

# Determinants of Economic Growth in Ethiopia



**Salale University**  
**College of Business and Economics Department of Economics**

A Thesis Submitted to Salale University College of Business and Economics Department of Economics for the Partial Fulfillment of the Requirements for the Award of Masters of Science in Development Economics.

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**Fitche, Ethiopia**

August, 2022

**Submitted By: Kemal Saide Shifaw**

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## DECLARATION

I, Kemal Saide Shifaw, ID. No RM0130/13, do hereby declare that this thesis entitled “**Determinants of Economic Growth in Ethiopia**” is my original work and that it has not been submitted partially or in full by any other person for an award of degree or publication in any other university/institution.

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### **CERTIFICATE**

This is to certify that the thesis entitled “**DETERMINANTS OF ECONOMIC GROWTH IN ETHIOPIA**” submitted to Department of Economics College of Business and Economics, Salale University by Kemal Saide Shifaw for the degree of Master of Science in Development Economics, is original work done by the candidate under my supervision. I further certify that the entire thesis represents the independent work of Kemal Saide Shifaw and all the thesis works were undertaken by the candidate under my supervision and guidance.

This thesis has been submitted for examination with my approval.

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## **DEDICATION**

I dedicate this paper to my wife Alemiye, my daughter Rahma and My Sons Abdelfattah and Ramadan. This is for their moral support and dedication during the time I was writing the paper. I also dedicate the paper to my able and inspiring supervisor Haile Girma (Assistant Professor) and DagimTadesse (Lecturer) who they dedicated all their time to guide me to come up with the best thesis paper. I also dedicate to my parents and siblings for their support.

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COLLEGE OF BUSINESS AND ECONOMICS  
DEPARTMENT OF ECONOMICS**

**BOARD OF EXAMINERS THESIS APPROVAL SHEET**

The undersigned certify that I have read and hereby recommend Department of Economics, Salale University, to accept the thesis entitled **“DETERMINANTS OF ECONOMIC GROWTH IN ETHIOPIA”** which had been submitted by **KEMAL SAIDE SHIFAW** in partial fulfillment of the requirements for the award of a **Master Degree in Development Economics**.

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**ACRONYMS AND ABBREVIATIONS**

ADF	Augmented Dickey Fuller
AIC	Akaike Information Criteria
ARDL	Autoregressive Distributed Lag
EAC	East African Community
ECM	Error Correction Method
EEA	Ethiopian Economic Association
EPRDF	Ethiopian People's Revolutionary Democratic Front
FDI	Foreign Direct Investment
GCF	Gross Capital Formation
GDP	Gross Domestic Product
GDPPC	Gross Domestic Product per Capital
GMM	Generalized Methods of Moments
GNI	Gross National Income
GNP	Gross National Product
GPI	Genuine Progress Indicator
GTP	Growth and Transformation Plan
H-D	Harrod- Domar
HDI	Human Development Index
IMF	International Monetary Fund
LAC	Latin America and the Caribbean's
LM	Langragian Multiplier
MOFEC	Ministry of Finance and Economic Cooperation
NBE	National Bank of Ethiopia
NDI	Net Domestic Income
NDP	Net Domestic Product
NI	National Income
NNI	Net National Income
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least square
PP	Phillips – Perron
PWT	Penn World Table
R& D	Research and Development
RGDP	Real Gross Domestic Product
SSA	Sub Saharan Africa
SSE	Secondary school Enrolment
S.W.T	SubhanahuWaTa'ala
TFP	Total factor productivity
UNCTAD	United Nation Conference on Trade and Development
VEC	Vector Error correction
WB	World Bank
WDI	World Development Indicator

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## ABSTRACT

The main objective of this study is to investigate the determinants of economic growth in Ethiopia ranging from periods of 1974 to 2020. The study employs an Auto-regressive Distributed Lag (ARDL) bound test model to co-integration in order to investigate the long run relationship and Error Correction Model (ECM) for short-run relationship between growth of real GDP and Its selected determinants. The long-run empirical result using the bound test reveals that there is a stable long run relationship between growth of real GDP and its determinants. Gross capital formations, Human capital, labor force, government spending and population growth have a positive significant impact on the growth of real GDP during the study period while export, foreign aid, external debt and financial sector development have a negative significant effect. However, inflation and social welfare expenditure has a negative insignificant impact on economic growth in the long-run, with unexpected sign. The financial sector development, export and social welfare expenditure are significant with unexpected sign. The short-run dynamic results show that gross capital formation and Government expenditure have also positive impact on the growth real GDP while all variables have negative significant effect. Finally, in the short run, the coefficient of equilibrating Error Term (ECM) is -0.9349 suggesting that about 93.49 percent annual adjustments towards long run equilibrium. That is since it is high speed of adjustment (feedback effects towards the long run equilibrium) it takes few years for full adjustment when there is a shock in the system. This study has also an important policy implication. The findings of this study imply that economic growth can be improved significantly when the gross capital formation 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 order to sustain long run growth the government or policy makers should design appropriate policies that results in the efficient use of resources contributing to economic growth and proper management of variables resulting to negative growth (specially all variables negatively impacted) in order to reverse their effect on output.

