs	Millennium Development Goal
MoFED	Ministry of Finance and Economic Development

NBE	National Bank of Ethiopia
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Square
OPEC	Organization of the Petroleum Exporting Countries
PASDEP	Plan for Accelerated and Sustained Development Plan to End Poverty
PMAC	Provision Military Administration Council
PP	Phillips Perron
R&D	Research and Development
RGDP	Real Gross Domestic Product
SBC	Schwarz Bayesian Criterion
SDPRP	Sustainable Development and Poverty Reduction Program
SSA	Sub-Sahara Countries
UEC	Unrestricted Error Correction
UN	United Nations
UNDP	United Nation Development Program
VAR	Vector Autoregressive
WBI	World Bank Index
WD	Durban Watson

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the study

Societies in general aspire for development. It is believed that economic growth explain much of the development aspect, countries spend much of their resources and time in an effort to ensure sustained economic growth.

Economic growth[1] is an issue of primary concern to policy makers in both developed and developing countries. As a consequence, growth theory has long occupied a central role in economics. It is a dynamic process, focusing on how and why output, capital, consumption and population change over time. The process of economic growth and the sources of differences in economic performance across nations are some of the most interesting, important and challenging areas in modern social science. The sources of economic growth is a question of great importance to many economists who are interested to know and search for factors enabling some countries to grow and develop while others are suffering from abject poverty.

Growth is usually calculated in real terms: that is inflation-adjusted terms to eliminate the distorting effect of inflation on the price of goods produced. Measurement of economic growth uses national income accounting. Economic growth or economic growth theory typically refers to growth of potential output. As an area of study, economic growth is generally distinguished from development economics. The former is primarily the study of how countries can advance their economies. The latter is the study of the economic aspects of the development process in

[1] Economic growth is defined as the increase in the market value of the goods and services produced by an economy over time. It is conventionally measured as the percent rate of increase in real Gross Domestic Product (IMF, 2012).

low-income countries. The trend of growth of real GDP can be considered as sustainable economic growth while the short-run fluctuations of growth over the trend can be thought of as business cycles. Economic development on the other hand includes economic growth, distribution of income; levels of literacy and education standards, levels of health care, quality and availability of housing, levels of environmental standards, unemployment and poverty (Seid, 2000).

The Economic growth of Ethiopia has shown various changes in different political regimes. These changes in government structure created a problem of inconsistency in implementing the policies by previous regimes as well as natural disaster like famine, drought, political instability and war (Alemayehu and Befekadu, 2005) had a depressing effect on the history of Ethiopian economic growth.

Because Ethiopia is one of the poorest countries in the world, its economy remains heavily dependent on agriculture, which accounts 43% (UNDP, 2014) of the GDP. Accordingly, 83% of the population gains its livelihood directly or indirectly from agricultural production. Despite the fact that the history of growth performance was poor in the past decades, the country has experienced strong economic growth in the current time. Real GDP growth averaged 11.2% per annum during 2003/04 and 2008/09 period, placing Ethiopia among the top performing economies in sub-Sahara Africa (NBE, 2013/14).

The Ethiopian economy 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 Sub Saharan Africa. 2012/13 was markedly successful in terms of maintaining macroeconomic stability and fiscal management as witnessed by inflation falling to a single digit, which had been a major challenge in the past two years. To achieve the vision of millennium development goals

(MDGs) by 2015 and becoming a middle-income country by 2025, the country performs much effort and economic activities while faces some challenges[2].

Ethiopia has a vision of becoming a middle income country in the coming one and half decades after implementing three successive five years development plan. At the end of the implementation of the growth and transformation plan (GTP, 2010/11-2014/15), the aim is to achieve MDGs. The development objective it to eradicate poverty in a relatively short period of time by implementing broad based development polices to enhance growth.

[2] The challenges that could impede the growth and transformation agendas, which include:

- A possible financial risk associated with growing stock of external debt (at 24.3% of GDP for 2012/13), foreign exchange shortage and limited financing options for the growth and transformation plan.
- Low levels of domestic savings and financial intermediation aggravated by negative real interest rates which continue to act as a disincentive to savings mobilization while hampering credit access.
- A decline in export value due to vulnerability to international commodity price fluctuations and few commodity choices for export market.
- The need to nurture a competitive private sector to drive the growth and transformation agenda. (UNDP report, 2014)

1.2. Statement of the Problem

Ethiopia is one of the poorest country in the world with a population of more than 88 Million (CSA, 2013) with subsistence agricultural sector. According to Alemayehu and Befekadu (2005), Ethiopia's history is full of conflict, drastic policy change and reversals. However, in the last 10 years Ethiopia is amongst the fastest growing non-oil economy as well as landlocked country in the world. Today the history of Ethiopia is changing from drought, famine, war and low economic growth to fast and sustainable economic growth. The Ethiopian economy shows an annual growth rate of 12.7% in the year 2004/05 and the annual average growth rate at a constant price was 11% for the period 2004/05 to 2012/13 (NBE , 2011/12).

Two decades ago, Ethiopian policy makers pursued a structural adjustment program which shifted emphasis from public sector to private sector. The goal was to encourage private domestic savings, private domestic investment and capital formation in order to enhance economic growth. In an attempt to achieve this goal, resources were diverted from current consumption and were invested in capital formation through privatization and commercialization of state enterprises.

The economy of Ethiopia is growing fast with a double digit since 2004. In the year 2012 fiscal year Ethiopia's economy grew by 9.7% and the tenth year in a row of robust economic growth. However, the African annual growth rate was 4.9% and that of Sub-Saharan countries was 5.3% for the same period (AFDB, 2012). According to African Economic Outlook report of 2012, Ethiopia was the 12^{th} fastest growing economy in the world and the annual average real GDP growth rate for the last decade was 10.9%. Moreover, the country's aggregate economy reached the sub-Saharan African 5^{th} biggest economy.

So far, just there are many studies such as, Seid (2000), Weeks *et al.*, (2004) and Tadesse (2011) done on factors affecting Ethiopian economic growth. Yet there is no comprehensive empirical study which determines factors affecting Ethiopian economic growth that includes export, aid, inflation, external debt, capital formation and human capital. In this study, identifying the macroeconomic determinants of economic growth is a major step to know factors responsible for the fast growth. The above researchers have tried to identify the major factors affecting economic growth in Ethiopia. However, there are many macroeconomic variables including export, aid, inflation, and external debt, which were not addressed in their studies. Therefore this study tries to fill this gab and empirically analyze the selected macroeconomic determinants of economic growth in Ethiopia during the specified period of time.

Moreover, this study attempt would be made to fill another research gap of the above studies. Tadesse used the Engle-Granger's two step procedure to test for the presence of cointegration. However this methodology is criticized for its weakness when there is more than one cointegrating. The Autoregressive distributed lag (ARDL) model is an alternative superior methodology, which has superior advantage than Engle-Granger and Johansen cointegration.

There is almost a universal consensus that macroeconomic stability, specifically defined as low inflation, is positively related to economic growth. Ethiopia has enjoyed improvements in its macroeconomic performance in the past decade. In spite of being the second most populous country in Sub-Saharan Africa, real GDP per capita has been steadily increasing in recent years. According to National Bank of Ethiopia report (2013/14), the growth of GDP per capita rose to USD 631 for the reporting period from USD 557 in the preceding year, registering 13.3% increase. GDP growth rates reflect this improvement, with average rates consistently exceeding

10 percent from 2004 to 2012. Along with this growth, however, the country has seen an accelerated, double-digit increase in the price of goods and services. More recently, the country faced a rising inflation problem. In 2008, inflation was reached at 29.1 percent and rose to 36.4 percent in 2009 (CSA,2010).

Post reform (post 1992), the Ethiopian government has been introduced a free market economy whereby the private sector would drive force in the economic growth. The huge public investment which focuses on infrastructure and pro-poor sector explained much of the economic performance from the expenditure side. Similarly the expenditure of socio-economic sector (expenditure on education, health) has been increasing form time to time, which expected to have a positive return to the economic growth in long run.

1.3. Objectives of the Study

The main objective of this study is to provide a comprehensive study and critical overview of the macroeconomic determinants of economic growth in Ethiopia in the specified periods.

Specifically the study tried to:

- Analyze the major determinants of economic growth in Ethiopia between the periods of 1974 - 2013 through applying the ARDL model
- Analyze the long run and short run relationship among the variables.
- Recommend the major macroeconomic indicators and actions that must be taken to speed up the process of economic growth and prosperity in Ethiopia.

1.4. Research Questions

There are many economic and non-economic factors affecting economic growth in Ethiopia. Therefore, this study basically focuses on the macroeconomic determinants of economic growth, which includes physical capital, human capital, export, aid, external debt and inflation; fore this reason the following questions should be addressed.

- What are the major determinants of economic growth?
- Which macroeconomic variable or variables more potent for economic growth in Ethiopia?
- To what extent the macroeconomic variables affect the growth rate?
- Is there a long run relationship among the real GDP and the selected macroeconomic variable?

1.5. Significance of the Study

Most of the studies carried out so far in this area have dealt with the determinants of economic growth that includes macroeconomic variable like physical capital, human capital, factors affecting productivity (technology) and some other factors like rainfall. However, an ample of empirical studies done in both developed and developing countries indicates that exports of goods and services, Aid, external debt and inflation also affect economic growth in the long run. Because one can be believe that a continuous and multi-disciplinary rigorous study is required to take the policy implications seriously as relevant to Ethiopia. Therefore this study tried to provide comprehensive evidence on the selected macroeconomic determinants of economic growth in Ethiopia during period of 1974 -2013.

The issue of determinants of economic growth is still on debate, therefore, the significance of this study is to provoke and lead a path for further studies in the field. But its immediate outcome is for policy makers as a bench marks.

1.6. Limitations of the study

This study is limited to the period between 1974-2013 (Derg regime and EPRDF regime), which covered forty years of time-series data on macroeconomic variable that can affect economic growth.

The limitation of this study was the one associated with data availability. There are shortages of data, particularly, on human capital and physical capital, specially, for the early period. Because of this problem, total investment and expenditure of health and education are used as a proxy for physical capital formation and human capital, respectively.

The most challenge while doing this study came from inconsistency of data from different organizations. So as to avoid such inconsistency attempt is made to stick to the same source of data. The main aim of this study is to analyze the macroeconomic determinants of economic growth. However, there are also non-economic factors that affecting growth like political stability, rules of economic regulation (monitoring and fiscal policy), and rules of law (property right) are not addressed here and might be consider other limitations of this study.

1.7. Organization of this paper

There are six chapters in this study. The first chapter is dealing with introduction of the study, statements of problem and objective of the study. The second chapter presents the theoretical and empirical literature reviewed related to economic growth. Chapter three contains the methodological aspect of the study which includes: model speciation, estimation producer and variable definition. In chapter four, a brief review about Ethiopia economy performance is presented. Chapter five contains the regression result and its interpretation. Finally, chapter six provides the conclusion and policy recommendation emanating from the study.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Theoretical Literature

2.1.1. Theories of economic growth

The process of economic growth and the sources of differences in economic performance across nations are some of the most interesting, important and challenging areas in modern social science. The analysis of the process of economic growth was a central feature of the work of the classical economists, as represented chiefly by Adam Smith, Thomas Malthus, David Ricardo, and Karl Marx were all concerned with the growth of the economy (I.e., the increase in the production of goods and services over time).

The interest of these economists in problems of economic growth was rooted in the concrete conditions of their time. Specifically, they were confronted with the fact of economic growth and social changes taking place in contemporary English society as well as in previous historical periods. 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.

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 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.

A variety of studies have addressed the issue of economic growth, mostly using either cross-country or panel data approach (Barro, 1997, 2003). While most of these studies utilize the standard neo-classical growth Model, More recent studies focus on endogenous growth models. There have been two periods of powerful work on growth theory, the first was in the 1950s and 1960s, and the second (30 years later) in 1980s and 1990s. In the first period, the neoclassical theory of growth was best known contribution by Robert Solow (1956).

2.1.1.1. The Keynesian theory of growth

Unlike Smith's conception of saving (frugality) as an important prerequisite of growth, Keynesians approach gives emphasis to the demand aspect. According to the Keynesian theory of growth demand from consumer and state were the prerequisite for economic growth. This assumption means that changes in income, especially disposable income, is the prime influence on consumption expenditures. If the household sector has more income because of the economy

is expanding, then they increase consumption expenditures. If the household sector has less income because of the economy is contracting and a large group of workers is unemployed, then they decrease consumption expenditures.

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. Roy Harrod (1939, 1948) and Evsey Domar (1946, 1947) were developing the growth model independently that relate an economy's rate of growth to its capital stock. However, the assumptions and results are, basically the same. While Keynes emphasized the impact of investment on aggregate demand, Harrod and Domar emphasized how investment spending also increased an economy's productive capacity (a supply-side effect).

The Harrod-Domar (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 savings, and the productivity of investment (i.e. in order to grow, economies must save and invest a certain portion of their GDP). The labor force is assumed to grow at a constant exogenous rate *n* and thus, $\frac{\dot{L}}{L} = n$. Thus, 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. . $\frac{\mathbf{L}}{\mathbf{Y}}$)

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

$\mathbf{Y_t = C_t + S_t}$ ---------- [2],

Where Y_t = GDP, C_t = consumption and S_t = saving.

In the Harrod-Domar growth model, gross investment (I_t) is assumed to be equal to aggregate saving (S_t);

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

Subtitling [2.3] into [2.2] yields [2.4]

$\mathbf{Y_t = C_t + I_t}$ ---------- [4]

The evolution of the capital stock over time is given by:

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

Where $\boldsymbol{\delta}$ is the rate of depreciation of capital stock. By assuming that total saving (S_t) is some proportion (s) of GDP (Y_t),

$\mathbf{S_t = sY_t}$ ---------- [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 [2.5] as:

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

Dividing both sides by v, and subtracting Y_t from both sides of equation [2.7] yields equation (2.8):

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

Dividing both sides equation [2.8] by Y_t yields that:

$\frac{\Delta Y}{Y} = \left(\frac{s}{v}\right) - \delta$, $\rightarrow \mathbf{g_y} = \left(\frac{s}{v}\right) - \delta$ ---------- [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 ratio and depreciation rate, the faster will an economy grow (Brian Snowdon and Howard R. Vane, 2005).

2.1.1.2. The neo-classical theory of Growth

School of thoughts and theories on economic growth can be traced back to the classical economists of the eighteenth and nineteenth century, whose works are briefly reviewed alongside the transition to neo classical growth theory. The basic framework of neoclassical growth models was first developed by Robert Solow (1956) and Trevor Swan (1956). This neo-classical model 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.

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".

This model (Solow) was started by criticizing the Roy Harrod and Evsey Domar (Harrod, 1939 and Domar 1946) models for its weaknes[3].

[3] The production takes place under conditions of fixed proportions and there is no possibility of substituting labor for capital in production. "Theory of Economic Growth (Solow, 1956)"

Based on his growth model, high investment rate (saving rate), high level of technology, skilled human capital, low level of population growth rate and low rate of capital depreciation are the most determinants of economic growth in long run. According to this simple mathematical model, economic growth can be measured as follows.

$$\Delta \mathbf{Y_t} = \frac{\partial \mathbf{Y} \Delta \mathbf{K_t}}{\partial \mathbf{K}} + \frac{\partial \mathbf{Y} \Delta \mathbf{L_t}}{\partial \mathbf{L}} + \frac{\partial \mathbf{Y} \Delta \mathbf{A_t}}{\partial \mathbf{A}} \text{ ---------- [10]}$$

When we divide both sides of [2.10] by $Y_{t,}$ it becomes that:-

$$\frac{\Delta \mathbf{Y_t}}{\mathbf{Y_t}} = \frac{\partial \mathbf{Y}}{\partial \mathbf{K}} \frac{\Delta \mathbf{K_t}}{\mathbf{Y_t}} + \frac{\partial \mathbf{Y}}{\partial \mathbf{L}} \frac{\Delta \mathbf{L_t}}{\mathbf{Y_t}} + \frac{\partial \mathbf{Y}}{\partial \mathbf{A}} \frac{\Delta \mathbf{A_t}}{\mathbf{Y_t}} \text{ ---------- [11]}$$

The above equation decomposes GDP growth into portions that can be attributed to growth in the capital stock, the labor force, and the technology level. Then

$$\frac{\partial \mathbf{Y}}{\partial \mathbf{K}} * \frac{\Delta \mathbf{K}}{\mathbf{Y_t}} = \frac{\partial \mathbf{Y}}{\partial \mathbf{K}} * \frac{\mathbf{K_t}}{\mathbf{Y_t}} * \frac{\Delta \mathbf{K}}{\mathbf{K_t}}$$

$$= \boldsymbol{\beta_k} \frac{\Delta \mathbf{K}}{\mathbf{K_t}}$$

$$= \boldsymbol{\beta_k g_k}$$

Using same methodology for labor and technology, reduced form of Equation [2.11] in growth form is as follows.

$$\mathbf{g_y} = \boldsymbol{\beta_k g_k} + \boldsymbol{\beta_L g_L} + \boldsymbol{\beta_A g_A} \text{ ---------- [12]}$$

Or $\boldsymbol{\beta_A g_A} = \mathbf{g_y} - (\boldsymbol{\beta_k g_k} + \boldsymbol{\beta_L g_L})$ ---------- [13]

Since the Solow's growth model assumption was constant return to scale and perfect competitive market, the summation of the share of capital and labor is a unity. So if share of capital is $\beta_{k,}$ then the share of labor is $1-\beta_k = \beta_L$ and the above equation can be rewrite as

$$\boldsymbol{\beta_A g_A} = \mathbf{g_y} - (\boldsymbol{\beta_k g_k} + (\mathbf{1} - \boldsymbol{\beta_k}) \mathbf{g_L})$$

Where $g_{y=}$ Growth rate of Real GDP

$g_{k=}$Growth rate of physical capital

$g_{L=}$ Growth rate of human capital

$g_{A=}$ Growth rate of technology and β_k , β_L, β_A are the marginal elasticity of capital, labor force and technology respectively. So if we have observations on the growth rate of output, the labor force, and the capital stock, we can have an estimate on the growth rate of total factor productivity. Equation [2.13] defines as the "Solow residual" in its long run growth model.

According the neo classical theory of growth, the model makes three important forecasts. First, increasing capital relative to labor creates economic growth, since people can be more productive given more capital. Second, poor countries with less capital per person grow faster because each investment in capital produces a higher return than rich countries with sufficient capital. Third, because of diminishing returns to capital, economies eventually reach a point where any increase in capital no longer creates economic growth and which is called a steady state[4].

2.1.1.3. The Endogenous theory of Growth

In the mid-1980s it became increasingly clear that the standard neoclassical growth model was theoretically unsatisfactory as a tool to explore the determinants of long-run growth .The main limitation of the Solow model is that technological progress is assumed exogenous and common across countries (Elhanan Helpman, 2004). The model without technological change predicts that the economy will eventually converge to a steady state with zero per capita growth. The fundamental reason is the diminishing returns to capital. The basic improvement of the new

[4] Based on Robert Solow and Trevor Swan, stead state is a point occur investment equals depreciation and the economy reaches its equilibrium, which may occur during a period of growth.

growth theory or endogenous growth theory over that model is that it explicitly tries to model technology rather assuming it to be exogenous. In essence, it looks for determinants of technology frontier upward continuously. In this theory, the central motive of profit maximization of business firms are considered to determine technological progress as these firms involve in research and development (R&D) seeking new and better idea.