*Keywords:- Ethiopia, Economic Growth, ARDL, Bound Test, ECM, Determinants.*

## CHAPTER ONE INTRODUCTION

### ➤ *Background of the Study.*

The debate on the key drivers of economic growth has been ongoing and it is still far from over (Nihat, *et al.*, 2013; Mbulawa, 2015; Obrimah, 2015). Really, the role of macroeconomic stability through stable prices (low inflation), low levels of debt (whether foreign or domestic), free market economy, low levels of unemployment, is considered crucial in stimulating sustainable economy (Mbulawa, 2015). However, the general agreement is that sources of growth are both internal and external to a country's economy. The issue was a question of great importance for many economists in the past and are also today who are interested to knowing and searching for factors enabling some countries to grow and develop while others suffer from miserable poverty.

As witnessed by the recent experiences some East Asian countries have recorded astonishing economic performances while the Sub-Saharan Africa (SSA) countries have not been able to obtain the kind of sustained-growth which commonly regarded as premise of development. Ethiopia belongs to SAA countries where poverty is widespread though the country has recently experienced appealing economic growth (Tadesse, 2011).

In light of this, taking Ethiopia in place as it belongs to SSA countries and Ethiopia has passed through three politically distinct regimes with different policy reforms and various changes in economic growth since 1930: The imperial Government (1930-1974), the Derg Regime (1974-1991) and Ethiopian People Revolutionary Democratic Front (1991-present Prosperity Party). During the Derg regime, the general growth rate of GDP was 1.6%. During the period 1974-1978, the growth rate was 0.4 due to the civil war and the instability. In 1979-83 growth rate rose to 4.2% - a period characterized by relatively stable and good weather conditions. In 1984-85 growth plummeted to -5.3%. These were periods of severe drought. This rate picked up to 7.9% in 1986-87, only to decline back to 1% and the average per capita GDP growth rate is -2.3% in 1988-89. This was because of the intensive internal war that takes place in Ethiopia to overthrow the government and to retain power by the ruling government. However, Ethiopia experienced a very high growth rate during the Derg regime between the periods of 1986-87 which was 7.9% per annum. This achievement is because of the best rains season at the time (Alemayehu, 2001).

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

However, According to (World Bank, 2021), even though Ethiopia's economy experienced strong, broad-based growth averaging 9.4% a year from 2010/11 to 2019/20, due to COVID-19 (corona virus pandemic, Ethiopia's real gross domestic product (GDP) growth slowed down to 6.1% in 2019/20. During this year Agriculture, Industry and service was growing by 35.52%, 24.82% and 37.15% respectively in which each sectors accounted for most of the growth. Agriculture was not affected by the COVID-19 pandemic and its contribution to growth slightly improved in 2019/20, as compared to the previous year (2018/2019), which shows that Agriculture, Industry and Services were growing at 31.11%, 27.31% and 36.41% as Private consumption and public investment explained demand-side growth, the latter assuming an increasingly significant role.

The consistent higher economic growth brought with it positive trends in poverty reduction in both urban and rural areas. The share of the population living below the national poverty line decreased from 30% in 2011 to 24% in 2016. However, Ethiopia government has launched a new 10-year perspective plan which will run from 2020/21 to 2029/30. The plan aims to sustain the remarkable economic growth achieved under the Growth and Transformation Plans (GTP), while putting more emphasis on the private sector (WB, 2021).

Generally, Ethiopian economic history is characterized by ups and downs of economic performance owing to different regimes of ruling governments and their associated policies and objectives for what the government set policies. This can be the reason for the low level of living standards that the present Ethiopia is encountering. So the study of economic growth and their determinants is interesting and hot phenomena that is to be addressed to have high level of potential growth that lifts out the society from poverty.

### ➤ *Statement of the Problem.*

Currently, the miscellaneous economic growth patterns are relatively common in the world. The progression of economic growth and the source of differences in economic performance across nations are some of the most interesting, important, and challenging areas in modern social science. So, the source of economic growth is a question of significant importance concern for

many economists, politicians and policy makers who are interested to know and search for factors enabling some countries to grow and develop while others are suffering from miserable poverty (Tewodros, 2015).

Ethiopia is one of the poorest countries in the world with a population projected of more than 114 million (World population prospects, 2019) 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. 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 22.40% for the period 2004/05 to 2020/21 (NBE, 2020/21). Two decades ago, Ethiopian policy makers pursued a structural adjustment program which shifted emphasis from public sector to private sector. The Ethiopian economic growth is characterized by mixed, erratic and averagely inferior performance showing positive and negative real GDP growth rates. For example, it shows a negative growth rates seven times between 1981 and 2010 (WB, 2011).

The goal was to encourage private domestic savings, private domestic investment, and capital formation to enhance economic growth. 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<sup>th</sup> fastest growing economy in the world and the annual average real GDP growth rate for the last decade was 10.9%. This shows it has been moving back and forth owing to several factors. On the other hand, official report on growth, poverty and inequality show that Ethiopia has registered a two-digit rate of economic growth in the last decade and has made immense progress in poverty reduction. Many suspect that the current unprecedented high growth rate is attributed to a combination of pro poor growth policy (since 2003 onwards) and state led development program (since 2005 onwards) (Zerayehu, 2013).

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

There are several studies which have examined the determinants of economic growth in many countries around the world. For instance, Barro (2013), Biswas and Saha, (2014) in Asia; Florin (2015) in Central and Eastern Europe; Dewan and Hussein (2001) in 41 middle-income developing country including Africa, Upret (2015) in 76 developing countries, (NdambiriH.Ket *al.*, 2012; Patrick Enu et al., 2013 and Kanuet *al.*, 2014) in Africa and etc. through different methods of analysis at different time by using different determinants of economic growth.

Regarding Ethiopia there are many studies such as, (Tadesse, 2011; Tewodros, 2015; and Khalid, Ahmed and Kenji, 2016) done on factors affecting Ethiopian economic growth. For example, Tadesse (2011) used an aggregate Cobb-Douglas production function and OLS regression analysis to compute the growth contributions of capital, labor, and technical progress for Ethiopian economic growth. He found capital labor ratio had positive effect on economic growth in short run as well as long run in Ethiopia during 1981-2009. Tewodros (2015), in his research model from 1974 to 2013, found that physical capital and human capital had a significant positive relationship with economic growth while external debt had a significant negative effect on it. He also found export of goods and service, foreign aid and inflation had insignificant effect on economic growth in the long run.

In another study, Khalid, and Kenji (2016) investigated the Source of Economic Growth in Ethiopia by applying Vector Error Correction Model. The study result was based on time series data that covered the period 1981-2014. The empirical result revealed that GDP growth has positive and significant long-run relationship with all independent variables (trade openness, human capital, and physical investment). On the other hand, the result showed that trade openness and employment were positively and significantly associated with economic growth while gross fixed capital formation and labor productivity growth have no impact on GDP growth in the short run. Additionally, the Wald test causality findings surprisingly indicate that gross fixed capital formation does not cause GDP growth in short run, which is theoretically unexpected. Yet there is no comprehensive empirical study which determines factors affecting Ethiopian economic growth that includes Gross capital formation, Human capital, export, foreign aid, external debt, inflation, Labour force, financial sector development proxied by domestic credit as percentage of RGDP, government expenditure as percentage of RGDP, population growth and social welfare expenditure as percentage of RGDP. In this study, identifying the determinants of economic growth responsible for the fast growth is a major step to know. The above researchers have tried to identify the major factors affecting economic growth in Ethiopia. However, there are many

macroeconomic variables including, Human capital, inflation, labour force, financial sector development proxied by domestic credit as percentage of GDP, social welfare, Government spending as percentage of RGDP and policy change variable as Dummy which were not addressed in their studies. Therefore, this study tried to fill this gap and empirically analyzed the selected determinants of economic growth in Ethiopia during the specified period of time by including variables like Human capital, inflation, labour force, financial sector development proxied by domestic credit as percentage of RGDP, social welfare expenditure, Government spending and policy change variable Dummy(D).

Moreover, this study attempts to fill another research gap of the above studies. Tadesse (2011) used the Engle-Granger's two-steps procedure to test for the presence of Co-integration. However, this methodology is criticized for its weakness when there is more than one co-integrating. The Autoregressive distributed lag (ARDL) model is an alternative superior methodology, which has superior advantage over Engle-Granger and Johansen Co-integration. So, there is no comprehensive empirical study that determines factors affecting Ethiopian economic growth that includes Gross Capital Formation(Formerly Gross investment), Human capital proxied by Expenditure of education and health, export, foreign aid, external debt, inflation rate, labour force, financial sector development (proxied by domestic credit as percentage of RGDP, government spending, social welfare expenditure and population growth.

Therefore, the thesis tried to fill the above stated researches gap and empirically analyzed the selected determinants of economic growth of Ethiopia both in long run and short run during the specified.

#### ➤ *Research Questions*

- *What are the trends of economic growth in Ethiopia?*
- *Is there a long and short run relationship between economic growth and major macro-economic variables?*
- *What is the directional causality of economic growth with major explanatory variables?*

#### ➤ *Objectives of the Study*

##### • *General Objective of the Study*

The general objective of this study is to investigate the determinants of economic growth in Ethiopia.

##### • *Specific Objectives of the Study*

The Specific Objectives of this study were:

- ✓ To investigate trend of economic growth in Ethiopia
- ✓ To examines the long and short run relationship between economic growth and major macro-economic variables.
- ✓ To examine directional causality of economic growth with major explanatory variables.

#### ➤ *Hypotheses of the Study*

Based on the empirical literature, this study sets two hypotheses as follows:

- **H<sub>0</sub>**: There is no relationship between economic growth and its determinants in Ethiopia.
- **H<sub>1</sub>**: At least some of economic determinant has a relationship with economic growth and
- **H<sub>0</sub>**: The selected Economic determinants have no significance impact on economic growth
- **H<sub>1</sub>**: At least some of economic determinant has significance impact on economic growth

#### ➤ *Significance of the Study.*

This study deal with the determinant of economic growth in Ethiopia and the beneficial from this study are different stakeholders such as for researcher, governments, policy makers and other economic agents. Additionally, the study improves the practical knowledge and skills of the researcher of this study by making familiar with factual evidence and general information on the selected determinants of economic growth in Ethiopia during the period of 1974-2020. Because issue of determinants of economic growth is still on debate, therefore, the significance of this study is to incite and lead a path for further studies in the field.