During the mid-1980s several economists, most notably Romer (1986) and Robert Lucas (1988), sought to construct alternative models of growth where the long-run growth of income per capita depends on investment decisions rather than unexplained technological progress. Romer (1986) and Lucas (1988)) was developed an economic growth model that includes mathematical explanation of technological advancement, which incorporates a new concept of human capital (skill and knowledge) that make workers productive. Unlike physical capital, human capital has an increasing rate of return. Therefore, overall there are constant rate of return to capital and economies never reach a steady state. According to the Endogenous theory of growth, economic growth does not slow as capital accumulation, but the rate of growth depends on the type of capital a country invest in. As research indicates that increasing human capital (education) and technological change (innovation) fast economic growth in long run (Elhanan Helpman, HulyaUlka, 2004).

The first version of endogenous growth theory was **AK** theory, which did not make an explicit distinction between capital accumulation and technological progress. In effect it lumped together the physical and human capital whose accumulation is studied by neoclassical theory with the intellectual capital that is accumulated when innovations occur. An early version of **AK** theory was produced by Frankel (1962), who argued that the aggregate production function can exhibit a constant or even increasing marginal product of capital. In the special case where the marginal

product of capital is exactly constant, aggregate output Y is proportional to the aggregate stock of capital K.

Thus: $\mathbf{Y = AK}$ ---------- [14], where A is a positive constant.

According to **AK** theory, an economy's long-run growth rate depends on its saving rate. For example, if a fixed fraction **s** of output is saved and there is a fixed rate of depreciation **δ**, the rate of aggregate net investment is:

$\dot{K} = sY - \delta K$ ---------- [15]

Dividing both side of equation [2.15] by K and simplifying it yields:

$\frac{\dot{K}}{K} = s\frac{Y}{K} - \delta \rightarrow g_k = sA - \delta$ ---------- [16], where g_k is capital growth rate and $A = \frac{Y}{K}$, Hence an increase in the saving rate **s** will lead to a permanently higher growth rate. Romer (1986) produced a similar analysis with a more general production structure, under the assumption that saving is generated by inter-temporal utility maximization instead of the fixed saving rate of Frankel. Lucas (1988) also produced a similar analysis focusing on human capital rather than physical capital.

The Romer model tries to explain why and how advanced countries of the world exhibit sustained growth. According to his model, technological progress is driven by R&D sector in advanced world and endogenizes the technological progress by introducing an R&D sector, i.e. search of new ideas by researcher interested in profiting from their invention. The aggregate production function in the Romer model is:

$Y = K^{\alpha}(AL_y)^{1-\alpha}$ ---------- [17], where **A** denotes for technology and $\mathbf{L_y}$ is part of labor force, which are numbers of people engaged in production of output.

One of the key equations in endogenous growth model (Romer) is the one describing the research and development (R&D) sector. Accordingly, technology (A) is the number of ideas, or stock of knowledge accumulated up until time t. The number of new idea $\dot{\mathbf{A}}$ is equal to the number of people devoting their time in discovery new idea ($\mathbf{L_a}$), multiplying by the rate at which they discover new ideas **(φ).** Thus:

$$\frac{\mathbf{dL_a(t)}}{\mathbf{dt}} = \boldsymbol{\varphi}\mathbf{L_a(t)} \text{ ---------- [18]}$$

Labor is used either to produce goods, L_y, or to produce new ideas L_a. So the economy faces the following resource constraint:

$L = L_y + L_a$

The rate, at which new ideas are discovered, $\boldsymbol{\varphi}$ might be constant, or an increasing function of **A.** Therefore the rate at which new ideas discovered may be rewritten as:

$\boldsymbol{\varphi} = \boldsymbol{\theta}\mathbf{A}^{\boldsymbol{\gamma}}$ ---------- [19], where $\boldsymbol{\theta}$ and $\boldsymbol{\gamma}$ are constants.

Notice that with $\boldsymbol{\gamma} > 0$ the productivity of research increases with the stock of ideas that have already been discovered. On the contrary with $\boldsymbol{\gamma} < 0$, discovering new ideas becomes harder over time. With $\boldsymbol{\gamma} = 0$ the discovery rate is independent from the stock of knowledge. It is possible that new ideas are more likely when there are more persons engaged in research. Thus, the effect of L_a is not proportional. Hence, it can be assumed that it is $\mathbf{L_a^{\mu}}$ that enter in the production function of new ideas, with $0 < \boldsymbol{\mu} < 1$. Therefore general production function of new ideas is:

$$\dot{\mathbf{A}} = \boldsymbol{\theta}\mathbf{L_a^{\mu}}\mathbf{A}^{\boldsymbol{\gamma}} \text{ ---------- [20]}$$

Dividing both side of [2.20] by **A** yields [2.21]

$$\frac{\dot{\mathbf{A}}}{\mathbf{A}} = \boldsymbol{\theta}\frac{\mathbf{L_a^{\mu}}}{\mathbf{A}^{1-\gamma}} \text{ ---------- [21]}$$

Along the balanced growth path (BGP), $\frac{\dot{A}}{A} = g_A$, $\frac{\dot{L}}{L} = n$. Thus, the numerator and the denominator should grow at the same rate, which means that:

$\mu \frac{L_a}{L} - (1 - \theta) \frac{\dot{A}}{A} = 0$. Rossi (2012), Simplifying this equation, finally it yields that:

$g_A = \frac{n\mu}{(1-\theta)}$ ---------- [22], both μ and θ are parameters, such as subsidies to research and development. The implication is that the growth rate of researchers and parameters of production function for ideas determine the long-run growth. Intuitively, it is highly likely to get people with brilliant mind in large population than small one (Jones, 1998, as cited in Seid, 2000).

2.2. Empirical Literature

In connection with the above discussions (the theoretical literature review), numerous researchers have examined sources of growth for cross country differences, 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.

There are many empirical studies conducted on determinants of economic growth (Ficher, 1993; Barro, 1991, 1997; Zafar Iqbal *et al.*, 1998; Edwin Dewan *et al.*, 2001; Ndambiri H.K *et al.*, 2012; Patrick Enu *et al.*, 2013; Biswas and Saha, 2014) and many more. Some of them are conducted to test the validity of the traditional growth models and others are extensions of the basic models. Those studies determine the major source of economic growth and mostly focus on cross-country basis rather than on a single country. According to empirical studies of the above researchers', Country's economic growth is influenced by several macroeconomic variables like physical capital formation (formally gross investment) , labor force (human capital) , export

level, Aid, money supply, general price level (inflation), government expenditure, external debt etc. These relations are reviewed in this section as follows.

2.2.1. Physical Capital Accumulation Versus Economic Growth

Theoretically the relation between capital formation and growth can be explained by 'Q' theory. As per this theory capital formation acts as the main driving force of economic growth. Capital formation refers to the proportion of present income saved and invested in order to enhance future output and income. It usually results from acquiring of new factory, machinery, equipment and all productive capital goods. The rate of accumulation of physical capital is one of the main factors determining the level of real output (GDP). Basically capital acts as the most fundamental input in a production system. It provides the base of growth of an economy. There exists a non-linear positive relation between capital formation and growth in general depending on the degree of efficiency of the capital use within the economic system. So the level of capital used within the economy is not only important but also the way it is used is also an important determinant of economic growth.

Several country level empirical studies (Zafar Iqbal *et al.*, 1998) and (Biswas and Saha, 2014) in Asia; Dewan and Hussein (2001) in 41 middle-income developing country including Africa; (Ndambiri H.K *et al.*, 2012; Patrick Enu *et al.*, 2013 and Kanu *et al.*, 2014) in Africa; (Weeks *et al.*, 2004) and (Tadesse, 2011) in Ethiopia. The above studies have found critical linkage between physical capital formation and the rate of growth. It is claimed that even a little robust growth rate can be sustainable over a long period of time only when a country is capable of maintaining capital formation at a sizeable proportion of GDP. It has been observed that any proportion less that 27 per cent can't sustain economic growth (Biswas and Saha, 2014). It is

estimated that the ratio of gross capital formation to GDP in the Sub-Saharan African countries which has experienced poor growth in the 1990s was less than 17 per cent compared to 28 percent in advanced countries (M. E. Hern´andez-Cat´a, 2000).

A time series analysis conducted in India using the Johansen co-integration method with annual data ranged from 1980/81 to 2010/11 found that, gross domestic capital formation (proxy for physical capital accumulation) and economic growth have positive relationship and statistically significant (Biswas and Saha, 2014). Accordingly physical capital is the main source of economic growth. In addition the result suggests that employment, export, foreign direct investment and money supply have positive effect on India's GDP growth where as inflation and fiscal deficit have negative effect. Similarly, a research done in Pakistan (Zafar Iqbal *et al.*, 1998) based on multiple regression frameworks over the period 1960 to 1997 indicates that, increasing the stock of physical capital would contribute to economic growth at large. According to the result, a one percent increase in physical capital- GDP ratio increases per capita real income by 0.21 percent and real GDP growth by 0.23 percent per annum. This result indicates that the higher rate of physical capital accumulation leads to higher rate of economic growth (both per capita income and real GDP). The other empirical work on growth is the one conducted by Dewan and Hussein (2001). This study was conducted in 41 middle-income developing countries including Africa based on panel data. The results suggest that apart from growth in the labor force, investment in both physical and human capital, as well as low inflation and open trade polices (less trade barriers), are necessary for economic growth. Furthermore, the ability to adopt technological changes in order to increase efficiency is also an important. Since many developing countries have a large agricultural sector, adverse supply shocks in this sector was

found to have a negative impact on growth. The growth rate in real GDP of one percent is due to the change of gross fixed investment of 0.17 percent (Ibid).

According to Ndambiri H.K *et al.* (2012), a study done in 19 sub-Sahara Africa countries, (based on panel data) for the period 1982-2000 indicates that, Physical capital formation is the main determinants of economic growth in the region. Based on the econometric result, a 1 percent change in physical capital was likely to increase the economic growth by 3.3 percent in the long run. Similarly, the research done in Ghana by Patrick Enu *et al.* (2013) between the period 1970 and 2011 applying the Johansen methods of co-integration indicates that physical capital and economic growth have positive and statistically significant relationship. The study found out that physical capital, labor force, foreign direct investment, foreign aid, consumer price index, government expenditure and military rule are the significant determinants of growth in real gross domestic product per capita in Ghana in the long run. From the results, physical capital increases by a unit, growth in real GDP per capita also increases by 8.4 units. This means that a percentage increase physical capital lead to more than a percentage increase in real GDP per capita growth.

Though there is rich literature on determinants of economic growth, little has been done in Ethiopia. Some of those have done on the macroeconomic performance rather than on the determinants of economic growth. Recent works in economic growth in Ethiopia were the studies done by Seid (2000); Weeks *et al.* (2004) and Tadesse (2011) were the best one. According to Seid (2000) study done on the Ethiopian economic growth during the period 1960/61 and 1998/99 by applying methods of Johansen co-integration, fixed capital formation is statistically insignificant. Rather the main finding or determining factor is that economic growth in Ethiopia were rainfall, export level and labor force in log run. However the research conducted by Tadesse (2011) during 1981 and 2009 found that the economic growth in Ethiopia

was driven by physical capital and human capital, which account 42 and 56 percent, respectively. On the other hand a research done in Ethiopia (Weeks *et al.*, 2004), indicates that the contribution of physical capital to growth is found to be statistically significant in short run despite the growth elasticity was less (0.30) comparing to Tadess's result (I.e. 0.42).

2.2.2. Human Capital versus Economic Growth

From the early 1990s, various studies have attempted to identify the determinants of economic growth; long-run growth is endogenous rather than exogenous (Romer, 1986; Lucas, 1988; Mankiw *et al.*, 1992). The concept of human capital refers to the abilities and skills of human resources of a country, while human capital formation refers to the process of acquiring and increasing the number of people who have the skills, good health, education and experience that are critical for economic growth. Thus, investment in education and health are considered as human capital development. Human capital plays a special role in a number of models of endogenous economic growth. In Romer (1990) human capital is the major input to the research sector, which generates the new products or ideas that underlie technological progress. Thus, countries with greater initial stocks of human capital experience a more rapid rate of introduction of new goods and thereby tend to grow faster.

Economic theory suggests that human capital would be an important determinant of growth, and empirical evidence for a broad group of countries confirms this linkage. Many economists use different measurement to proxy human capital, however, the assumptions and results are, nevertheless, basically the same. The study conducted in 73[5] developing countries during 1960 to

[5] OECD 22 countries, Middle East/North Africa 14 countries, Sub-Sahara 14 countries, and Latin America/Caribbean 23 countries (Barro, 1991).

1985 by Barro (1991) was the famous one. In his study the average number of years of education attainment (School attainment) was used as measurements of human capital. The result indicates that Countries that start with a higher level of educational attainment grow faster for a given level of initial per capita GDP.

Based on his regression result, 2.3 percent change of human capital (Educational growth) will bring 1.7 percent of economic growth in log run. Similarly, (Florian Schutt, 2003) uses the same measurement as Barro to proxy human capital and found that human capital did matter of economic growth. The channels through which it may affect output growth include direct productivity effects and more indirect effects due to externalities, facilitated technological adoption, or enhanced productivity of R&D.

Some researchers use education and health expenditure as proxy of human capital. A study conducted in India (Haldar and Mallik, 2006) was used expenditure in education and health, school enrollment as proxy measurement of human capital jointly with other macroeconomic variable during the period 1960 to 2005 applying the Johansen methods of co-integration. According to their result, both school enrollment and expenditure in education and health (proxy of human capital) were positively related with growth and had statistically significant effect in long-run on per capita gross national product. Similarly, a research done in India (Biswas and Saha, 2014) during the period 1980/81 to 2010/11, total employment was used as proxy of labor force (human capital) jointly with other macroeconomic variables to analyze determinants' of economic growth. The result suggests that gross domestic capital formation, employment, export, foreign direct investment and money supply have positive effect on India's GDP growth where as inflation and fiscal deficit have negative effect.

Recently research conducted in Africa that analyzed the determinants of economic growth in the long term. A study done by Ndambiri H.K *et al.* (2012) during the period 1982 to 2000 by applying Generalized Method of Moments (GMM) in 19 Sub-Sahara Africa is one of them. In this study life expectancy (proxy of human capital) was one explanatory variable to account for the factors that influence economics growth of the region. Results of the study indicate that physical capital formation, export and human capital significantly contribute to the economic growth among Sub-Saharan countries. This result indicates that a one unit rise in literacy rate was likely to improve GDP performance by 35.9 percent in the long run. In addition the research conducted in Ghana by Patrick Enu *et al.* (2013) during the period 1970 to 2011 had similar result; I.e there is a direct relationship between human capital and economic growth. However the human capital measurement was different from the above. The active labor force (people age group 15-65 as percentage of total population) was used to proxy human capital in the economic growth model. The study found out that in the long run, physical capital, labor force, foreign direct investment, foreign aid, consumer price index, government expenditure and military rule are the significant determinants of growth in real gross domestic product per capita in Ghana. However, the relationship between labor force and economic growth were inversely related. As results indicates that a unit increase in labor force will cause growth of real GDP per capita to decrease by 65.7 units. This shows that a percentage increase in the type of labor force produced now will lead to a more than percentage fall in real GDP per capita growth.

Few studies conducted in Ethiopia, which analyzed the impact of human capital on the economic growth. One of those was the study conducted by Woubet Kefle (2006) in partial fulfillment of the requirement for degree of master in economics in Addis Ababa University. The study was conducted for the period 1971 -2005 by applying an error-correction method (ECM) taking average years of schooling as measurements of human capital. The macroeconomic evidence from the study showed that human capital variable in the forms of average years of schooling had insignificant impact of the level of output. According to him schooling might not actually be creating the required skills or raising worker's productivity. Besides, in the wake of a stagnant demand for labor, a rise in the supply of educated labor could only lead to a decline in the returns. However a study done by Tadesse (2011) based on time series empirical analysis, which analyzed source of economic growth during the period 1981 to 2009 found out that the economic growth of Ethiopia was driven by labor force, which account for 56 percent during the period under considerations. Despite the result here with statistically significant and positively related with economic growth, human capital was proxied differently. Therefore active labor force (both employed and unemployed, people aged 15 and more) as percentage of total population was used to proxy human capital. More or less most literature reviewed here indicates that human capital is the main determinants of economic growth, whatever the magnitude differs.

2.2.3. Export versus Economic Growth

Exports of goods and services represent one of the most important sources of foreign exchange income that affluence the pressure on the balance of payments and create an employment opportunities. An export led growth strategy aims to provide producers with incentives to export

their goods through various economic and governmental policies. It is important to note that a large number of studies on the importance of exports in economic performance and the relationship between exports and aggregate economic activity (economic growth) have been conducted over the years, particularly in recent years. It is gratifying to observe that in recent times, there has been great and increasing interest in the study of exports and economic growth within the context of developing countries.

Numbers of studies have been conducted to examine the link between exports and economic growth. These studies have been proved that there exists a strong relationship between exports and economic growth positively (Iqbal and Zahid, 1998; Faye, 2001; Khaled R.M. *et al.,* 2010; Ndambiri H.K. *et al.,* 2012; Ugochukwu and Chinyere, 2013; Biswas and Saha, 2014). A research done in Pakistan during 1959/60 to 1996/97 Applying multiple regression technique (Iqbal and Zahid, 1998) showed that, export and economic growth have direct relationship during the specified period of study. Their result indicates that a one percentage increase in export-GDP ratio raises the growth rate of GDP per capita by 0.7 percentage points and real GDP by 0.77 percentage points per year. In addition the positive relationship between export and economic growth have also confirmed in Indian economy (Biswas and Saha, 2014). This research was conducted during 1980/81 to 2010/11 and applying Johansson cointegration technique to test the long run relationship among the variables. As the result showed that one percent increase in export of goods and service will raises the GDP of Indian by 0.965 percent.

Moreover, researches conducted in Africa have reported similar result. According to Khaled R.M. *et al.,* (2010), which was conducted during 1970 to 2007 in Libya, export and economic growth have direct relationship. This study found out that any rise in exports growth would have

a positive influence on economic development in both short and long-runs. Similarly, a study done in 19 Sub-Sahara Africa countries, (based on panel data) for the period 1982-2000 indicates that, export was an important determinant of economic growth. As a result a one percent increase in export-GDP ratio had probability of increasing GDP by 2.5 percent. Moreover, the study found out that, economies that are more open to trade and capital flows have higher GDP per capita and the economy was grew fast. In the same way, a study done in Nigeria (Ugochukwu and Chinyere, 2013) during the period of 1986 to 2011 showed that, both Oil export and non-Oil export have positive and statistical significant impact on economic growth. They found that, for ever one percent increase in the value of oil export (holding other variables constant), the GDP will increase by 0.62 percent, And for every one percent increase in the value of non-Oil export, and GDP will increase by 0.29 percent.

When we come to Ethiopia, the research result was inconsistent. A research done by Faye (2001) indicates that there was a positive and significant impact between export and economic growth in the Ethiopian context. According to his result, the rate of real growth rate of real export has positive effect on the rate of economic growth. Not only this but also he found that, there was a strong positive relationship in the long run than in the short run. Similarly, a study done by Soressa (2013) Appling the Autoregressive distributed lag model (ARDL) and Grange causality for the period 1960 to 2011 found that, a one percent increase in export will lead to increase the economic growth by 0.57 percent in long run. Moreover, the research done by Hailegiorgis (2012) during 1974 to 2009 by using granger causality found that, there is an evidence of unidirectional causality between export and economic growth in Ethiopia (I.e. export growth causes economic growth).

However, the study of Gezahegn (2012), which was conducted during 1981 to 2011 that analyzed the long run effect of export volatility on economic growth, was inconsistence with the above studies. According to the study empirical finding, the long run effect of export volatility seems to have negatively statistical effect on output growth on Ethiopia. In addition the study found that export was insignificant to the Ethiopian economic growth even though there was a positive relationship between export and economic growth during the study period.

2.2.4. Foreign Aid versus Economic Growth

Foreign capital inflows are receiving due attention because of their potential to finance investment and perceived to promote economic growth in the recipient country. The growing divergence in saving and investment rates, export-import gap (foreign exchange constraints to import capital goods) and budget deficits in developing countries make them to depend highly on inflow of foreign capital. Poor countries like Ethiopia lack sufficient domestic resources to finance investment and the foreign exchange to import capital goods and technology. The existing situation in Ethiopia is a living example of the scenario which binds economic growth.

There was different research (empirical study) on foreign aid and economic growth that generated mixed results (both negative and positive) in log run. A study done by Ndambiri H.K *et al.* (2012) on Sub-Sahara Africa countries using panel data indicates that there was negative relationship between foreign aid and economic growth. According to their result every unit increase in the foreign aid was likely to lead to a decline in GDP growth by 7.7 percent. Similarly, Malik (2008) argued that there was significant and negative impact of foreign aid on economic growth in Sub-Saharan African (SSA) countries. The study conducted by E.M.Ekanayakeet *el al.* (2008) on 85 developing countries (Asian, African, Latin America and

Caribbean) for the period of 1970 -2007 found that mixed results. Aid had negative impact on economic growth for Asia and Latin America countries. However, the study found that Aid was positively related with economic growth in Africa countries. Similarly, the IMF working paper done by (Camelia *et al.,* 2009) in developing countries for the period 1960-2000, showed that foreign aid promotes economic growth in long run.

In addition a study done in Ethiopia for the period 1970-2009, indicates that there is a positive and statistically significant relationship between foreign aid and economic growth in the long run but insignificant in short run (Tasew, 2011). According to his result the long run elasticity of growth with respect to aid is 0.45. This implies that every unit increase in the foreign aid was likely to grow GDP by 0.45 percent in long run.

2.2.5. External Debt Versus Economic Growth

Most developing countries, especially developing countries in Africa faced domestic financial constraints. Those constraints made external debt an essential complement to domestic resources for promoting sustainable economic growth among these developing countries. The theoretical literature suggests that foreign borrowing has a positive impact on investment and growth up to a certain threshold level; beyond this level, however, its impact is adverse. According to the empirical evidence of many developing countries including Africa and Latin America (IMF, 2002, 2003; Boboye *et al.,* 2012; Alfredo, 2005; S. Ayadi *et al.,* 2008; Teklu *et al.,* 2014) a reasonable external debt accelerates economic growth. However, beyond certain threshold level, additional indebtedness may reduce growth.

A study done on the Nigerian economy by Boboye *et al.* (2012) reported that external debt burden had an adverse effect on the nation income and per capita income. According this study,

high level of external debt led to devaluation of the nation's currency, increase in retrenchment of workers, continued industrial strike and poor education system. In addition the IMF working paper (2002) from 1969-1998 based on panel data of 93 developing countries, a reasonable level of external debt help finance productive investment and expected to enhance growth but beyond certain threshold level, additional indebtedness may reduce growth. A country with average indebtedness and doubling the debt ratio to real GDP would reduce annual per capita growth by 0.5% -1%.

The research done in Ethiopia for the last recent four decades by Teklu *et al.* (2014), reported that the ratio of public external debt to GDP has negative and statistically significant relationship with real GDP in the long run and had no significant effect in short run. A stud by melese (2005) conducted in Ethiopia during 1970-2002 using a structural macroeconomic model found that; all the debt burden indicators have a negative relationship with economic growth. Similarly, Hailemariam (2011) examined the impact of external debt on Ethiopian economic growth and private investment in Ethiopian applying a vector autoregressive (VAR) model over the period of 1960/61 – 2008/09. The study found that in the long run both external debt stock as well as debt servicing ratio have a negative and significant impact on economic growth and private sector capital accumulation activity. However, in the short run external debt and economic growth have positive relationship. He conclude that, the estimated short run models points out the current level of external debt flow has a positive while the past debt accumulation has a negative impact on economic growth and private investment of Ethiopia. The other recent study done in Ethiopia, which analyzed the effect of external debt on Ethiopian economic growth (Wessene, 2014) by applying ARDL model during the period of 1970/71-2010/11 was found that there is a negative and significant relationship between external debt and economic growth in long run. She found

that a one percent increase in external debt would result real GDP decline by 0.018 percent. Finally, despite the magnitude is different, all of the studies under this review came up with an influence that high level of external debt is liked with relatively low level of economic growth.

2.2.6. Inflation Versus Economic Growth

Currently, the word inflation is a major problem of the world. It is a monster that threatens all economies because of its undesirable effect and developed countries named as number one public enemy in the 21th century (Asmamaw, 2011). According to classical theories inflation occurs in an economy when the overall price level increases and the demand of goods and service increases. Based on the Keynesian theories inflation occurs when demand exceeds the potential output of the economy. In 1960s, inflation and growth were positively related in the short run. Even in the long run, Tobin (1965) and Sidrauski (1967) suggested a positive effect on growth from higher inflation. When inflation was high, wealth would be reallocated away from money and into physical capital.

However, recently many empirical evidence show that there is a negative relationship between inflation and Economic growth (Khan and Senhadji, 2000; Michael and William, 1996; Barro, 2013; Bawa and Abdullahi, 2010; Saliand and Gopakumar, 2008; Veiga *et al.*, 2014; Asmamaw, 2012). Although the magnitude of the inflation is different in different studies, high inflation rate slows down the growth rate. Barro (2013), classified the threshold of inflation in to three categories namely below 15% low inflation, 15 up to 40% medium rate and above 40% is high inflation rate and affected the growth rate negatively. Similarly, Michael and William (1996), say that the threshold inflation rate is not exceeding 40%.

A study conducted in 140 countries (both developed and developing) during 1960-1998 (Khan and Senhadji, 2000) found out that the threshold inflation level for industrial countries and developing countries were 1-3 percent and 11-12 percent respectively, under the study period. Similarly, a study conducted in Nigeria Bawa and Abdullahi (2010) during 1981-2009 based on the quarterly data and by using the threshold regression model found out that the threshold inflation level was 13 percent. In addition their finding indicates that below the threshold level, inflation has a mild effect on economic activities, while above it, the magnitude of the negative effect of inflation on growth was high.

A research done by Barro (2013) in 100 countries of the world including Ethiopia from 1960 - 1990, indicates that an increasing in average inflation by 10% are likely reduce the growth rate of real per capita GDP by 0.2 to 0.3 percentage and reduce the ratio of investment to real GDP by 0.4-0.6 percentage per year. Similarly the study done on 15 Sub-Sahara Africa by Veiga *et al.* (2014) showed that a unit percentage rise in inflation will reduce the growth rate by 1.5% in the region. Not only this but also the study of Asmamaw (2012) in Ethiopia have similar result. According to his research result, which was based on time series data from 1974-2011 applying VAR methodology, a unit percentage rise in inflation will reduce the GDP growth by 0.178% in log run.

CHAPTER THREE

3. MODEL SPECIFICATION AND METHODOLOGY

3.1. Model specification

This section presents a simple growth model that attempts to capture some of the major macroeconomic factors affecting economic growth in Ethiopia. Macroeconomic theory has identified various factors that influence the growth of a country from the classical, neo classical and the new growth theories. These factors include natural resources, investment, human capital, innovation, technology, economic policies, foreign aid, trade openness, institutional framework, foreign direct investment, political factors, socio-cultural factors, geography, demography and many others. Understanding characteristics and determinants of economic growth requires an empirical framework that can be applied to a relatively long time frame. In order to examine the empirical evidence of the macroeconomic determinants of economic growth in Ethiopia, the study considers most of these factors. As we discussed in the theoretical literature review, origin of the econometric model is extended neoclassical growth model Thus:

$\mathbf{Y = f(Pk, Lf)}$---------- **[23]**, where **Pk** and **Lf** represents Physical capital and human capital, respectively

Following broadly the approach of extended neo classical growth model, we specify the economic growth function for Ethiopia as follows: Real GDP is a function of physical capital, human capital, exports of goods and service, foreign aid, external debt and inflation. Studies like Patrick Enu *et al.* (2013); Biswas and Saha (2014) applied similar economic function to analyze macroeconomic determinants of economic growth in Ghana and India respectively. Moreover, the variables are preferred based on their relevance and data availabilities.

Therefore the mathematically relationship between real GDP and its major macroeconomic determinant are expressed as follows:

$$\mathbf{Y = f(GCF, EHE, EXT, AID, EXD, INF)}\text{---------- [24]}$$

From the beginning the researcher transformed all the variables under study into Log data to avoid hetroscedasticity (Gujarati, 2004) and to show elasticity of the variables; the growth function of equation [24] becomes:

$$\mathbf{lnY_t = \beta_0 + \beta_1 lnGCF_t + \beta_2 lnEHE_t + \beta_3 lnEXT_t + \beta_4 lnAID_t + \beta_5 lnEXD_t + \beta_5 INF_t + \varepsilon}\text{ --}$$

$$\text{---------- [25]}$$

Where $\mathbf{Y_t}$ represents real GDP at a time t; $\mathbf{GCF_t}$ represent for physical capital (formally gross investment) at a time t; $\mathbf{EHE_t}$ represents for human capital proxies by expenditure to health and education; $\mathbf{EXT_t}$ stands for total export; $\mathbf{AID_t}$ represents for foreign Aid; $\mathbf{EXD_t}$ is for external debt and $\mathbf{INF_t}$ is for general inflation;. The error term ($\boldsymbol{\varepsilon}$) assumed to be normally and independently distributed with zero mean and constant variance, which captures all other explanatory variables which influences real gross domestic product in a country which are not captured in the model. $\boldsymbol{\beta_i}$ are the partial elasticity's of real GDP with respect to macroeconomic variables listed above.

3.2. Estimation Procedure

To test the long run relationship between dependent variable (real GDP) and independent variable (physical capital, human capital, Export, Aid, External debt and Inflation), the study applies Autoregressive Distributed Lag (ARDL) Model. The study will first investigate the time series properties of our data by using Augmented Dickey-Fuller (ADF) and Philip-Perron (PP) tests. The unit root tests will be used to check the stationarity of the variables and to check none

of the variables are not order two (I.e. I (2)), which is precondition to apple ARDL model (Pesaran *et al.*, 2001).

3.3. The Autoregressive distributed lag Model (ARDL)

A large number of past studies have used the Johansen cointegration and Engle-Granger causality technique to determine the long-term relationships between variables of interest. In fact, this remains the technique of choice for many researchers who argue that this is the most accurate method to apply for I (1) variables. Recently, however, a series of studies by Pesaran *et al.* (1999, 2001); Narayan (2004); have introduced an alternative cointegration technique known as the 'Autoregressive Distributed Lag (ARDL)' bound test. There are numbers of advantages of using ARDL model also called 'Bound Testing Approach' instead of the conventional Engle-Granger two-step procedure (1987), Maximum likelihood methods of cointegration (Johansen, 1988) and Johansen and Juselius (1990).

First, the ARDL model is the more statistically significant approach to determine the cointegration relation in small samples as the case in this study (Pesaran *et al.*, 2001; Narayan,2004), while the Johansen co-integration techniques require large data samples for validity. A second advantage of the ARDL approach is that while other cointegration techniques require all of the regressors to be integrated of the same order; the ARDL approach can be applied whether the regressors are purely order zero [I(0)], purely order one [I(1)], or mixture of both. This means that the ARDL approach avoids the pre-testing problems associated with standard cointegration, which requires that the variables be already classified into I(1) or I(0) or mixture of both (Pessaran *et al.*, 2001). Third, with the ARDL approach it is possible that different variables have different optimal numbers of lags, while in Johansen-type models this is

not permitted. Forth, the other advantages of bound testing approach in the long run and short run parameters of the model in questions are determined simultaneously (Nasiru, 2012 as cited in Tsadkin, 2013). Finally, Appling the ARDL technique we can obtain unbiased and efficient estimators of the model (Narayan, 2004), (Harris and Sollis, 2003; Pesaran, 1995) as cited in Tsadkin 2013.

According to Pesaran *et al.* (2001), the ARDL modeling of unrestricted error correction model using Ordinary Least Square (OLS) can be represent as follows.

$$\Delta \mathbf{Y_t} = \boldsymbol{\beta_0} + \sum_{\mathbf{i=1}}^{\mathbf{p}} \boldsymbol{\beta} \Delta \mathbf{Y_{t-i}} + \sum_{\mathbf{i=1}}^{\mathbf{p}} \boldsymbol{\alpha} \Delta \mathbf{X_{t-i}} + \boldsymbol{\delta_1} \mathbf{Y_{t-1}} + \boldsymbol{\delta_2} \mathbf{X_{t-1}} + \cup_{\mathbf{t}} \text{ ---------- [26]}$$

Where Δ denotes for first difference operation, $\mathbf{Y_t}$ is for a vector of dependent variables, $\mathbf{X_t}$ is a vector of **p** determinants of $\mathbf{Y_t}$ regressors, $\mathbf{U_t}$ is the residual term which is assumed to be white noise. Basically, the ARDL approach to cointegration (See Pesaran *et al.* 2001) involves estimating of the error correction model (ECM) version of ARDL model for the determinants of economic growth:

$$\begin{aligned}\Delta \mathbf{lnRGDP_t} = \propto_{\mathbf{0}} &+ \sum_{\mathbf{i=1}}^{\mathbf{p}} \boldsymbol{\beta_0} \Delta \mathbf{lnRGDP_{t-i}} + \sum_{\mathbf{i=0}}^{\mathbf{p}} \boldsymbol{\beta_1} \Delta \mathbf{lnGCF_{t-i}} + \sum_{\mathbf{i=0}}^{\mathbf{p}} \boldsymbol{\beta_2} \Delta \mathbf{lnEHE_{t-i}} + \\ &\sum_{\mathbf{i=0}}^{\mathbf{p}} \boldsymbol{\beta_3} \Delta \mathbf{lnEXT_{t-i}} + \sum_{\mathbf{i=0}}^{\mathbf{p}} \boldsymbol{\beta_4} \Delta \mathbf{lnAID_{t-i}} + \sum_{\mathbf{i=0}}^{\mathbf{p}} \boldsymbol{\beta_5} \Delta \mathbf{lnEXD_{t-i}} + \\ &\sum_{\mathbf{i=0}}^{\mathbf{p}} \boldsymbol{\beta_6} \Delta \mathbf{INF_{t-i}} + \boldsymbol{\theta_0} \mathbf{lnRGDP_{t-1}} + \boldsymbol{\theta_1} \mathbf{lnGCF_{t-1}} + \boldsymbol{\theta_2} \mathbf{lnEHE_{t-1}} + \\ &\boldsymbol{\theta_3} \mathbf{lnEXT_{t-1}} + \boldsymbol{\theta_4} \mathbf{lnAID_{t-1}} + \boldsymbol{\theta_5} \mathbf{lnEXD_{t-1}} + \boldsymbol{\theta_6} \mathbf{INF_{t-1}} + \cup_{\mathbf{t}} \text{ ---------- [27]}\end{aligned}$$

Where RGDP is the real GDP in million Birr at a time t, GCF is capital formation (proxied by gross investment), EHE is expenditure of health and education (both recurrent and capital), which is proxy of human capital, EXT is total export of goods and service, AID is foreign Aid, EXD is total external debt and INF is the general inflation rate, u is the residual term, which is assumed to be white noise, **p** is the optimal lag length and **ln** is natural logarithm. Except inflation all the variables entered in the model is measured in millions of Birr.

The bounds test is mainly based on the joint Wald test or F- test which its asymptotic distribution is non-standard under the null hypothesis of no cointegration. The null hypothesis for no co-integration in the long-run among the variables in equation **[27]** is:-

$\mathbf{H_0: \theta_0 = \theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = \theta_6 = 0}$ (meaning no long run relationship among the variables) against the alternative one:

$\mathbf{H_1: \theta_0 \neq \theta_1 \neq \theta_2 \neq \theta_3 \neq \theta_4 \neq \theta_5 \neq \theta_6 \neq 0}$**.** The **F**-test has no standard distribution which depends on (i) whether the variables include in the model are I(0), or I(1), (ii) the numbers of regressors, and (iii) whether the model contains an intercept and/or a trend (Narayan, 2004). In order to test the existence of long-term relationship among the variables, equation **[27]** had be estimated applying OLS. To test the significance of lagged level of the variables under consideration, the appropriate statistic is **F** or Wald test as Pesaran *et al.* (2001) proposed for bound test approach will be applied.

According to Pesaran *et al.* (2001), there are two sets of critical value bounds for all classifications of regressors' namely upper critical bound value and lower critical bound value. The critical values for I (1) series are referred to as upper bound critical values; while the critical values for I (0) series are referred to as lower bound critical values. If the calculated **F** statistic is greater than the upper bound critical values, we reject the null hypothesis of no long run relationship among the variables. If the calculated **F** statistic is less than the lower bound critical values, we can't reject the null hypothesis rather accept the null hypothesis of no cointegration among the variables. However, if the calculated **F** statistic is between the upper and lower bound critical values, inference is inconclusive and we need to have knowledge on the order of integration of underling variables before we made conclusive inference (Pesaran *et al.*, 2001).

However, in this study we are not going to follow the bound critical value developed by pesaran *et al.* (2001) because of the computed critical values are based on large sample size (500 and more). Rather, a relatively small sample size in this study of 40 years observations, we will use the critical values developed by Narayan (2004) which was developed based on small sample size between 30 and 80 observations.