#### ➤ *Scope of the Study*

The geographical scope of the study was delimited to the political boundary of Ethiopia. It would be considered only the main determinants of economic growth in Ethiopia it only covers from the period (1974-2020), which consists of forty-six (46) years of time-series data from various sources on variables that can affect economic growth in Ethiopia, because of the limitation of data before 1974. The variables used in this study are one dependent and twelve independent variables. The dependent variable being growth of real GDP and the twelve explanatory variables including dummy variables for policy changes are namely Gross capital formation (Physical capital), human capital (expenditure of education and health), export, foreign aid, external debt,



inflation rate, labor force, financial sector development proxies by domestic credit as percentage of GDP, social welfare expenditure, population growth and Government spending.

However, Other important determinants of growth which affect economic growth positively or negatively such as, unemployment rate, imports, FDI, adopted technological changes, expenditure on research and development, public investment/ domestic private investment, real exchange rate, corruption, weather condition and exploitation of natural resources are not addressed in this study. The reason behind, treating a very few variables here when compared to the several factors affecting growth in Ethiopia is for to manage data. Additional reason, is that, in a single country, the time series approach cannot incorporate all these factors; because, some variables are not measured annually, some change very slowly over time or would thus, be poor at explaining annual growth which can vary significantly and there is simply a limit to the number of variables that can feasibly be included. Therefore, this study has been focused on Gross capital formation(gross investment), human capital, export, foreign aid, external debt, inflation rate, labor force, and financial sector development proxies by domestic credit as percentage of RGDP, social welfare, Government spending, population growth and dummy variables for policy changes (M'Amanja D O., 2005).

➤ *Limitation of the Study*

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

➤ *Organization of this Paper*

There are five chapters in this study. The first chapter is dealing with introduction of the study, statements of problem and objectives of the study. The second chapter presents the theoretical and empirical literature reviewed which are related to economic growth. Chapter three is having the methodological aspect of the study which includes: model specification, estimation techniques and variable definition. In Chapter Four a brief review of Ethiopia's economic performance and the regression results as well as its interpretation are presented. Finally chapter five provides the conclusion and policy recommendation emanating from the study.

## CHAPTER TWO LITERATURE REVIEW

### A. Introduction

Economic growth has always received overwhelming interest and related the development of economic growth literature can be classified into two frameworks, which involve the application of economic theory to growth estimations. The first framework addresses the issue of 'convergence' which relates to whether contemporary differences in aggregate economies converge to equilibrium over time. The second framework concerns the identification of growth determinants which explain the observed differences in growth among countries. This paper focuses on the second framework where growth covariates are shown, with special reference to Ethiopia. Many scholars and researchers have investigated the determinants of economic growth in many countries and various theories of economic growth have been developed. This chapter contains two sections; section 2.2 presents some key theories of economic growth and section 2.3 proceeds to analyze the most relevant empirical research that has been conducted on economic growth both in cross-country and country. The former provides an important theoretical basis for analysis while the latter gives practical insight into how the subject matter can be investigated.

### B. Theoretical Literature Review.

#### ➤ Definition and Main Concept of Economic Growth

Economic growth has always received vast interest. Many scholars and researchers have investigated the determinants of economic growth in many countries and various theories of economic growth have been developed. Economic growth is synonym of production of goods and services, creation of jobs and wealth. It is conventionally measured with the percentage of increase in gross domestic product (GDP). Therefore, GDP shows the total market value or monetary value of all finished goods and services produced in a country border in a specified period and calculated on annual basis. Measurement of economic growth uses national income accounting. Economic growth typically refers to growth of potential output. It is used as indicator of economic health of a country and tools a country's standard of living (Song, 2006). Economic growth is not a panacea for the country's problems, but it helps the implementation of public policies that complement the shortcomings of growth. In short, the growth is a necessary condition but not sufficient to ensure social welfare (Mamoudou, 2011). On the other hand, economic development refers to economic growth gone with an improvement in the material well-being of the poor; a decline in agriculture's share of national output; increase in the output share of industry and services; an increase in the education and skills of the labor force; and technical advances originating within the country. The economic achievements lead to the improvement of the standard of life, adequate conditions of medical care, improvement of the educational system and a better redistribution of incomes (Muhedin, 2016). Economic growth can be positive, zero or negative. Positive economic growth is recorded when the annual average rhythms of the macro-indicator are higher than the average rhythms of growth of the population. When the annual average rhythms of the macroeconomic indicators, particularly GDP are equal to those of the population growth, we can speak of zero economic growth. Negative economic growth appears when the rhythms of population growth are higher than those of the macroeconomic indicators.