If there is an evidence of long-run relationship (cointegration) of the variables, the following long-run ARDL ($P_1,\ P_2,\ P_3,\ P_4,\ P_5,\ P_6,\ P_7$) mode will be estimated.

$$\mathbf{lnRGDP_t} = \propto_0 + \sum_{i=1}^{p} \boldsymbol{\beta_0} \mathbf{lnRGDP_{t-i}} + \sum_{i=0}^{p} \boldsymbol{\beta_1} \mathbf{lnGCF_{t-i}} + \sum_{i=0}^{p} \boldsymbol{\beta_2} \mathbf{lnEHE_{t-i}} + \sum_{i=0}^{p} \boldsymbol{\beta_3} \mathbf{lnEXT_{t-i}} + \sum_{i=0}^{p} \boldsymbol{\beta_4} \mathbf{lnAID_{t-i}} + \sum_{i=0}^{p} \boldsymbol{\beta_5} \mathbf{lnEXD_{t-i}} + \sum_{i=0}^{p} \boldsymbol{\beta_6} \mathbf{INF_{t-i}} + \boldsymbol{\varepsilon_t} \text{---------- [28]}$$

Here all variables are as previously defined. The orders of the lags in the ARDL Model is selected by either the Akaike Information criterion (AIC) or the Schwarz Bayesian criterion (SBC), before the selected model is estimated by ordinary least squares. We use the Akaike Information criterion (AIC) in lag selection because of its advantages for small sample size (Tsadkan, 2013) as it is the case in this study. Determination of the optimal lag length is so crucial in ARDL model, because of it helps us to address the issue of over parameterizations and to save the degree of freedom (Taban, 2010) as cited in Tsadkan (2013). For annual data, Pesaran and Shin (1999) recommend choosing a maximum of 2 lags. From this, the lag length that minimizes Akaike Information criterion (AIC) is selected.

In the presence of cointegration, short-run elasticities can also be derived by

Constructing an error correction model of the following form:

$$\Delta \mathbf{lnRGDP_t} = \propto_0 + \sum_{i=1}^{p} \beta_0 \Delta \mathbf{lnRGDP_{t-i}} + \sum_{i=0}^{p} \beta_1 \Delta \mathbf{lnGCF_{t-i}} + \sum_{i=0}^{p} \beta_2 \Delta \mathbf{lnEHE_{t-i}} +$$

$$\sum_{i=0}^{p} \beta_3 \Delta \mathbf{lnEXT_{t-i}} + \sum_{i=0}^{p} \beta_4 \Delta \mathbf{lnAID_{t-i}} + \sum_{i=0}^{p} \beta_5 \Delta \mathbf{lnEXD_{t-i}} + \sum_{i=0}^{p} \beta_6 \mathbf{INF_{t-i}} +$$

$\gamma \mathbf{ECTt-1}$ --------- ---------- **[29]**

Where, $\mathbf{ECT_t}$ is the error correction term, defined as:

$$\mathbf{ECT_t} = \mathbf{lnRGDP_t} - \left[\propto_0 + \sum_{i=1}^{p} \beta_0 \mathbf{lnRGDP_{t-i}} + \sum_{i=0}^{p} \beta_1 \mathbf{lnGCF_{t-i}} + \sum_{i=0}^{p} \beta_2 \mathbf{lnEHE_{t-i}} + \right.$$

$$\mathbf{i=0p\beta 3lnEXTt-i + i=0p\beta 4lnAIDt-i + i=0p\beta 5lnEXDt-i + i=0p\beta 6INFt-i} \text{ ---- } \mathbf{[30]}$$

Here Δ is the first difference operator; $\boldsymbol{\beta}$'s are the coefficients relating to the short-run dynamics of the model's convergence to equilibrium, and $\boldsymbol{\gamma}$ measures the speed of adjustment.

3.4. Unit Root Test

It is fundamental to test for the statistical properties of variables when dealing with time series data. Time series data are rarely stationary[6] in level forms. Regression involving non-stationary (I.e., variables that have no clear tendency to return to a constant value or linear trend) time series often lead to the problem of spurious regression[7]. This occurs when the regression results reveal a high and significant relationship among variables when in fact, no relationship exist. Moreover, Stock and Watson (1988) have also shown that the usual test statistics (t, F, DW, and R^2) will not possess standard distributions if some of the variables in the model have unit roots. The other necessary condition for testing unit root test when we applying ARDL model is to check whether the variables enter in the regression are not order two (I.e. I(2)), which is

[6] A type of stochastic process that has received a great deal of attention and scrutiny by time series analysts is the so-called **stationary stochastic process.** Broadly speaking, a stochastic process is said to be stationary if its mean and variance are constant over time and the value of the covariance between the two time 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.(Gujarari 2004)

[7] spurious regression is a regression result of un related variables but strongly related as per the result

precondition in ARDL model. Therefore, it is necessary to test for time series variables before running any sort of regression analysis.

Non-stationarity can be tested using Augmented Dickey-Fuller (ADF) test, Phillips Perron (PP) test and Kwiatkowski- Phillips-Schmidt-Shin (KPSS) test. However, to ensure reliable result of test for stationarity, the study employs both Augmented Dickey-Fuller (ADF) test and Philip-Perron (PP) tests.

The testing procedure for the ADF unit root test is specified as follows:

$$\Delta Y_t = \alpha + \delta t + \gamma Y_{t-1} + \sum_{i=1}^{\rho} \lambda \Delta Y_{t-i} + \epsilon_t \text{ ---------- [31]}$$

Where Y_t is a time series variables under consideration in this model at time t, t is a time trend variable; Δ denotes the first difference operator; ϵ_t is the error term; p is the optimal lag length of each variable chosen such that first-differenced terms make ϵ_t a white noise. Thus, the ADF test the null hypothesis of no unit root (stationary).

That is: $H_0: \gamma = 0$; $H_1: \gamma \neq 0$

If the t value or t-statistic is more negative than the critical values, the null hypothesis (I.e. H_0) is rejected and the conclusion is that the series is stationary. Conversely, if the t-statistic is less negative than the critical values, the null hypothesis is accepted and the conclusion is that the series is non-stationary.

3.5. Data source and Variable description

Real GDP (Y) is the market value of the goods and services produced by an economy over time. It is conventionally measured as the percent rate of increase in real Gross Domestic Product. Since most economists argue that economic growth can be measured as growth in real GDP, it includes in the model as main dependent variable in order to measure economic growth. In order to avoid the inconsistency associated with different base year price while computing real GDP, this study was used the real GDP (constant value), which is deflated by Ministry of Finance and Economic Development (MoFED) based on the constant price of 2010/11.

Physical capital accumulation (GCF) is defined as Gross capital formation (formerly gross investment) in a country. However, getting such a readymade time series data in Ethiopia is difficult. Therefore in this study, gross investment was used as proxy of this variable and have been expected a positive impact on economic growth.

Human capital (EHE): It is difficult to measure human capital in economics. As a result researchers use different proxy of human capital (I.e., school enrollment like primary, secondary and tertiary level; labor force age group from 15 up to 65; life expectance; literacy rate; expenditure to education and health) to indicate as major determinants of economic growth in long term. Therefore this study has been used expenditure of health and education as proxy of human capital and the sign of the coefficient would be expected positive.

Exports of goods and service (EXT) are defined as the total exports of goods and service to the rest of the world. It is believed that export of a country's is one of the macroeconomic determinants of economic growth. For this reason and due to researcher's interest this variable is

entered as explanatory in order to analyze it effect on Ethiopian economic growth. The expected sign of this variable is expected to be positive.

Foreign Aid (AID) is defined as aid inflows from external assistances. As we know Ethiopia is one of the poor countries in the world. As result Ethiopia is getting from external assistance in the form of aid. To see its effect on the economic growth this variable is chose as one explanatory variable and expected to have positive sign.

External Debt (ED) = is defined as net incurrence of government liabilities. Even though there is fast economic growth, Ethiopia is challenged in financial problem to finance its mega project. For this reason the Ethiopian external debt will increase from time to time. As a result, it is the researcher's interest to include in this study in order to analyze its effect on economic growth and would be expected a negative sign.

General Inflation (INF) = Inflation is defined as an increase in the overall price level in a country and measured in percent. In Ethiopian history inflation was not a problem of economic growth. However, starting 2008 it is a serious problem. Therefore to analyze its effect on economic growth, it is the other interest of the researcher's, which is included in this study as independent variable. The coefficient of this variable would be expected a negative sign.

As we discussed earlier, this study was used annual secondary data from 1974 to 2013 sourced from Ministry of Finance and Economic Development (MoFED); National Bank of Ethiopia (NBE); Central Statistical Agency (CSA) and World Bank Indicator (WBI). Except inflation, all the variables are measured in millions of Birr.

3.6. Methods of data analysis

In this study both simple descriptive and econometrical methods of data analysis are employed. To analyze the macroeconomic performance of Ethiopia during the study period, we used tools of descriptive statistical such as tables, charts and trend graphs. On the other hand standard econometrical technique would apply to analyze the major determinants of economic growth under the study period. Finally, Microfit 4.1 and Eview 7.0 versions have been used as statistical software package for the entire analyze running this study.

CHAPTER FOUR

4. AN OVERVIEW OF ETHIOPIAN ECONOMY

4.1. Introduction

The Ethiopian economic growth has shown various changes in different political regimes. These change 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.

In modern Ethiopian political economic history, we can distinguish three regimes that followed unique macroeconomic policies with its impact on macroeconomic growth performance of the country. These are the period of pre 1974(the monarchy regime), the period 1974-1991(the military regime) and 1992 to the present (the EPRDF regime). Ethiopia's economic policy history is characterized by several radical policy changes and blows. During the monarchy (pre 1974) economic policy was mainly known to be a market-oriented economic system. However, the period 1974–1991 characterized by centralized and command economic system. Since 1992 EPRDF officially denounced the socialist system and supported market-oriented economic system.

> Alemayehu and Befekadu (2005) stated that "*cyclical political processes and regime shifts were unpredictable and violent with negative consequences on the economic performance of the country. Economic insecurity pervades the systems as a rule of law, and enforcement of contracts and property right insecurity are configured on an unstable political base."*

Here we summarize the descriptive analysis of economic performance of the country by using secondary data in different regime as follows.

4.2. The Imperial Regime (1930-1974)

The period referred here as the 'Imperial Regime' refers to reign of the last emperor, emperor Haile Selassie I, (1930-1974). During this period an attempt to modernize the country is made (an expansion of modern schools and health facilities, the first constitution, infrastructural development, the beginning of medium term planning etc are cases in point). During this regime, the land aristocracy (feudal structure) and the majority of peasants (tenants) constitute the major socio-economic agents. Land was the most important resource and source of power that served as institution to exploit the masses by the Monarchy and the Feudal land lords. The Imperial regime had also the positive record of modernizing the economy by developing infrastructure, establishing and encouraging the establishment of imports substituting industries, modern political system and in particular expansion of education.

In terms of policy, the Imperial regime pursued a market-oriented economic policy and economic growth during the period 1960-1974 was an average of 3.7 percent per annum (the per capita growth being 1.4 percent). Similarly, the sectorial growth performance for agriculture, Industry and service were 2.1, 6.9 and 7.6 percent, respectively for the same period (EEA, 2007/08). In addition the sectorial share of agriculture, Industry and service to real GDP was 62, 10 and 14 percent, respectively during the same period.

Table 4.1: GDP, GDP per capita Growth rate and GDP sectorial share (1960-1974)

GDP Growth rate	3.7
Per Capita GDP Growth rate	1.4
Agricultural share from GDP	62%
Industrial Share From GDP	10%
Service share from GDP	14%

Source: EEA and MoFED

During this regime, land was the economic basis of the ruling class, which the emperor himself was at the top of the system. According to Alemayehu and Befekadu (2005), an economic growth of average of 4 percent per annum during 1960-1974 was achieved. However, it did not improve the lives of most Ethiopians. Majority of the Ethiopian population were subject to exploitation from feudal system. About 80 percent of the population was subsistence farmers who lived in abject poverty because they used most of their small production to pay taxes, rents, debt payments, and bribes to the feudal land lords and theirs affiliates.

By late 1960s new educated elite started to challenge the political system by articulating the misery under which the majority of the populations lived. Systemic exploitation by feudal and the monarchy outraged majority of the rural population (because of unjust distribution of land), who were basically in the state of serf-dom. There were a series of protests in 1974 against the feudal regime and the revolution toppled it the same year. The immediate causes for the revolution were associated with the famine in Northern Ethiopia (Wollo); the strike by taxi drivers following the 1974 OPEC-induced oil crisis; a revised curriculum of education which was strongly opposed by the educated elite and salary increase demand by the soldiers (military). As these problems were not addressed responsibly, the military removed the emperor from power in 1974 (Ibid).

4.3. The Socialist (Derg) Regime: (1974-1991)

The revolution in 1974 ultimately resulted in removal of the emperor from power. Immediately after Emperor Haile Selassie was overthrown; a Military Committee was established from several divisions of the Ethiopian Armed forces. As result the government installed a socialist (command) economic system where market system was deliberately repressed and socialization

of the production and distribution process followed. The land reform policy of Derg was the major success history that earned credit to the socialist government and that was honored by the masses. The Derg did not give any opening for privatization to domestic and foreign investors.

After the revolution, the government's role in determining economic policies changed dramatically. In l975, the government nationalized or took partial control of most companies including extra housing, financial firms, manufacturing and so on. Moreover, the regime nationalized rural land and granted peasants "possessing rights" to parcels of land not to exceed ten hectares per grantee during; and issued Proclamation No. 76, which established a 500,000 birr ceiling on private investment and urged Ethiopians to invest in enterprises larger than cottage industries during this period (Alemayehu and Befekadu, 2005; Tadesse, 2011). However, this policy changed in mid-1989, when the government implemented three special declarations: encourage the development of small-scale industries, the participation of non-governmental bodies in the hotel industry, and the establishments of joint ventures are the most one.

Under the Provisional Military Administrative Council (PMAC; also known as the Derg), Ethiopia's political system and economic structure changed dramatically, and the government embraced a Marxist-Leninist political philosophy. Planning became more ambitious and more pervasive, penetrating all regions and all sectors of the society, in contrast to the imperial period (Ibid).

By all measures they embraced a “hard control” during this regime. The average rate of growth of gross domestic product (GDP) and the per capita term was 1.6% and -0.7%, respectively (Eshetu and Mekonnen, 1992) during 1974-1990 and this growth rate was far below the estimated population growth of 2.5%. However, in 1984 and 1985, the GDP growth rate began to

decelerate, amounting to -5.3%, which means that the per capita GDP was -10% in the same period. Similarly, Alemayehu and Befekadu (2005), reported that economic growth was decelerated to 2.3 percent (-0.4 percent in *per capita* terms) between 1974/75 and 1989/90. Reports of EEA (2007/08) indicates that, the average annual growth of GDP and GDP per capita were 2% and 0.5%, respectively during the entire period of derg (1974-1991). The sectorial growth rate of agriculture, industry and service sector were 1.3, 1.4 and 3 percent, respectively during the same period.

Table-4.2: Average Trends of GDP, GDP per capita and Population

Period	Average growth rate of GDP	Average growth rate of GDP per capita	Average growth rate of Population
1974-1978	0.4%	-1.3%	1.7%
1979-1983	4.2%	1.9%	2.3%
1984-1985	-5.3%	-8.5%	3.2%
1986-1987	7.9%	4.7%	3.2%
1988-1990	1.0%	-2.3%	3.3%
1974-1990	1.6%	-0.9%	2.5%

Source: Eshetu and Mekonnen (1992), Own computation from MoFED data

During 1974-1978, GDP grew only by 0.4 percent, because this period was a period of intensive internal conflicts and war with Somalia. However, during 1979-1983 there was a period of recovery, in which GDP registered a respectable growth rate of 4.2 percent. As we know this period was named '*zemecha year'*, when an all-out (greatest possible) efforts were made to boost production (Eshetu and Mekonnen, 1992) on the basis of annual development

campaigns. In 1984 and 1985, the period of catastrophic drought and famine, in which GDP and GDP per capita actually declined by 5.3 and 8.5 percent, respectively, with disastrous consequence for the economy and society. Despite the fluctuate economic growth in the regime(Derg), we find that 1986-1987 was the period of recovery, in which GDP and GDP per capita grew by 7.9 and 4.7 percent, respectively (the highest economic growth in the regime), largely as result of best rain seasons. In general, during the entire period of military regime, both growth rate of GDP and GDP per capita were far below the estimated average population growth of 2.5 percent. To sum up, the military period was characterized by: very low economic growth moreover, extremely irregular growth; there was high rate of governmental consumption; the external debt position was also at an alarming rate of which financed to military force 40-50 percent (Tadesse, 2011); there was full of conflict both with internal and external parties (unrest); and many other problems were affect the economic growth badly (Ibid).

4.4. The EPRDF Regime (Since 1991)

This period begins following the accession to power of the Ethiopian People Revolutionarily Democratic Front (EPRDF) in May 1991, following the demise of the Derg. The EPRDF 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 Alemayehu and Befekadu (2005). Over the last two decades, the Government of Ethiopia (GoE) has been implementing a development program aimed at poverty reduction through rapid economic growth and macroeconomic stability. The country has recorded strong economic growth over the past decade, mainly due to the Government-led development policies emphasizing public

investment, commercialization of agricultural sector and non-farm private sector development.

EPRDF accepted the reform to get external endorsements (in the face of domestic opposition) and to use macro policy instruments (such as fiscal decentralization) to fight the hostile bureaucracy and promote equitable distribution. In addition to these political factors the government accepted the reform to stimulate the crippled socialist economy by encouraging the participation of private sectors. On wards the reform the government promoted domestic private sector and opened the door to foreign investors, except in the financial industry. The major policy reforms of post EPRDF includes: (1) Domestic and external trade liberalization; (2) Financial sector liberalization (only for local investor) and labor market liberalization; (3) Liberalization of the product market, in particular the agricultural sector; (4) Pursuing conservative fiscal and monetary policy (minimization of expenditure and switching, tax reform, tight monetary policy, exchange rate and public sector reform) were the most one (Tadesse, 2011). Since 1992, the government began to implement an economic reform program with a view to reviving an economy in the country that had suffered from many years of civil war, food security crises, heavy central planning and more.

4.5. Macroeconomic Performance

Ethiopia has a vision of becoming a middle income country in the coming one and half decades after implementing three successive five years transformation and development plan. The development policies and strategies pursued Sustainable Development and Poverty Reduction Program (SDPRP), the country's vision and achievements registered under SDPRP

were the basis for PASDEP[8]. The Ethiopian economy has experienced an impressive growth performance for the last two decades with an average GDP growth rate of 6.7 percent far away as compare with the monarch and military regime, which were 3.7 and 1.6 percent, respectively (see Figure 4.1). Specially, since 2004, the country grew with an average GDP growth rate of 10.9 percent; the per capita income also growing with an average of 8 percent while the estimated average population grew by 2.2 percent during the same period (NBE, 2013/14).