Economic growth is a complex, long-run phenomenon, subjected to constraints like excessive rise of population, limited resources, inadequate infrastructure, inefficient use of resources, excessive governmental intervention, institutional and cultural models that make the increase difficult, etc. It is obtained by an efficient use of the available resources and by increasing the ability of production of a country. It helps the redistribution of incomes between population and society. The cumulative effects, the slight differences of the increase rates, become big for periods of one decade or more. It is easier to redistribute the income in a dynamic, growing society, than in a static one. There are situations when economic growth is confounded with economic fluctuations. The application of expansionist monetary and tax policies could lead to the elimination of recessionary gaps and to increasing the GDP beyond its potential level. Economic growth supposes the modification of the potential output, due to the modification of the offer of factors (labor and capital) or of the increase of the productivity of factors (output per input unit). When the rate of economic growth is big, the production of goods and services rises and, so, unemployment rate decreases, the number of job opportunities rises, as well as the population's standard of life (Petronella, 2012).

#### ➤ The Stylized Facts of Growth

A convincing theory of economic growth obviously needs to be consistent with the stylized facts of growth that have appeared from historical experience. It was Kaldor (1961) who first set out what he considered to be the main empirical observations with which any growth theory needed to be consistent. According to Kaldor (1961), a satisfactory theory of economic growth would be able to explain the following six stylized facts by which we mean results that are broadly observable in most capitalist countries. Firstly output per worker shows continuing growth "with no tendency for a falling rate of growth of productivity". Secondly, capital per worker shows continuing growth. The third stylized fact describes that the rate of return on capital is steady. Fourthly, the capital output ratio is steady. The fifth stylized fact says labour and capital receive constant share of total income and finally, there are wide differences in the rate of productivity growth across countries (Heijdra, 2002). Note that not all these stylized facts are independent. For instance, the first and fourth stylized facts are easily seen to imply the second stylized fact. In a similar fashion, stylized facts four and five imply stylized fact three.

Romer (1989) argues that there is evidence which leads him to disbelieve the fifth stylized fact, but the remaining facts can be considered stylized even four decades after Kaldor original claims. Romer (1989) also suggests another five more stylized facts that growth theorists should be able to explain. According to him the first stylized fact tells that in cross-section, the mean growth rate shows no variation with the level of per capita income. The second is that the rate of growth of factor inputs is not large enough to explain the rate of growth of output; that is, growth accounting always finds a residual. Thirdly, Growth in the volume of trade is positively correlated with growth in output. The fourth stylized fact tells population growth rates are negatively correlated with the level of income. The last stylized fact explains both skilled and unskilled workers tend to migrate towards high-income countries. Jones (2001) also adds the other three stylized facts. Those are: (1) there is enormous variation in income per capita across countries. (2) Growth rates for the world as a whole and for individual countries vary over time. (3) The relative position of any country in world distribution of income can change (Snowdon and Vane, 2005).

➤ *Theories of Economic Growth*

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

• *Early Concepts of Growth*

Primary growth theories were originated during the sixteenth and middle eighteenth centuries by a group of writers who were concerned with the process of nation building appeared in Europe. They authored essays and pamphlets on international trade that advocated an economic philosophy known as mercantilism. In particular, the advocates of this philosophy appeared in such countries as England, Spain, France, Portugal, and the Netherlands.

According to the Mercantilists view a nation become rich and powerful if and only if it could achieve a favorable trade balance (a surplus of exports over imports) through the inflow of precious metals, primarily gold and silver. Hence the nation’s economic wealth is depending on the accumulation or holdings of these precious metals (bullion or specie) which are gained from more exports than its imports. Such revenues would contribute to increased spending and rise in domestic output and employment. Thus, the presence of gold and silver coins in circulation was elevated to a necessary fundamental principle of the economic growth, while active trading activity was seen as a prerequisite for such growth. This implies that the main source of a nation’s economic growth is the accumulation of this wealth. To promote a favorable trade balance, the mercantilists advocated government regulation of trade such as tariffs, quotas, and other commercial policies were proposed to minimize imports to protect a nation’s trade position. This situation implied that international trade was a zero –sum game, in which one country’s economic gain was achieved at the expense of the other countries (Salvator, 1990).

In the second half of the 18th century, Physiocrats come to replace the mercantilists. Physiocracy (from the Greek for "Government of Nature"), is an economic theory developed by a group of enlightened French economists, who believed that the wealth of nations was derived solely from the value of "land agriculture (products of the soil)" or land development and that agricultural products should be highly priced. The most significant contribution of the Physiocrats was their emphasis on productive work as the source of national wealth. The Physiocratic school of economic thought was the first to see labor as the sole source of value. However, for the Physiocrats, only agricultural labor created this value in the products of society. All industrial and non-agricultural labor was unproductive appendages to agricultural Labour. Physiocrats considered the economic life a natural process that has its own internal laws and showed the principle of natural order they opposed to state's intervention in economic processes (Karl Marx and Frederick Engels, 1998).