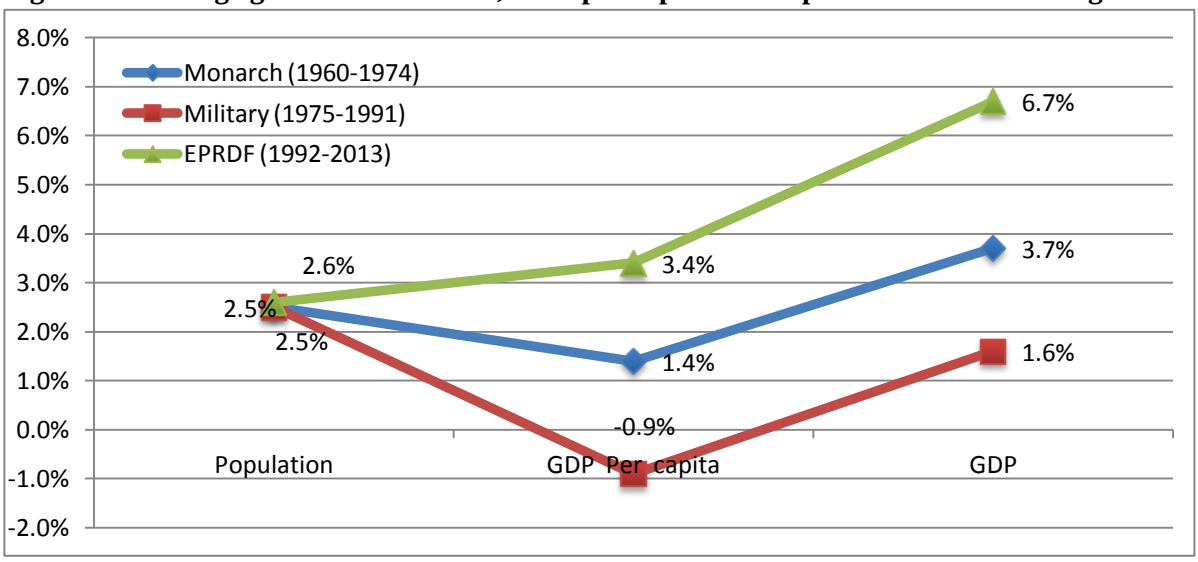
The Ethiopian economy continued to grow and the overall economic performance reflected the rapid expansion of the country. According the National Bank of Ethiopia report (2012/13), real GDP continued to grow on average by 10.9 percent in the past decade (2003/04-2012/13). During the fiscal year 2013/14, the real GDP revealed a remarkable growth of 10.3 percent compared to the 5.4 percent for sub-Saharan Africa countries for 2014. The growth was mainly contributed by the service sector (51.7 percent), agricultural sector (21.9 percent) and industrial sector (26.4 percent). Nominal GDP per capita went up to USD 631 from USD 557 in the preceding year, registering a 13.3 percent increase (Ibid).

During the last decade, Ethiopia has made strides in economic and social development. The robust economic growth averaging with double digits since 2004 and social assistance, which now reached more than 8 million beneficiaries in about 1.5 million household (IMF, 2013) have resulted in several fold rise in real per capita income and dramatic drop in the national

[8] "The Plan for Accelerated and Sustained Development Plan to End Poverty (PASDEP) is the first five year phase to attain the goals ad targets set in the Millennium Development Goals (MDGs) at minimum". (GTP, 2010/11- 2014/14)

poverty rate. According the report of IMF (2013), the national poverty rate had declined from 60.5% in 2005 to 30.7% in 2011[9]. Similarly, the Ethiopian government also confirmed this figure during the same period and declined to 29.6 percent MoFED (2013). In addition the income distribution in the country is relatively even. Among the Sub-Sahara Africa countries, Ethiopia is one of the most egalitarian with a Gini coefficient of 0.33 (IMF and MoFED, 2013) and it has consistently maintained this distribution in the last ten years. Thus, this economic growth has helped to reduce unemployment rate particularly in the urban areas. While overall unemployment rate stands at about 25%, urban unemployment rate declined from 22.9% in 2004 to 17.5% in 2012 (IMF, 2013).

Figure 4.1 Average growth rate of GDP, GDP per capita and Population in different regimes



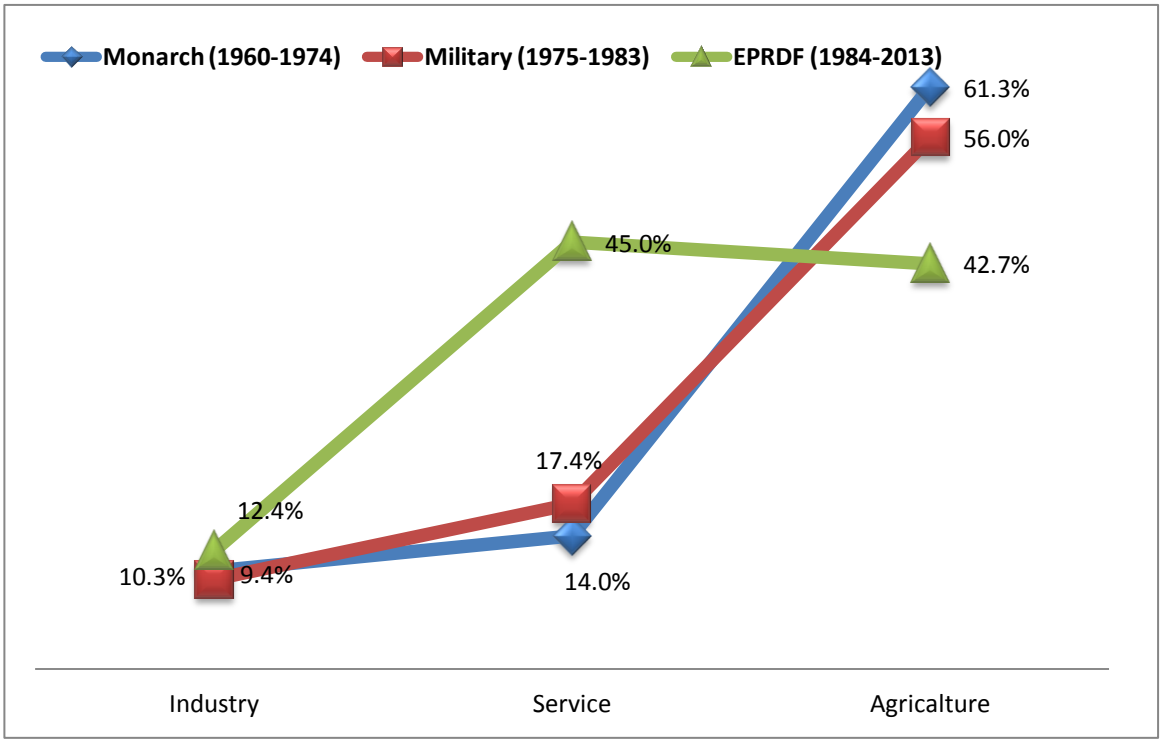
Source: Own computation from MoFED, NBE, CSA data

As we see from Figure 4.1, the growth rate of both GDP and GDP per capita were better than the monarch and military regime during the post-reform (EPRDF). The average growth rate of

[9] Based on the international standard of US$1.25 a day, purchasing-power-parity adjusted (World Bank's World Development Indicators, August 2013).

the economy and per capita income were 6.7 and 3.4 percent, respectively during 1992-2013, while the population grew in average by 2.6 percent during the same period. However, the economic growth was too low during the military power (Derg regime) while the population grew nearly by the same figure (2.5%). In the emperor period, the economic growth was faire relatively; despite the per capita income growth was below the population growth rate (i.e. 2.5%). From the above figure, generally we can conclude that the economic performance (growth) was robust sine the post-reform (1992-2013) with fairly same population growth rate comparing to the last two regimes.

Figure 4.2 share of GDP in different regimes

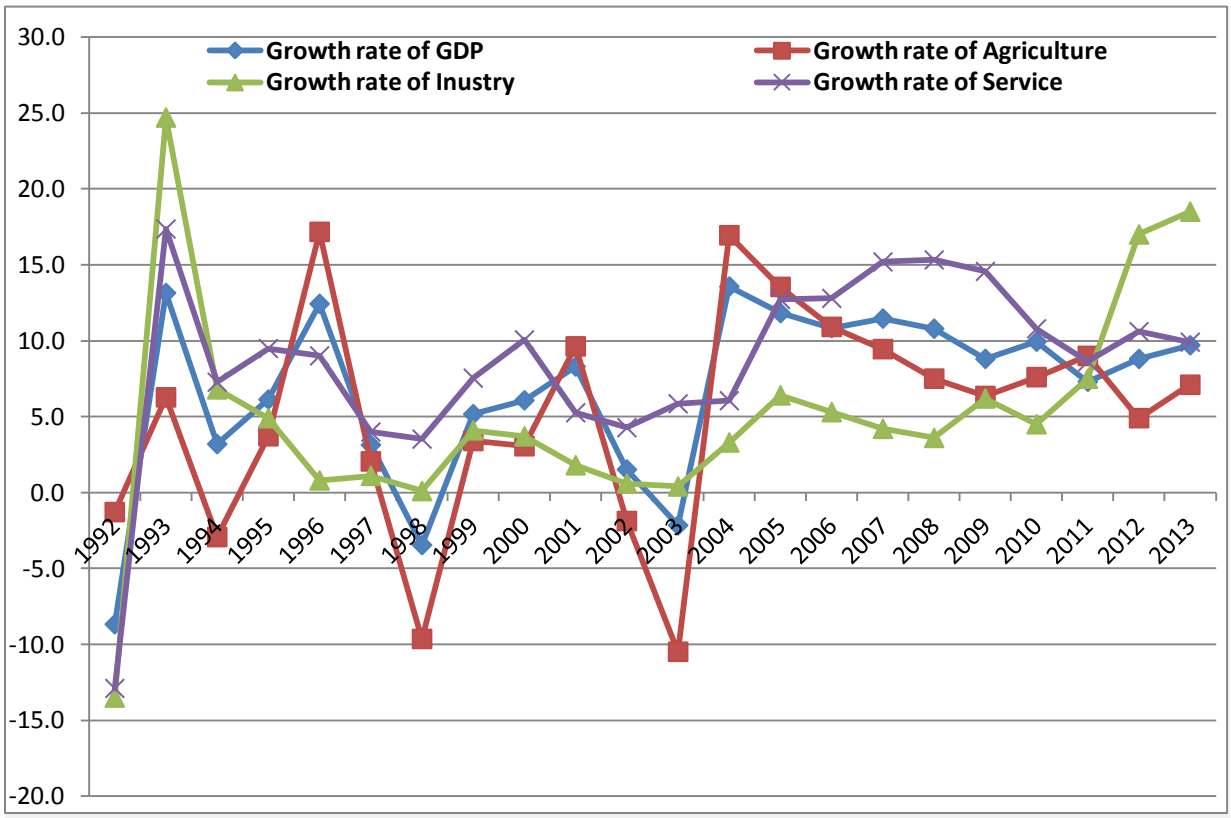


Source: Own computation from MoFED and NBE, data

As we have seen from the figure, the share of the industrial sector, however, has remained stagnant in the past years. Although the country's development plan shows a direction from

agriculture to industry and services, no significant change is observed with respect to increasing the share of industry. The average growth rate of the industry sector was 2.1 percent during 1960-2013. For this reason a predominantly agriculture based economy (where agriculture employs more than 83 percent of the population (CSA, 2013) and nearly 43 percent to GDP), the economic performance in Ethiopia is largely determined by what happens in the agricultural sector. Despite the amazing economic growth, the structure of the economy has not changed very much, agriculture have been dominating the other sectors until 2010/11. However, recently the share of the service sector including both distributive and other services has increased substantially. According to the Ethiopian Economic Association report, growth in Trade, Hotels, Financial intermediation and education services are the major components that contributed to the growth of the service sector (EEA, 2007/08). Despite the stagnant industrial growth, since 2011/12, a slight change is observed in the Ethiopian economy. Therefore, share of the economy was dominated by the service sector, which has relatively rapid growth rate among the three sectorial growth rates. (I.e. agriculture, industry and service grew by 7.9, 12.6 and 13.6 percent, respectively during 2005/06 – 2012/13, NBE, 2012/13).

Figure 4.3 Trend of GDP growth and sectorial share



Source: Own computation from MoFED and NBE, data

In all sectors, the Ethiopian economic growth rate during 1992-2003 was oscillated as we can see in the graph. However, since 2004 the growth rate had grew evenly with double digits whatever the growth rate is different in its magnitudes. Similarly, agriculture and industry sector growth were also like GDP growth while the service sector was in robust growth since the post reform and take over the largest share of GDP during 2012/2013 (GTP-APR, 2012/13) and which accounts 45.2 percent of the total GDP.

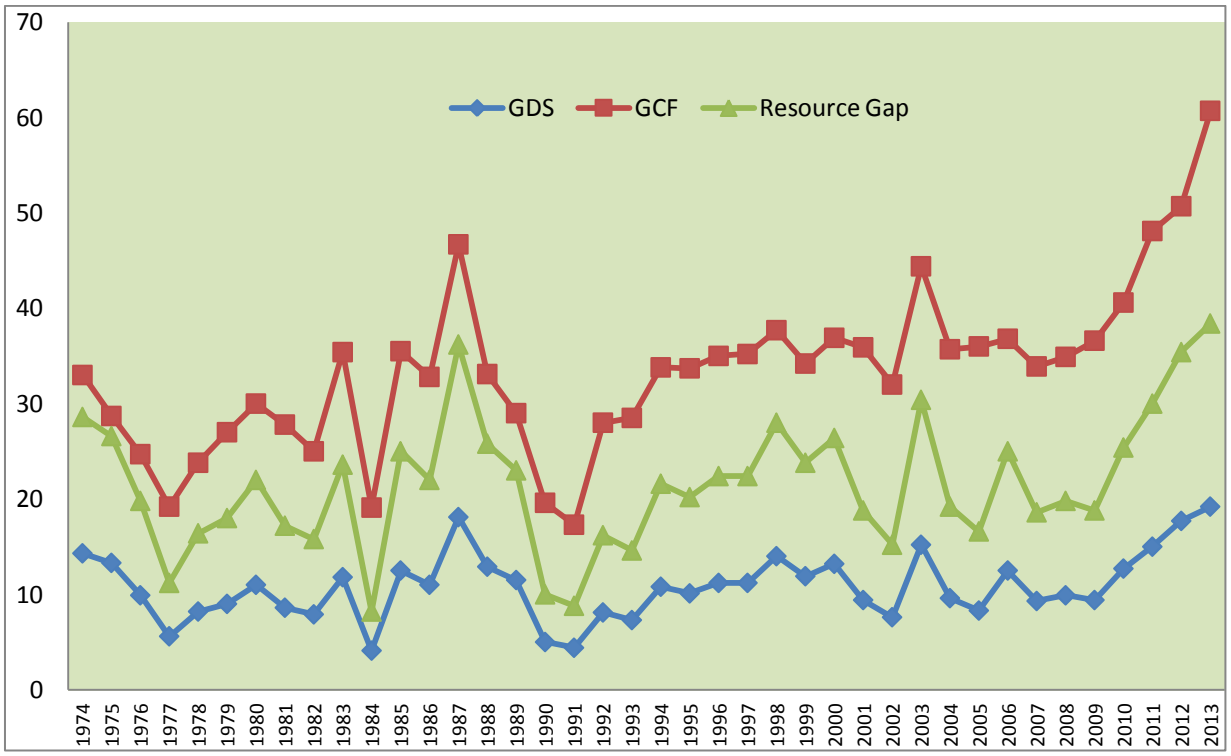
4.5.1. Saving and Investment

It is fact that, a countries economic growth is significantly affected by the rate of investment and rate of saving. However, Low saving rate has been a dominant feature of the Ethiopian economy comparing to fast investment rate. The share of gross domestic savings from GDP was, on average, 12.9 percent for the last 15 years. On the other hand, gross capital formation as a share of GDP was 28.3 percent over the same years, which is higher than gross domestic saving (EEA, 2007/08). As a result, the resource gap was, on average, -15.4 percent over the last fifteen years, which was financed by external sources. According to the EEA report, the share of gross capital formation financed by the external sector was 73.6 percent during 1997/98 to 2007/08. Similarly, MoFED (2013) also reported that, domestic saving was small (10.6%) while gross investment rate was 26.9 percent during 200/01 to 2011/12. Accordingly, the resource gap of the country registered 18.1 percent as ratio of GDP during the same period, and which was financed primarily from foreign source (specially, from external debt during 2000 to 2003 and 2007 to 2010 while during 2004 to 2005 was primarily form internal debt.

According to the GTP, gross capital formation (formally gross investment) was expected to take 30 percent of GDP share while it reaches 40.3 percent during 2013/14 (NBE, 2013/14), which was achieved before the GTP period completed. Despite, the gross domestic saving rate registered 22.5 percent of GDP share, which is above the GTP target (15%) and even achieved before the period is completed, still it very low as comparing to the investment rate needed. During 2009/10, domestic saving was only 5.2 percent of GDP. However, during the past 4 GTP periods domestic saving started to take off; as a result the share has jumped to 22.5 percent in 2013/14. For the amazing growth of domestic saving rate, the government introduced to stimulate domestic saving including wide range of awareness creation activities in urban and

rural areas of the country; strengthening existing saving tools and introduction of new saving mobilization instruments such as selling of government Bonds, deepening of financial institutions, introducing private social security scheme, strengthening government workers social security scheme, strengthening saving for housing program, saving for investment equipment scheme, and sustaining the high level of government savings. Thus expansion of investment over the past years has been one of the key drivers of growth on the demand side.

Figure 4.4: Trends of Gross Domestic Savings (GDS), Gross Capital Formation (GCF), and the Resource Gap (as a share of real GDP)



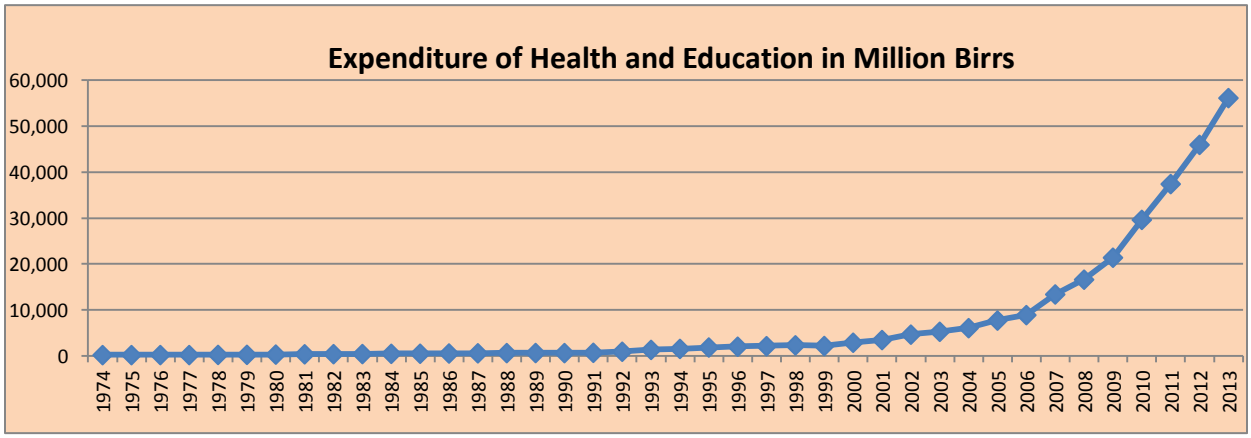
Source: Own compilation based on the MoFED data's.

4.5.2. Social Sectors 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. More over the life expectancy at birth was 44 years (WB, 2015). The amounts of budget allocated to this sector were insignificant capering 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 GDP) and reached 717 Million Birr (0.6 percent of GDP) in the year of 1991 while military expenditure ratio to GDP was 5.8 percent during the same period (WB, 2015).