• *Classical Growth Theory*

The first work in economic theory which deals with the issues of economic growth is the work by Adam Smith titled: "Inquiry into the Nature and Cause of the Wealth of Nations" (1776). He explained that the output depends on the amount of input (labor, capital, and land) and the output growth is determined by the population growth, increase in investments, land and the total labor productivity growth. The main factor of economic growth was the division of labor, which leads to the output growth, technical progress, and accumulation. According to Smith, the division of labor is limited by the market dimension. If the division of labor increases than the output, then it increases the market dimension and induces further division of labor and as a result brings about further economic growth. Another factor which stimulates economic growth according to Smith is capital accumulation. It is based on the saving of main capitalists. For that reason, Smith considered income division as one of the most important determinants of rapid economic growth. Smith approved the necessity of state interventions to a market economy. This model can be written as follows:

$$Y=f(L, K, D)..... (1)$$

**Where:-** Y denotes output, L denotes labor, K denotes capital and D represents land, such that output is related to labor, capital and land inputs. David Ricardo and Thomas Robert Malthus took up Adam Smith’s (1776) theory in the first half of the 19th century. They implemented the law of decreasing returns to the theory of economic growth. At the end of the 1920s, the

theory of growth was enriched by Ramsey’s “intertemporal optimization of households’ behavior”. The idea was accepted in the 1960s.

• *Keynesian and Post-Keynesian (Neo-Keynesian) Growth Theories*

Keynesian growth theory is mainly connected with Harrod (1939) and Domar (1946). These neo-Keynesian economists tried independently to dynamize Keynesian theory. In their scientific work, Harrod (1939) started from the accelerator principle and Domar (1946) started from the multiplication effect. Despite the different approaches, they came to the same conclusion that the rate of growth of output is determined jointly by the national savings ratio and national capital-output ratio. In economic literature, their theory appears as Harrod-Domar Keynesian theory of growth or simply, Harrod-Domar growth model (Harrod, 1939; Domar, 1946).

The Harrod-Domar growth model shows through a mathematical equation, the existence of a direct relationship between savings and the rate of economic growth. The model, which attempts to integrate Keynesian analysis with the element of economic growth, assumes that economic growth is a direct result of capital accumulation in the form of savings. In addition, the Harrod-Domar growth model assumes a fixed coefficient production function and constant returns to scale.

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

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

$$Y_t = \min \left[ \frac{K_t}{v}, \frac{E_t}{u} \right] \text{-----}[2]$$

Where:  $Y_t$ = total output (GDP) at a time t,  $K_t$ = physical capital stock at a time t,  $v$  = used capital-output ratio (constant, i.e.  $\frac{K}{Y}$ ),  $E_t$ =effective labor force at a time t, and  $u$  = employed effective labor-output ratio (constant, i.e.  $\frac{L}{Y}$ ).

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

$$Y_t = C_t + S_t \text{-----} [3]$$

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

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

That is,

$$I_t = S_t \text{.....}[4]$$

Substituting equation [3] into equation [2] yields equation [5].

$$Y_t = C_t + I_t \text{-----} [5]$$

The evolution of the capital stock over time given by:

$$K_{t+1} = (1-\delta) K_t + I_t \text{-----} [6]$$

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

$$S_t = sY_t \text{----- [7]}$$

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 [6] as:

$$vY_{t+1} = (1-\delta)vY_t + sY_t \text{----- [8]}$$

Dividing both sides by  $v$ , and subtracting  $Y_t$  from both sides of equation [8] yields equation [9]:

$$Y_{t+1} - Y_t = \left(\frac{s}{v} - \delta\right) Y_t \text{----- [9]}$$

Dividing both sides of equation [9] by  $Y_t$  yields that:

$$\frac{\Delta Y}{Y} = \left(\frac{s}{v} - \delta\right) \text{ this implies } g_y = \frac{s}{v} - \delta \text{----- [10]}$$

This simply tells that the growth rate ( $g_y$ ) of GDP is jointly found 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 (Snowdon and R. vane, 2005). Even if the H-D growth theory is simple it has its own limitations firstly it requires a prerequisite for building the analysis within the theory economic growth depends on the growth of investment and this dependence is a linear function; economic growth does not depend on the growth in the use of labor. Secondly the limitations of the theory are explained by historical conditions. Thirdly the theory considers saving as sufficient. Fourthly its rigid assumptions of fixed proportions, no diminishing returns, no factor substitution, not consider technological progress (Todaro & Smith, 2012).

• *Neoclassical Growth Theories and the Exogenous theory of Robert Solow*

Being dissatisfied with Harrod-Domar’s knife edge (Razor edge) instability in the growth process due to the assumption of fixed capital-output ratio, neoclassical growth model has been put forward. The most known neo-classical models are the Solow (1956) and Swan (1956) model. The model tries to explain the output determination using the reciprocal interaction of capital, labor, and technology. The Solow model implies that if a country’s national saving rate rises, growth will temporarily rise above its long-run rate as the economy shifts to its new equilibrium. However, long-run equilibrium growth is independent of the savings rate or the population growth rate. If all countries have access to the same technology, all should have the same steady state (long-run) growth rate. Thus, for the neoclassical growth theorist, long-term per capita growth is determined by the capital-labor ratio, human capital accumulation and the pace of technological progress.

$$Y = f(A, K, L) \text{----- (11)}$$

Where,  $Y$  is a gross domestic product,  $K$  capital,  $L$  is labor and  $A$  is a constant reflecting the base level of technology. When the optimum level of capital-labor ratio is attained marginal productivity declines as a result of which economic growth retards. This theory does not explain the advancement of technology which is a major driving force for growth. To overcome this backdrop endogenous growth model was proposed.