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% ratio to real GDP) and reached 56,157 Million Birr (8.3% ratio to real GDP) in 2013. Parallel to fast growing in human capital expenditure, economic growth was also robust and registered 6.7 percent annual growth during the same period.

Figure 4.5: Trends of human capital expenditure in Millions of Birr



Source: Own compilation based MoFED data.

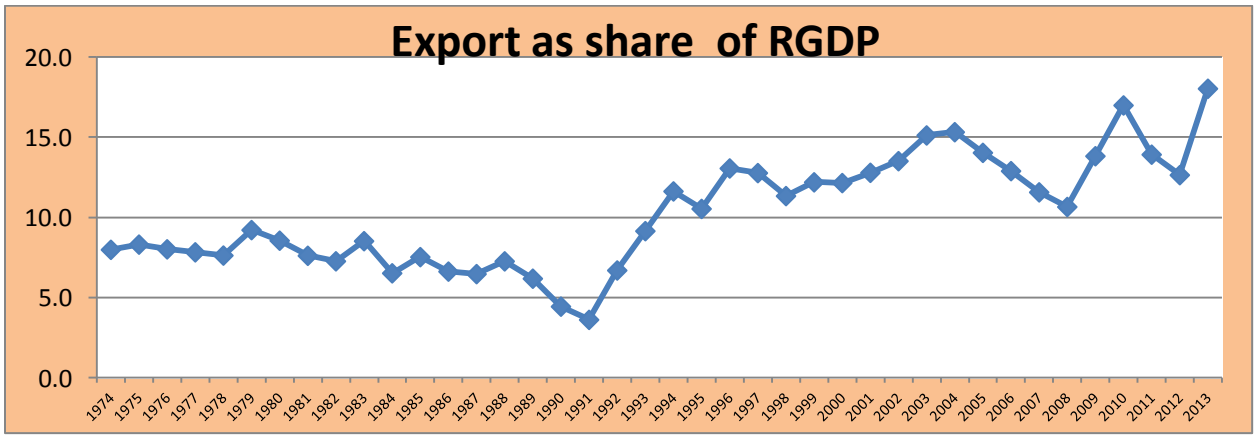
Beside the reasonable budget allocation, health and education of the society improvised since 1992 (relatively to the previous). Accordingly, the total student enrollment rate for primary and secondary school were 95.5 and 38.4 percent respectively, in the year 2012/13 (ministry of education report) as quoted in MoFED report. Similarly the health status and health coverage of the society improved, where life expectancy reached 64.2 years in 2013 from 44 years in 1974 (WB, 2015). On the other hand, the economic growth also goes in the same direction and registered an average growth rate of 11 percent during 2003-2013. Today, there are 397,930 students in per-school, 17 Million students in primary school, 1.5 Million students in secondary school, 335,058 students in TVET, 487,048 in higher education and totally around 20 Million of students are in education and training.

4.5.3. Export and Ethiopian Economy

The export sector has played an important role to bring about rapid economic growth in developing countries. 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. Likewise, the Ethiopian commodity export sector is basically characterized by the dominant share of agricultural raw commodities in generating the greater proportion of the export earning of the country. These export commodities together have accounted more than 86 percent (NBE, 2012/13) of the total merchandise export earnings. The major export items, in order of their significance in the total commodity export value include coffee, gold, oil seeds, hides and skins, pulses, chat, flower, fruits and vegetables.

The total amount of export value in 1974 was 8,192 Million Birr. It has steadily increased to 10,136 Million Birr in 1983 at constant value. In the year 1984, however, it was fluctuated and starts to decline and reached 4,727 Million Birr in 1991. After the reform period i.e. 1992, export earnings increased with little fluctuations and recorded 122,632 Million Birr in 2013.

Figure 4.6: Trends of total export as percentage of real GDP



Source: Own compilation based on the NBE data.

Despite the increment of export as share of real GDP from 3.6 percent in 1991 to 18 percent in 2013, the trade balance as share of real GDP (resource balance) continued to rise to 17.8 percent during 2013/14 from 14.2 percent in 2002/03 (NBE, 2013/14). This huge gap resource balance indicates that exports of goods and service have insignificant impact on the Ethiopian economic growth. According the GTP of the Ethiopian government, Export of goods and non-factor services were expected to play an important role in accelerating the growth of the economy. However, the export sector played an insignificant role particularly in 2011/12 and 2012/13 (MoFED, 2012/13). The fluctuated growth of exports of goods and service (see figure4.6) were associated with the agricultural commodity export, since agriculture, in general, is under the vagaries of nature, particularly in the Ethiopian case, the high concentration on non-traditional export goods resulted in an unstable export performance.

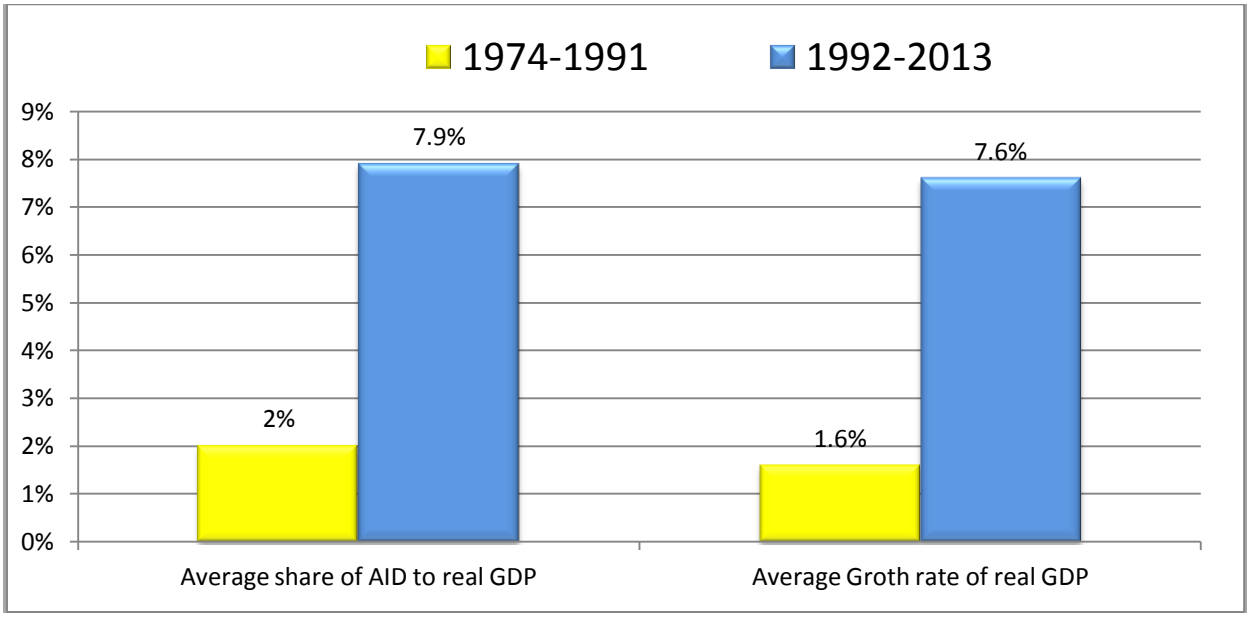
Ethiopia's export sector is characterized by over dependence on few agricultural products, with very limited exports of manufactured and semi-manufactured goods. This structure of concentrating on few agricultural commodities has not significantly changed over time. Besides, Coffee has still remained to be the dominant export commodity, though its share in the value of total exports fluctuates from time to time. It accounted for, an average, 27 percent of export earnings between 2010/11 and 2012/13. Gold, Oil seeds, chat, flower, pulses, and live animal have share of 18, 13.7, 9.6, 6.2, 5.9 and 5.8 percent, respectively during the same period. The combined share of coffee along with the above six items were 86.2 percent. This indicates that the dominant shares of Ethiopian export sector are agricultural commodities and it confirms that the diversification of the export sector is limited to these agricultural raw commodities.

4.5.4. Aid and Ethiopian economy

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. 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.

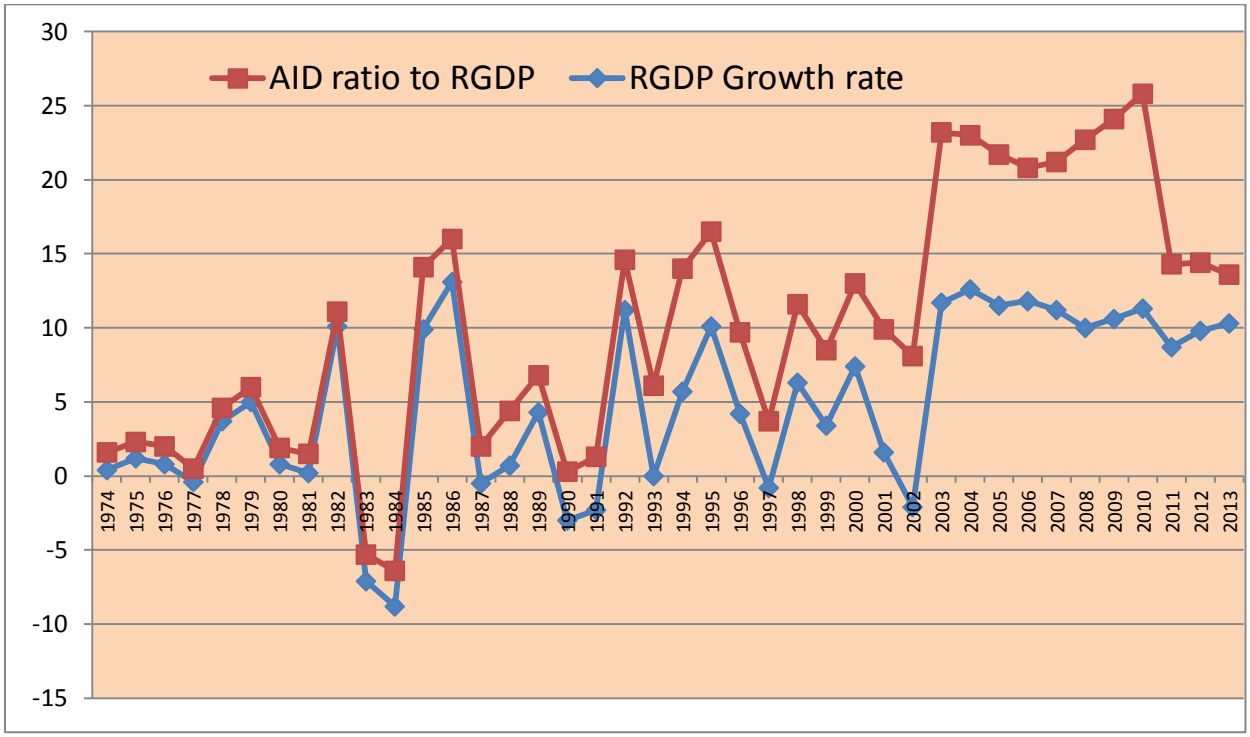
Foreign aid donated to Ethiopia from different donors increased during the study period starting from 1,230 Million of Birr in 1974 to 73,355 Million of Birr in 2010. The total Financial and technical aid during the military power (1974-1991) was 45,285 Million Birr while 583,497 Million was registered post 1992 (1992-2013) (from MoFED, time series data)

Figure 4.7: Average Aid share of real GDP and Average real GDP growth rate



Source: Own compilation based on the MoFED and WB data.

Figure 4.8: Trends of Aid ratio to real GDP and real GDP growth rate.



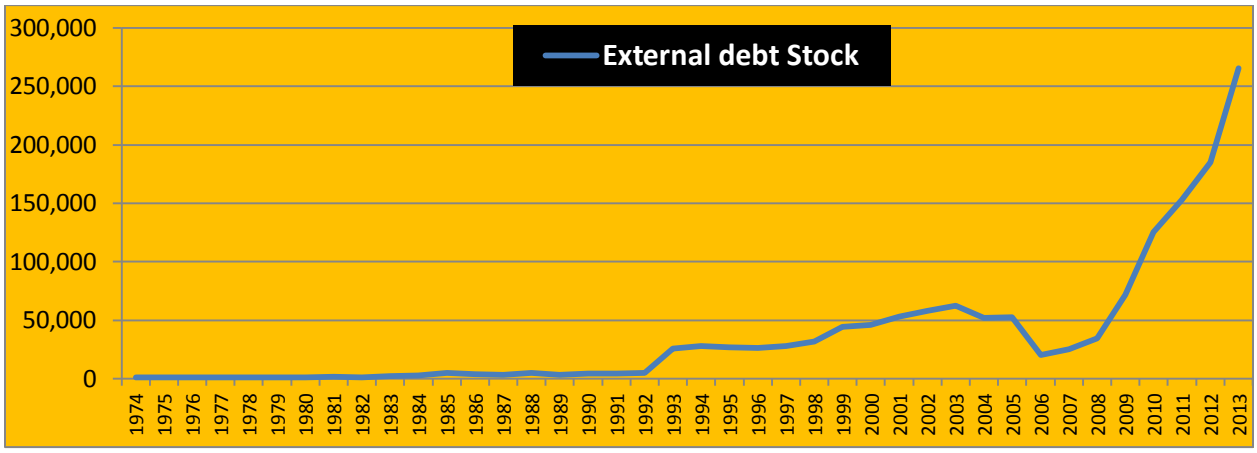
Source: Own compilation based on the MoFED and WB data

As we observed from the above graph (Figure4.8), even though the Aid ratio to real GDP continuously grew from 1.2 percent in 1974 to 11.5 percent in 2003, the economic growth fluctuated, which registered the highest growth rate (13.1 percent) in 1986 and lowest growth rate (8.8 percent below zero point) in 1984, which was due to best rain seasons and catastrophic drought and famine, respectively. As a result the aid was served for consumption of the society rather than financing economic developments. However, Aid ratio to real GDP increases to 14.5 percent in 2010 (i.e. the highest value under the study period) from 11.5 percent in 2003, the economic growth also went in the same direction and registered an average growth rate of 11 percent for the period of 2003-2013.

4.5.5. External Debt and Ethiopian Economy

The Ethiopian external debt stock has shown significant change in its size over the years under consideration. Its external debt is steadily increasing specially, since 2007. According to the UNDP country report (2014), the Ethiopian external debt reached $11.1 billion or 24.3 percent of GDP during 2013 from $2.7 billion in 2006. While the real GDP growth registered 9.7 percent for the same period (GDP per capita reached 550 USD from 270 USD) in 2006.

Figure 4.9: Trends of external debt stock (total) in Millions of Birr.



Source: Own compilation based on the MoFED and WB data's.

During the monarch period (1970-1974), the country's external debt had grown at an average of 5 percent per annum. However, during the military power the country had shown dependency on external assistance and reached a stage where it cannot function without external assistance (Befekade and Birhanu, 1999/00) as cited in Wessene (2014). But, the economic growth registered 2.3 percent while the per capita being -0.4 percent (Alemayehu and Befekadu, 2005). This very low economic growth may be associated with high external debt burden of which 40-50 percent financed for military expense during the same period (Tadesse, 2011). In the other hand, Hailemariam (2011) stated that, Ethiopia is one of the Highly Indebted Poor Countries

(HIPC) in the world. As we have seen in Figure 4.9 above, the external debt continually at increasing rate since 2007. The economy also grew at an average of double digit (11.4 percent) for the same period. Form this we can observe that as the external debt increase the growth also raises, which indicates that the external debt were invested in the macroeconomic development rather for recurrent consumption despite they have inverse relationship between growth and external debt.

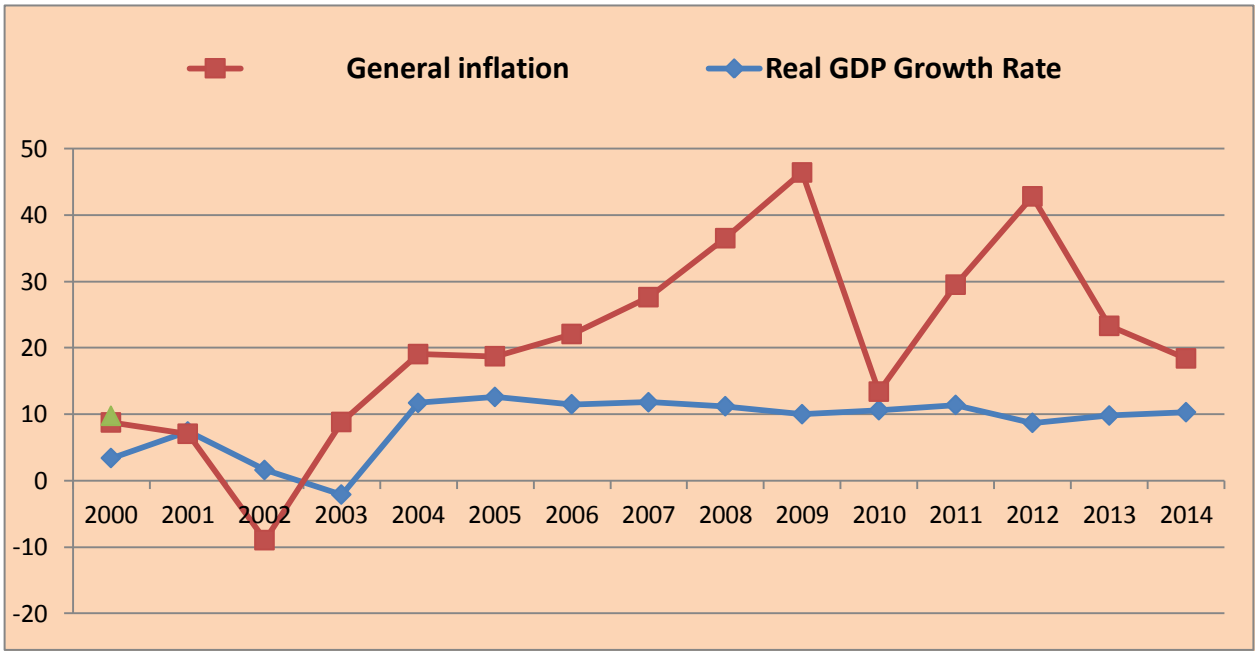
4.5.6. Trends of Inflation in Ethiopia

Trends of inflation show the change in the inflation over the years. Looking at the trends of the Inflation would enable the reader to understand the change of inflation during the study periods. Ethiopia has recorded strong economic growth over the past 10 years mainly due to the Government-led development policies emphasizing public investment, commercialization of agriculture and non-farm private sector development. Inflation remained at a reasonable low level rate before 2000/03. However, post 2003/04 sow sharp increase despite rapid economic growth during the same period (Alemayehu and Kibrom, 2008). According to Alemayehu and Kibrom (2008), the sharp increasing of general inflation was caused primarily by food inflation, which is the effect of food demand triggered and international food price hike.

The official headline inflation during 2008 stood at about 33 percent with food inflation being about 49 percent. This was huge macroeconomic shock in the history of Ethiopia for the last five decades and until 2003, was below 5 percent per annum (Ibid). This high rate of inflation continued until 2011/12. The 12 month moving average general inflation rate, which shows a longer inflation situation, was 18 percent for June 2010/11 and 33.7 percent in June 2011/12.

According to the MoFED report (2012/13) the high inflation rate, particularly in the year 2011/12 adversely affected the wellbeing of people and the effect to promote private investment. As a result, the Ethiopian government had taken policy measurements (prudent fiscal and monetary policy) and price stabilization intervention. Consequently, as of June 2012/13, the general inflation declined to 13.5 percent. As the National Bank of Ethiopia report indicates (2013/14), the general inflation declined form 13.5 percent in 2012/13 to 8.1 percent in 2013/14. Generally, we can say that, in the Ethiopian history inflation was at reasonable low level (i.e., dose not harm the economy significantly) except for the period 2008-2012.

Figure 4.10:- Trends of Inflation and real GDP growth (2000-2014)



Source: NBE.

As seen from Figure 4.10, even if, the inflation rate was skipper than real GDP growth rate, the real GDP registered a continuous and sustainable growth rate.

CHAPTER FIVE

5. RESULTS AND DISCUSSION

5.1. The Unit Root Test Analysis

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 test statistic (PP) test. Moreover in applying ARDL model all the variables entered in the regression should not be integrated of order two. To check these conditions, unit root test is conducted before any sort of action taken. Even though the ARDL framework does not require per-testing variables to be done, the unit root test could convenience us whether or not the ARDL model should be used. The result in Table 5.1 shows that there is a mixture of I(0) and I(1)but not any order two.

Table 5.1: unit root test (Augmented Dickey-Fuller test)

Augmented Dickey-Fuller test statistic (ADF Test)						
Variable	**With Intercept**			**Trend and Intercept**		
	At Level	At First Difference	Order of []	At Level	At First Difference	Order o f[]
LRGDP	4.370	-1.909	**I[0] at 1%**	1.098	-6.513	**I[1] at 1%**
LGCF	1.318	-7.789	**I[1] at 1%**	-1.980	-8.213	**I[1] at 1%**
LEHE	3.934	-4.012	**I[0] at 1%**	-0.206	-5.056	**I[1] at 1%**
LEXT	0.731	-5.234	**I[1] at 1%**	-1.603	-5.493	**I[1] at 1%**
LAID	-1.075	-5.999	**I[1] at 1%**	-3.653	-5.999	**I[0] at 5%**
LEXD	-0.939	-5.092	**I[1] at 1%**	-2.185	-5.021	**I[1] at 1%**
INF	-1.691	-8.781	**I[1] at 1%**	-4.149	-8.792	**I[0] at 5%**
MacKinnon (1996) with constant, no trend				with constant and trend		
Test critical values:		1% level	-3.621	Test critical values:	1% level	-4.227
		5% level	-2.943		5% level	-3.537
		10% level	-2.610		10% level	-3.200

Source: Eview 7.0 results

As we have seen form table5.1, GDP (LRGDP) , human capital (LEHE), capital formation (LGCF), export (LEXT) and external debt (LEXD) are integrated of order 0ne (I.e. I(1)) while foreign aid (LAID) and general inflation (INF) are integrated of order zero (I(0)). Meaning aid and inflation are stationary in level where as GDP, capital formation, Human capital, export and external debt are stationary in first difference (trend and intercept). However, with Intercept, except GDP and Human capital, all the variables are stationary in first difference. GDP and human capital are stationary in level.

Table 5.2: unit root test (Phillips-Perron test statistic test)

Phillips-Perron test statistic (PP Test)						
Variable	**With Intercept**			**Intercept and Trend**		
	At Level	At First Difference	Order o f[]	At Level	At First Difference	Order o f[]
LRGDP	7.897	-4.387	**I[0] at 1%**	1.1075	-6.081	**I[1] at 1%**
LGCF	3.283	-8.101	**I[0] at 5%**	-1.945	-10.323	**I[1] at 1%**
LEHE	3.611	-4.008	**I[0] at 5%**	-0.318	-5.061	**I[1] at 1%**
LEXT	1.315	-5.162	**I[1] at 1%**	-1.430	-6.884	**I[1] at 1%**
LAID	-1.083	-5.998	**I[1] at 1%**	-2.318	-5.996	**I[1] at 1%**
LEXD	-0.972	-5.115	**I[1] at 1%**	-2.185	-5.044	**I[1] at 1%**
INF	-4.133	-9.233	**I[0] at 1%**	-4.164	-9.079	**I[0] at 5%**
Test critical values:		1% level	-3.616	Test critical values:	1% level	-4.219
		5% level	-2.941		5% level	-3.533
		10% level	-2.609		10% level	-3.198

Source: Eview 7.0 results

Similarly, the PP test shows that there is a mixture of integration order zero and order one. That is, GDP, capital formation, human capital and inflation are stationary in level while export, foreign aid and external debt are stationary in first difference (with intercept only). However, except inflation all the variables are stationary after first difference with intercept and trend. Form table 5.1 and 5.2 we can conclude that none of the variables entered in the regression are order two, which are not desire in applying ARDL model. So ARDL cointegration technique proposed by Pesaran *et al.* (2001) is the most appropriate method for estimation or to check the long run relationship among the variables.

5.2. Model Stability and Diagnostic Test

To check the verifiability of the estimated long run model, some diagnostic test is undertaken. Priority in doing any analysis, we required to check the standard property of the model. In this study we carried a number of model stability and diagnostic checking, which includes Serial correlation test (Brush & Godfray LM test), Functional form (Ramsey's RESET) test, Normality (Jaque-Bera test), and Hetroscedasticity test. In addition to the above diagnostic tests, the stability of long run estimates has been tested by applying the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) test. Such tests are recommended by Pesaran *et al.* (2001). In order to reject or accept the null hypothesis, we can decide by looking the p-values associated with the test statistics. That is the null hypothesis is rejected when the p-value are smaller than the standard significance level (I.e. 5%).

Table 5.3: Diagnostic test for the long run ARDL (1, 0, 0, 2, 1, 2, 2)

Test Statistics	LM Version	F Version
A: Serial Correlation	CHSQ(1)= .82205[.365]	F(1, 22)= .48645[.493]
B: Functional Form	CHSQ(1)= .10702[.744]	F(1, 22)= .062132[.805]
C: Normality	CHSQ(2)= .10802[.947]	Not applicable
D: Hetroscedasticity	CHSQ(1)= .040745[.840]	F(1, 36)= .038642[.845]
	R^2 = 0.998	**$\bar{R}^2$ = 0.997** **DW = 2.25**

A: Lagrange multiplier test of residual serial correlation

B: Ramsey's RESET test using the square of the fitted values

C: Based on a test of skewness and kurtosis of residuals

D: Based on the regression of squared residuals on squared fitted values

Source: Microfit 4.1 results

The above table indicates that the long run ARDL model estimated in this study passes all the diagnostic tests. This is because the p-value associated with both the LM version and the F version of the statistic was unable to reject the null hypothesis specified for each test. Therefore based on the result of the test:

(A) The null hypothesis of no serial correlation (Brush Cod fray LM test) is failed to reject for the reason that that the p-values associated with test statistic is greater than the standard significant level (I.e. 0.365> 0.05). Her LM test for testing serial correlation is applied because unlike the traditional Durbin Watson test statistic which is totally inapplicable when the lagged dependent variable appear as a regressors, LM test avoid such limitation of DW test.

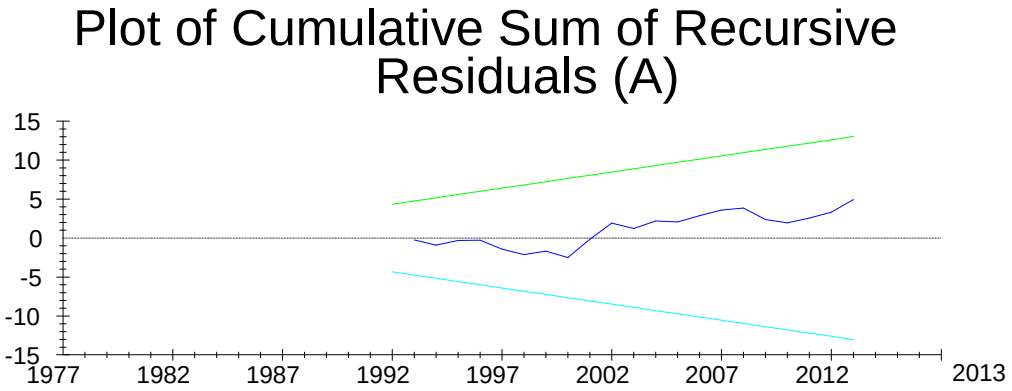
(B) We could not reject the null hypothesis test for Ramsey's RESET test, which tests whether the model suffers from omitted variable bias or not. As the test result indicates that we can't reject the Ramsey's test, which means that the model is correctly specified.

(C) The third diagnostic test is about the residual test. As the result indicates that we could not reject the null hypothesis which says that the residuals are normally distributed, for the reason, that the p-value associated with the Jaque-Berra normality test is larger than the standard significance level (I.e. 0.947>0.05).

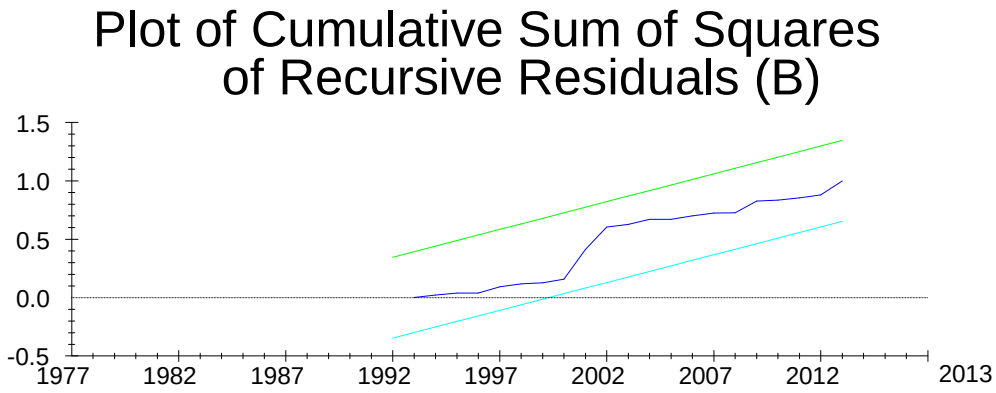
(D) The last diagnostic test is for hetroscedasticity test. As we have seen from the above table, we can reject at 5% significant level due to its p-value associated with the test statistics are greater than the standard significance level(I.e. 0.840> 0.05).

Moreover, the stability of the model for long run and short run relationship is detected by using the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) tests. The test finds serious parameter instability if the cumulative sum goes outside the area (never returns back) between the two critical lines.

Figure 5.1: Testing parameter stability using CUSUM and CUSUMSQ test



The straight lines represent critical bounds at 5% significance level



The straight lines represent critical bounds at 5% significance level

As can be seen from the first figure, the plot of CUSUM test did not cross the critical limits. Similarly, the CUSUMSQ test shows that the graphs do not cross the lower and upper critical limits. So, we can conclude that long run estimates are stable and there is no any structural break. In addition to the model stability 99.7percent of the model have been explained by the regressors. Hence the results of the estimated model are reliable and efficient.

5.3. Long Run ARDL Bounds Tests for Co-integration

Since we determined the stationary nature of the variables, the next task in the bounds test approach of co-integration is estimating the ARDL model specified in equation (4.5) using the appropriate lag-length selection criterion. According to Pesaran and Shine (1999), as cited in Narayan (2004) for the annual data are recommended to choose a maximum of two lag lengths. From this, a lag length that minimize AIC is 2. In addition to this, we have also used AIC to determine the optimal lag because it is a better choice for smaller sample size data as this study. Apart from this, AIC found to produce the least probability of under estimation among all criteria available (Liew *et al.*, 2004) as cited in Tsadkan (2013).

As we discus in the third part of this study, the F-test through the Wald-test (bound test) is performed to check the joint significance of the coefficients specified in equation (4.5). 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 and inflation. The computed F-statistic value is compared with the lower bound and upper bound critical values provided by Pesaran *et al.* (2001) and Narayan (2004).

Table 5.4: Calculate F- Statistic

Lag Length	Value of calculated F-statistic
2	21.010 [0.000]

Source: Microfit 4.1

As we have seen form the above table the calculated F-statistic is strongly significant at 1 percent significance level.

Table 5.5: The Upper and Lower critical values

Critical value	Pesaran *et al.* (2001)		Narayan (2004)	
	Lower Bound value	Upper bound value	Lower Bound value	Upper bound value
1 percent	5.15	6.36	4.770	6.333
5 percent	3.79	4.85	3.435	4.523
10 percent	3.17	4.14	2.833	3.730

Source: Pesaran *et al.* (2001) and Narayan (2004) critical values.

The critical values reported for Pesaran *et al.* (2001) are the case with unrestricted intercept and no trend (case III). In this study we have been used Narayan (2004) which is developed based on 30 to 80 observations as we discussed earlier in the third part of this study. As it is depicted in Table 5.4 and 5.5 above, with an intercept and trend, the calculated F statistics (21.010) is higher than both the Pesaran *et al.* (2001) and Narayan (2004) upper bound critical values at 1% level of significance. This implies that the null hypothesis of no long-run relationship is rejected; rather accept the alternative hypothesis (there is long-run relationship) based on the Pesaran *et al.* (2001) and Narayan (2004) critical values at 1% level of significance. Therefore, there is cointegration relationship among the variables in long run.

5.4. Long Run ARDL Model Estimation

After confirming the existence of long-run co-integration relationship among the variables, the next step is running the appropriate ARDL model to find out the long run coefficients, which is reported in table 5.6 below.

Table 5.6 Estimated Long Run Coefficients using the ARDL Approach ARDL (1, 0, 0, 2, 1, 2, 2) selected based on Akaike Information Criterion.

Dependent variable is LRGDP			
Regressors	Coefficient	Standard Error	T-Ratio[Prob]
LGCF	0.2998***	0.0780	3.8425[.001]
LEHE	0.2579***	0.0696	3.7068[.001]
LEXT	0.0023	0.0508	0.0452[.964]
LAID	0.0178	0.0392	0.4550[.653]
LEXD	-0.0840***	0.0230	-3.6525[.001]
INF	-0.0018	0.0025	-0.7086[.486]
CONS	7.6637***	0.7466	10.2645[.000]

Note: *** denotes significance at 1% which indicates rejection of null hypothesis at 1%.

Source: Microfit 4.1 ARDL (1, 0, 0, 2, 1, 2, 2) results.

The result of Table 5.6 indicates that all the variables entered in the regression have the expected signs regardless of their significant level. As we have discussed in the theoretical and empirical literature parts, physical capital, human capital, exports of goods and service, foreign aid have positive impact on Ethiopian economic growth while external debt and inflation have an inverse impact in Ethiopian economic growth regardless of significant.

As the long run estimated result of the above table showed, the physical capital formation which is proxied by gross investment has a positive impact on Ethiopian economic growth and statistically significant at 1 percent significance level.

This result is in-line with the theory of economic growth which states that capital formation is the major determinates of economic growth (Keynesian theory of growth, solow's theory of growth). Moreover, this study's result is consistence with study of Biswas and Saha (2014) in India; Iqbal and Zahid (1998) in Pakistan; Ndambiri H.K. *et al.* (2012) and Patrick Enu *et al.* (2013) in Africa; Weeks *et al.* (2004) and Tadesse (2011) in Ethiopia.

Since we have specified the growth model in a log-linear form, the coefficients can be interpreted as elasticity with respect to real GDP. The coefficient of gross capital formation (GCF) is 0.2998. This indicates that, in the long run, holding other things constant, a one percent change in gross capital formation which is proxied by gross investment brought 0.2998 percent change in real GDP during the study period.

Next to physical capital, human capital has a long run impact on the Ethiopian economy growth and statistically significant at 1 percent significance level. The findings of this research concerning the long run positive impact of the human capital on Ethiopian economic growth, are consistent with the endogenous growth theories (mainly advocated and/or developed by Lucas (1988) , Romer (1990) which argue that improvement in human capital (skilled and healthy workers) leads to productivity improvement that enhances output. In addition this research result is similar with the results found by Haldar and Mallik (2008); Ndambiri H.K *et al.* (2012) and Tadesse (2011). As a result a one percent increase in the human capital which is proxied by

expenditures to health and education has resulted in 0.2579 percent change in real GDP under the study period.

The result of this study revealed that the impact of total exports of goods and service on Ethiopian economic growth during the study period, even if there is positive relationship, it is not statistically significant. This insignificant result might be associated with agricultural primary product (as we discussed in part four of this study, more than 68 percent of export level in the country comes from agricultural primary product), which suffered from international price shock. The other reason behind insignificant result might be associated with huge gap resource balance (17.8% as ratio to real GDP), which indicates that exports of goods and services have insignificant impact on Ethiopian economic growth. This result also confirmed by MoFED particularly during 2011/12 and 2012/13 despite it was expected to play an important role in accelerating the economic growth during the GTP period. Moreover, this result is in line with the research conducted in Ethiopia by Gezehegn (2012), he found that, total exports of goods and service was insignificant on Ethiopian economic growth even though there is positive impact, while there is an inverse relationship between economic growth and export volatilely.

As indicated in table 5.6 above foreign aid has positive impact on Ethiopian economic growth. But it is statistically not significant during the study period, which is also in line with the study of E. M. Ekanayake and Dasha Chatrna(1980-2007) conducted in 85 developing countries including Africa. An empirical result provide in the literature part also report a mixed results. In my opinion, there might be two possible reasons behind the insignificant result. In the first case, the inflow of foreign aid might finance for consumption than for investment, which is used to accelerating economic growth. If so, it does not have any impact on economic growth due to no

value add to macroeconomic growth. The second reason behind the insignificant result may be associated with the data inconsistency, which we took from two organization(World bank, 1974-1985; MoFED,1986-2013) to solve the problem of no long time series (40 years) data availability for this variable only.

The debt burden, which is measured by total external debt has a negative relationship with real GDP and statistically significant at 1 percent significance level. This result indicates that the existence of debt overhang problem in the country during the study periods and Ethiopia is one of the highly indebted poor countries in the world as Hailemariam (2011) stated. Moreover, this result was consistent with the finding of IMF (2002) working paper for 93 developing countries; Boboye *et al.* (2012) for Nigeria; Hailemariam (2011), Teklu *et al.* (2014) and Wessene (2014) for Ethiopia. As the result showed that a one percent increase in the external debt will result in 0.084 percent decline in real GDP during the study periods. In addition this result is in line with Wessene's finding. In my view, the negative impact of external debt on economic growth might be liked with the low domestic saving rate in the country. As a result, to finance the government investment especially for the mega project, the Ethiopian government will borrow from different external financial institution and governments. This implies that the government with heavy debt burden may be forced to increase taxes in the future in order to pay the debt service.