• *Theory of Endogenous Economic Growth*

The endogenous growth theory was developed as a reaction to omissions and deficiencies in the Solow- Swan neoclassical growth model. It is a new theory which explains the long-run growth rate of an economy on the basis of endogenous factors as against exogenous factors of the neoclassical growth theory. The first ideas of new endogenous growth theory appeared in Paul M. Romer’s work on the “Increasing Returns and Long-Run Growth” in 1986, Robert E. Lucas’ work on the “Mechanics of Economic Development” in 1988 and Paul M. Romer’s work on the “Endogenous Technological Change” in 1990. The endogenous growth models emphasize technical progress resulting from the rate of investment, the size of the capital stock, and the stock of human capital. The development of new endogenous growth theory is linked with explicitly involved research and development (R and D) and imperfect competition. The conception can be followed in Romer’s work in 1987, Grossman and Helpman (1992).

Romer took three key elements in his model, namely externalities, increasing returns in the production of output and diminishing returns in the production of new knowledge. In his model, new knowledge is the ultimate determinant of long-run growth which is determined by investment in research technology. Lucas assumes that investment in education leads to the production of human capital which is the crucial determinant in the growth process. He makes a distinction between the internal effects of human capital where the individual worker undergoing training becomes more productive and external effects which spillover and increase the productivity of capital and of other workers in the economy. It is an investment in human capital rather

than physical capital that have spillover effects that increase the level of technology. The endogenous growth theory can be expressed in a simple equation:

$$Y=AK \dots\dots\dots (12)$$

Where A can be interpreted as any factor that affects technology and; K represents both human and physical capital.

### C. Empirical Literature Review

Economic growth is a well-researched part of modern macroeconomics. Thus, before making a new inquiry into this subject matter, it is vital to make a comprehensive review of some of the most relevant empirical investigations, which have thus far been conducted. This review is aimed at supplying first-hand information on some of the most important aspects and challenges that have been met in modeling economic growth.

#### ➤ Cross-Country Studies

The broadest and most vigorous studies on the determinants of economic growth are those which simultaneously study economic growth in many countries. They look to investigate the common factors which determine economic growth by studying panel data from many countries. For instance, Barro (2013); Biswas and Saha, (2014) in Asia; Florin (2015) in Central and Eastern Europe; Dewan and Hussein (2001) in 41 middle-income developing country including Africa; Upret (2015) in 76 developing countries ;(NdambiriH.Ket *al.*, 2012; Patrick Enu et al., 2013 and Kanuet *al.*, 2014) in Africa; and Ayanewu (2014), are typical examples of such rich enquiries that have the most reliable and internationally accepted evidence on growth determination. This first section of empirical literature considers such studies to highlight the common macroeconomic factors which are believed to influence economic growth across countries.

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 Veigaet *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.

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

Whereas, in case of economic growth determinant of developing countries, Upret (2015) identified that the factors affecting economic growth through cross-country data for 76 countries for the years 2010, 2005, 2000 and by using OLS regression, high volume of exports, plentiful natural resources, longer life expectancy, and higher investment rates have positive impacts on the growth of per capital GDP during all time periods measured in study area.

Similarly, Dewan & Hussein (2001) used a sample of 41 middle-income developing countries, including Fiji. Both cross country and time variation specifics were used to explain determinants for sustained economic growth in developing countries. 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 to increase efficiency is also important.

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

According to, Basamini&Scarpeta (2001) the driving force of economic growth using panel data evidence from 21 OECD (Organization for Economic Cooperation and Development).The driving force of economic growth such as accumulation of physical capital, human capital, research and development, macroeconomic policy setting, financial development, and

international trade as the main driving force behind economic growth. The study once again confirms the positive impact of human capital and physical capital accumulation on economic growth. Their finding also supports the notion that the "overall size of government in the economy may reach levels that hinder growth". In addition, the finding reveals that expenditure on health, education and research & development sustains living standards. On the other hand, higher direct taxes, government consumption and government investment hinder development. Above all the study suggests differences in GDP across OECD countries are explained by differences in policy and institutional settings.

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

Several cross-country economic growth investigations have been conducted in the African context. For instance research done on determinants of economic growth in Sub-Saharan Africa using a panel data approach was undertaken by; Ndambiri et al (2012) employed a generalized method of moment (GMM) for 19 sub Saharan countries for the period 1982 to 2000. In the study, with all the variables in the log form, a GDP per capita was used to proxy for economic growth with the right hand variables comprising the lagged per capita GDP, the ratio of gross physical capital formation to GDP, final consumption expenditure, the ratio of exports of both goods and services to GDP, nominal discount rate, literacy rate and foreign aid as the ratio to GDP. The results revealed that physical capital formation, human capital development measured in terms of improved literacy rate, and exports as a ratio of GDP, exert positive effect on economic growth. However, government expenditure, nominal discount rate, foreign aid, and the lagged value of GDP per capita, were found to have negative effects on economic growth in the concerned countries.