The general inflation rate, as showed in the above table 5.6 has negative impact on Ethiopian economic growth, even though statistically insignificant. In the Ethiopian history, inflation remained at a reasonable low level rate until 2002/03. But after 2004, the inflation rate increased and reached 36.4 percent in 2009 (NBE, 2013/14), which was caused primarily by food inflation and affect the wellbeing of the society than harming the macroeconomic performance. The

insignificant effects of inflation on Ethiopian economic growth might be associated with the reasonable low level (single digit) inflation rate until 2003 as we discussed in chapter four of this study. Moreover, the result of this study also consistent with (Khan and Senhadji, 2000) and Bawa and Abdullahi (2010) as an average inflation registered 9.7 percent during the study period. From the descriptive and econometric result we can understand that, inflation does not harm the economic growth significantly for the study period. Finally, the long run estimated model presented as follow with figures in the parenthesis indicates calculated t-value.

$$LRGDP = 7.66 + 0.30LGCF + 0.26LEHE + 0.002LEXT + 0.02LAID - 0.084LEXD - 0.002INF$$

(10.27) (3 .84) (3.71) (0.05) (0.46) (-3.65) (-0.71)

5.5. Short Run Error Correction Model

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

Table 5.7: Error Correction Representation for the Selected ARDL (1, 0, 0, 2, 1, 2, 2) selected based on Akaike Information Criterion.

Dependent variable is dLRGDP			
Regressors	**Coefficient**	**Standard Error**	**T-Ratio[Prob]**
dLGCF	0.1856***	0.0440	4.2162[.000]
dLEHE	0.1596**	0.0659	2.4223[.022]
dLEXT	0.0047	0.0456	0.1029[.919]
dLEXT1	-0.0749**	0.0366	-2.0487[.050]
dLAID	-0.0495**	0.0223	-2.2180[.035]
dLEXD	-0.0415*	0.0214	-1.9427[.063]
dLEXD1	0.0537**	0.0222	2.4220[.022]
dINF	0.0010	0.0008	1.3259[.196]
dINF1	0.0011	0.0007	1.5306[.138]
dCONS	4.7439***	1.3370	3.5482[.001]
ecm(-1)	-0.6190***	0.1328	-4.6597[.000]
R-squared = 0.84897;		R-bar- squared = 0.75704	
F-stat. F (10, 27) 12.9290[.000];		DW-statistic = 2.2518	

Source: Microfit 4.1 result. ***, **, * indicates statistical significant at 1%, 5% and 10%, respectively.

The error correction coefficient, estimated at -0.6190 is highly significant, has the correct negative sign, and imply a very high speed of adjustment to equilibrium. According to Bannerjee *et al*. (2003) as cited in Kidanemarim (2014), the highly significant error correction term further confirms the existence of a stable long-run relationship.

Moreover, the coefficient of the error term (ECM-1) implies that the deviation from long run equilibrium level of real GDP in the current period is corrected by 61.9 % in the next period to bring back equilibrium when there is a shock to a steady state relationship.

The coefficient of determination (R-squared) is high explaining that about 85 % of variation in the real GDP is attributed to variations in the explanatory variables in the model. In addition, the DW statistic does not suggest autocorrelation and the F-statistic is quite robust.

As Chandran *et al.* (2010), which is quoted in Tsadkan (2013), the long run effect of the model can be captured by the error term (ECM). Thus, in the long run LGCF, LEHE, LEXT, LAID, LEXD and INF granger cause LRGDP (i.e. unidirectional causality). Not only this but also in applying autoregressive distributed lag (ARDL) model, does not require testing for granger causality since, it considers an endogenity problem in the model (Wessene, 2014).

From the above table 5.7, similar to the long run result, capital formation (gross investment) and human capital (expenditures to health and education) have positive impact on Ethiopian economic growth and statistically significant at 1 and 5 percent significance level, respectively in the short term. As a result a one percent increases in capital formation will result in 0.19 percent increase in real GDP in the short run. Similarly, a one percentage increase in human capital expenditure will result in 0.16 percent increase in real GDP.

On the other hand, total exports of goods and service is still insignificant like the long run, with positive coefficient, which indicates the positive relationship between export and Ethiopian economic growth. However, with one period lagged, export is significant at 5 percent significance level with negative coefficient.

Unlike the long run, the aid variable significantly affects economic growth at 5 percent significance level. Even though, the sign is negative.

Similar to the long run effect, the external debt variable is found to have a negative relationship with real GDP. However, the one year lag result indicates that external debt is associated directly with economic growth. The result is significant at 5 percent significance level. As a result a one percent increase in external debt will result in a decline in the real GDP by 0. 042 percent in short run. This indicates that the effect of external debt in Ethiopia under the study periods is permanent as well as transitory and overhang occurs both in short and long run. This result is also consistent with Wessene (2014) for Ethiopia. According to her result, the reason behind the negative impact on economic growth in the short run might be the improper management of external debt, which might also the case in this study.

As one can understand form the above table (5.7), inflation is not significantly affect Ethiopian economic growth during the study period, despite their relationship is positive in short run. From this we can understand that under the study period, whether in the long run or in the short run, general inflation rate, does not have significant (both negative and positive) impact on the Ethiopian economic growth.

CHAPTER SIX

6. CONCLUSION AND POLICY RECOMMENDATION

6.1 Conclusion

The main objective of this study is to analyze the determinants of economic growth in Ethiopia during the specified period. To determine the long run and short run relationship among the variables, Autoregressive Distributed Lag (ARDL) model was applied. Before applying the ARDL model, all the variables are tested for their time series properties (stationarity properties) using the ADF and PP tests. As a result, real GDP and human capital variables are stationary (no unit root problem) at level, while capital formation, export, aid, external debt and inflation are stationary at first difference with intercept. However, with trend and intercept, except aid and inflation (i.e., stationary in level), all the variables are stationary in first difference.

Next to testing for time series property, the model stability was done by testing the diagonal testing techniques. The result revealed that no evidence of serial correlation, no functional form problem (the model is correctly specified), the residual is normally distributed and no evidence of hetroscedasticity problem. As we discussed above, this study applied the methodological approach called ARDL model also known as bound test approach. As the result indicted the bound test (F-statistic) value is larger than the upper bound critical value both for Pesaran *et al.(*2001) and Narayan(2004), which indicates there is a long run relationship between real GDP and its determinants (capital formation, human capital, export, aid, external debt and inflation) in long run during the study period.

The empirical result showed that both physical capital (gross investment) and human capital (expenditure of health and education) are found to have positive impact on Ethiopian economic

growth during the study period and statistically significant at 1 percent significance level. A one percent increase in capital formation (gross investment) results in 0.30 and 0.19 percent increase in real GDP in long run and short run, respectively. Likewise, a one percent increase in human capital (expenditure of health and education) will result in 0.26 and 0.16 percent increase in real GDP in long run and short run, respectively. The external debt also has negative impact in economic growth during the study period in both long run and short run. A one percent increase in external debt will result in 0.08 and 0.04 percent decline in real GDP in long run and short run, respectively. However, the study found out that export of goods and service and foreign aid have statistically insignificant impact on economic growth with positive sign in the long run. From this one can understand that so far the GTP target (i.e., exports of goods and non-factor service as percentage of GDP, 31.2%) does not achieved.

The other finding of this study is the insignificant impact of inflation in Ethiopian economic growth during the study period. Despite its sign is inconsistent in long run and short run, it has insignificant impact on Ethiopian economic growth. From this one can understand that inflation wasn't significantly harming the Ethiopian economic growth during the study period.

Moreover, this study is found out that economic growth during EPRDF (1992-2013) relatively robust in growth compared to the military regime (1974-1991). During the military period, the average growth rate of real GDP was 1.6 percent (real GDP per capita was -0.9%), while the average population growth was 2.5 percent, which indicates the growth rate in real GDP was far away from satisfactory points. However, during the EPRDF regime, growth is relatively fast and beyond satisfactory. The average growth rate in real GDP registered 6.7 percent (real GDP per capita was 3.4%) during 1992 to 2013, while the average population growth was 2.6 percent. Moreover, since 2004, the growth rate in real GDP on average registered 10.9 percent (NBE, 2013/14) and by far more than the average growth rate for Sub-Sahara African Countries.

6.2 Policy Recommendation

Based on the finding of this study, the following policy recommendations are forwarded.

- In order to enhance the contribution of the physical capital formation, the government of Ethiopia has to set policies to increase domestic saving which is believed as a back bone of growth. This includes increase saving mobilization like selling of government Bonds, expanding financial institutions and by strengthening existing saving tools (strengthening both private and government workers social security scheme, strengthening saving for housing program, saving for investment equipment scheme).

- In order to enhance the contribution of the human capital formation ,the government of Ethiopia has allocate adequate finance which will help to work on quality of education and providing basic health services to the society. Thus educated and healthy societies will bring technology and innovation, which is believed as a spring board of economic growth.

- Exports of goods and service have insignificant positive impact on Ethiopian economic growth. Therefore, the Federal Government of Ethiopia should strengthen the existing strategies in export development and promoting investment particularly in the manufacturing sector for export and import substitution. Moreover, the researcher recommends that policies that facilitate flexibility in production for exports be formulated.

- As debt affects the economic growth of Ethiopia negatively, allocating resources on selected productive investment areas, which used to return back the debt burden and together with basic infrastructure construction that facilities productive of other sector is decisive. In addition there should be close monitoring and consistent debt management strategies, which is used to avoid misallocation and mismanagement of external debt problem.

- Though inflation is not that much a problem in Ethiopian growth, the federal government should work to reduce the inflation rate if possible, otherwise, it should sustain the existing inflation rate (with single digit) by tight fiscal and monetary policies, financing of budget deficit from non-inflationary sources and implementation of price stabilization program by subsiding basic food items

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Appendices

Appendix A: Variable Addition Test (OLS case)

```
*******************************************************************************
 Dependent variable is DLRGDP
 List of the variables added to the regression:
 LRGDP(-1)        LGCF(-1)         LEHE(-1)         LEXT(-1)         LAID(-1)
 LEXD(-1)         INF(-1)
 37 observations used for estimation from 1977 to 2013
*******************************************************************************
 Regressors              Coefficient       Standard Error         T-Ratio[Prob]
 CONS                      13.1848            1.5571             8.4678[.000]
 DLRGDP(-1)               -.025501            .15270            -.16700[.870]
 DLRGDP(-2)                -.17285            .17516            -.98684[.339]
 DLGCF(-1)                -.028038           .039963            -.70159[.494]
 DLGCF(-2)                -.023368           .040506            -.57691[.573]
 DLEHE(-1)                  .14165           .053155             2.6649[.018]
 DLEHE(-2)                -.011366           .063264            -.17965[.860]
 DLEXT(-1)                 .014410           .032057             .44950[.659]
 DLEXT(-2)                -.021520           .031777            -.67721[.509]
 DLAID(-1)                .0014665           .020223            .072517[.943]
 DLAID(-2)                 .013960           .021108             .66133[.518]
 DLEXD(-1)                -.023391           .018325            -1.2765[.221]
 DLEXD(-2)               -.4082E-3           .020030           -.020380[.984]
 DINF(-1)                -.0010271          .9745E-3            -1.0540[.309]
 DINF(-2)                -.4402E-4          .6411E-3           -.068665[.946]
 LRGDP(-1)                .6460E-5          .7953E-6             8.1228[.000]
 LGCF(-1)                -.8733E-6          .1516E-5            -.57615[.573]
 LEHE(-1)                -.3273E-4          .3888E-5            -8.4174[.000]
 LEXT(-1)                -.3418E-5          .1639E-5            -2.0860[.054]
 LAID(-1)                -.1947E-5          .7822E-6            -2.4885[.025]
 LEXD(-1)                 .2225E-5          .5842E-6             3.8088[.002]
 INF(-1)                 -.0012719          .8279E-3            -1.5363[.145]
*******************************************************************************
 Joint test of zero restrictions on the coefficients of additional variables:
 Lagrange Multiplier Statistic     CHSQ( 7)=  33.5755[.000]
 Likelihood Ratio Statistic        CHSQ( 7)=  88.0588[.000]
 F Statistic                   F(  7,  15)=  21.0098[.000]
*******************************************************************************
```

Appendix B: Diagnostic Tests

```
Autoregressive Distributed Lag Estimates
      ARDL (1,0,0,2,1,2,2) selected based on Akaike Information Criterion


*****************************************************************************
*    Test Statistics  *        LM Version        *         F Version        
*****************************************************************************
*                     *                          *                          
* A:Serial Correlation*CHSQ(   1)=   .82205[.365]*F(   1,  22)=   .48645[.493]
*                     *                          *                          
* B:Functional Form   *CHSQ(   1)=   .10702[.744]*F(   1,  22)=  .062132[.805]
*                     *                          *                          
* C:Normality         *CHSQ(   2)=   .10802[.947]*       Not applicable     
*                     *                          *                          
* D:Heteroscedasticity*CHSQ(   1)=  .040745[.840]*F(   1,  36)=  .038642[.845]
*****************************************************************************
   A:Lagrange multiplier test of residual serial correlation
   B:Ramsey's RESET test using the square of the fitted values
   C:Based on a test of skewness and kurtosis of residuals
   D:Based on the regression of squared residuals on squared fitted values
*****************************************************************************
R-Squared                      .99823   R-Bar-Squared                  .99716
 S.E. of Regression            .029338   F-stat.    F( 14,  23)  928.1408[.000]
 Mean of Dependent Variable   12.1703   S.D. of Dependent Variable      .55028
 Residual Sum of Squares       .019797   Equation Log-likelihood       89.7170
 Akaike Info. Criterion       74.7170   Schwarz Bayesian Criterion     62.4351
 DW-statistic                  2.2518   Durbin's h-statistic     -1.3523[.176]
*****************************************************************************
```

Appendix C: Estimated Long Run Coefficients using the ARDL Approach

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

Dependent variable is LRGDP

38 observations used for estimation from 1976 to 2013

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LGCF	.29979	.078020	3.8425[.001]
LEHE	.25790	.069576	3.7068[.001]
LEXT	.0022969	.050846	.045174[.964]
LAID	.017819	.039167	.45495[.653]
LEXD	-.084025	.023005	-3.6525[.001]
INF	-.0017592	.0024826	-.70860[.486]
CONS	7.6637	.74662	10.2645[.000]

Appendix D: Error Correction Representation for the Selected ARDL Model

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

```
********************************************************************************
 Dependent variable is dLRGDP
 38 observations used for estimation from 1976 to 2013
********************************************************************************
 Regressor              Coefficient       Standard Error         T-Ratio[Prob]
 dLGCF                      .18557            .044014             4.2162[.000]
 dLEHE                      .15964            .065907             2.4223[.022]
 dLEXT                     .0046864           .045564             .10285[.919]
 dLEXT1                    -.074886           .036552            -2.0487[.050]
 dLAID                     -.049510           .022322            -2.2180[.035]
 dLEXD                     -.041521           .021373            -1.9427[.063]
 dLEXD1                     .053688           .022167             2.4220[.022]
 dINF                      .0010461          .7890E-3             1.3259[.196]
 dINF1                     .0010975          .7170E-3             1.5306[.138]
 dCONS                       4.7439             1.3370             3.5482[.001]
 ecm(-1)                    -.61901             .13284            -4.6597[.000]
********************************************************************************
ecm = LRGDP   -.29979*LGCF   -.25790*LEHE -.0022969*LEXT  -.017819*LAID +  .0
84025*LEXD -.0017592*INF   -7.6637*CONS
********************************************************************************
 R-Squared                      .84897   R-Bar-Squared                   .75704
 S.E. of Regression            .029338   F-stat.    F( 10,  27)   12.9290[.000]
 Mean of Dependent Variable    .049633   S.D. of Dependent Variable     .059521
 Residual Sum of Squares       .019797   Equation Log-likelihood        89.7170
 Akaike Info. Criterion        74.7170   Schwarz Bayesian Criterion     62.4351
 DW-statistic                   2.2518
********************************************************************************
 R-Squared and R-Bar-Squared measures refer to the dependent variable
 dLRGDP and in cases where the error correction model is highly
 restricted, these measures could become negative.
```

Appendix E: Real Data entered in the Regression **(Except Inflation All variables are measured in Millions of Birr)**

Year	Real GDP	Gross Capital Formation	Expenditure of Health & education	Total Export	Aid	External debt	General Inflation
1974	102,407	19,176	208	8,192	1,231	586	10.7
1975	103,100	15,866	209	8,581	1,161	711	4.7
1976	104,155	15,407	220	8,363	1,225	834	18.9
1977	103,567	14,116	219	8,122	885	1,037	21.9
1978	108,533	16,960	255	8,292	952	1,174	18.6
1979	113,795	20,453	275	10,500	1,185	1,532	13.0
1980	115,224	21,880	325	9,872	1,267	1,705	12.5
1981	115,111	22,075	392	8,778	1,535	3,813	1.9
1982	126,707	21,632	418	9,227	1,288	6,789	7.3
1983	118,729	28,003	444	10,136	2,134	7,959	3.9
1984	107,221	16,067	492	7,007	2,605	8,740	-0.3
1985	117,837	27,052	512	8,890	4,961	10,790	16.4
1986	134,380	29,350	566	8,925	3,852	5,386	6.5
1987	134,309	38,448	602	8,708	3,307	6,176	-9.6
1988	134,767	27,202	654	9,809	4,990	6,491	2.3
1989	140,248	24,516	670	8,693	3,542	7,257	9.6
1990	135,165	19,684	650	6,023	4,480	7,498	5.2
1991	130,177	16,755	717	4,727	4,687	6,551	20.0
1992	145,799	29,027	948	9,784	4,958	18,779	21.9
1993	148,276	31,469	1,346	13,585	9,037	25,722	7.7
1994	156,247	35,958	1,563	18,188	13,038	27,732	3.3
1995	172,839	40,856	1,865	18,233	10,987	27,088	13.4
1996	180,911	43,065	2,037	23,648	9,950	26,510	0.9
1997	178,301	42,821	2,157	22,789	8,084	27,917	-6.4
1998	188,990	44,834	2,341	21,449	9,955	31,566	3.9
1999	197,611	44,108	2,195	24,120	10,049	44,648	4.3
2000	214,194	50,746	2,911	26,047	12,099	46,269	5.4
2001	217,411	57,705	3,488	27,828	18,030	52,994	-0.3
2002	212,699	51,975	4,668	28,767	21,729	58,282	-10.6
2003	241,964	70,590	5,287	36,607	27,722	62,188	10.9
2004	270,363	70,671	6,078	41,452	28,123	52,094	7.3
2005	299,465	83,053	7,727	42,057	30,610	52,339	6.1
2006	333,669	81,227	8,915	43,058	30,018	20,215	10.6
2007	369,534	90,924	13,416	42,800	36,778	25,455	15.8
2008	401,598	100,416	16,634	42,854	51,166	34,451	25.3
2009	452,823	122,967	21,418	62,644	61,125	71,800	36.4
2010	505,646	140,904	29,652	85,955	73,356	125,449	2.8
2011	549,765	181,854	37,446	102,887	30,849	152,631	18.1
2012	606,734	200,122	45,977	107,969	27,837	185,315	34.1
2013	679,766	281,786	56,157	122,632	22,157	265,593	13.5
Source	**MoFED**	**MoFED**	**MoFED**	**NBE**	**MoFED, WB**	**MoFED**	**CSA**

Declaration

I, the undersigned, declare that this thesis is my original work and has not been presented for a Master's degree in any other University, and that all sources of material used for this thesis have been duly acknowledged.

Declared By:

Name: Tewodros Gebru

Signature: _____

Date: _____

Confirmed by (Advisor)

Name: Fantu Guta (PhD)

Signature: _____

Date: _____

Place and date of Submission: _____