Other researcher, Shwilima (2015), conducts an empirical study on the link between economic growth and nonrenewable resources. A panel of 145 countries is used to estimate the growth model using Ordinary Least squares (OLS). It has been found that economic growth is positively influenced by government effectiveness, nonrenewable resources exports, life expectancy and investment. For the period under study (1995-2010), there is no evidence of resource curse.

Finally, Calderon et al. (2020) focused on studying the impact of trade integration on economic growth and the sources of economic growth, namely capital accumulation, and total factor productivity growth. Empirical results estimated on 174 countries (including 45 Sub-Saharan nations) during the period 1970–2014 showed that economic growth was positively influenced by trade integration, as expected. Along the same trading lines, Kassim (2015) investigates into how trade liberalization affects the growth of imports and exports in Sub-Saharan countries. Using 1975–2014 time-series data for Botswana, Malefane (2020) showed that trade openness proxies (i.e., total trade to GDP, exports to GDP, trade openness index) fostered economic growth in the short and long run. The impact of trade openness proxied by the ratio of imports to GDP did not reach significance level.

#### ➤ *Previous Studies in Case of Ethiopia and Single Country.*

It is an unquestionable fact that cross-country empirical studies are highly trustworthy in determining common factors which affect economic growth. Nevertheless, since the goal of economic growth is largely pursued at national level; it is imperative to investigate the nation-specific determinants of growth. A considerable amount of empirical work has been keen to launch the macroeconomic factors which influence economic growth in many countries. This subsection presents some of these investigations and their findings.

Gross 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.

Different several empirical studies have found critical linkage between physical capital formation and the rate of growth (Tadesse, 2011; Tewodros, 2015; and; Borojo & Yushi (2015). In their study entitled 'The Impact of Human Capital on Economic Growth in Ethiopia' using time series data from 1980 to 2013, Borojo & Yushi (2015), the empirical result showed that, physical capital was having positive significant effect on economic growth, while in the short-run model, it was established that physical capital has significant positive effects on economic growth. Similarly, the findings of overall study results showed that physical capital is largely positive and significantly affected economic growth of Ethiopia (Tewodros 2015; Ahmed and Kenji, 2016; Biruk, 2017; Mohanty, 2017; Admasu, 2017; Mulugeta, 2017). On the other hand, result of Rao and Leta (2017) showed that in Ethiopia investment can be negatively and significantly associated with growth.

In terms of human capital development, the empirical literature reviewed in this study shows that human capital development was positively and significantly associated with economic growth (Borojo&Yushi 2015;Ahmed and Kenji 2016; Biruk 2017; Mulugeta 2017; Mohanty 2017;).In contrast, in the short-run model, it was established that human capital development (in terms of health expenditure), were having significant positive effects on economic growth, while human capital in terms of educational expenditures, found to be insignificant (Borojo&Yushi (2015).

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; Hui et.al, 2015 and Ismaila&Imoughele, 2015).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. 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.

Though numerous 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; (Tadesse, 2011; Tewodros, 2015; and Khalid, and Kenji, 2016) were the best one.

According to Tewodros (2015), the empirical results found that, physical capital and human capital had a significant positive relationship with economic growth while external debt had a significant negative effect on it. Additionally, the empirical results found, export of goods and service, foreign aid and inflation had insignificant effect on economic growth in the long run. Rather the main finding or determining factors of economic growth in Ethiopia were rainfall, export level and labor force in long- run. Similarly, 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.

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. The relationship between trades related variables and economic growth is mixed. Most empirical results revealed that exports are positively and significantly associated with economic growth (Ahmed and Kenji 2016; Mulugeta 2017; Senait 2014). On the other hand, result of Dechassa, Butte and Ayele (2017) concluded that export have no significant effect on economic growth. Additionally, Hailegiorgis (2012), study found that there is evidence of unidirectional causality between export and economic growth for the country. The study concluded that export growth causes economic growth in Ethiopia, which is contrary to conclusion given by Senait (2014).

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.

Different study on foreign aid and external debt with economic growth generated mixed results (both negative and positive) in long-run. For instance, Both Foreign aid and external debt have positively and significantly affected economic growth in Ethiopia (Dechassa, Butte and Ayele, 2017; Mohanty 2017). On the other hand Haile (2015), foreign aid; Becker, Palme and Fissaha (2006), external debt; found to be negatively and significantly associated with economic growth. Haile (2015) investigation included the positive coefficient of aid policy index interaction. The study showed that aid has positively contributed to economic growth in Ethiopia if it interacted with stable macroeconomic policy environment.

Another study done on the Nigerian economy by Boboyeet al. (2012) reported that external debt burden had an adverse effect on the nation income and per capita income. According to this study, high level of external debt led to devaluation of the nation's currency, increase in cutback of workers, continued industrial strike and poor education system. The research done in Ethiopia for the last recent four decades by Tekluetal. (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.

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.



Generally 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.

Recently, Inflation is global problem. A major finding from the empirical analysis is that the estimated effects of inflation on growth and investment are significantly negative when some reasonable instruments are used in the statistical procedures. Thus, there is some reason to believe that the relations reflect causation from higher long-term inflation to reduced growth and investment *Robert J. Barro*. The empirical evidence shows that there is a negative relationship between inflation and Economic growth (Asmamaw, 2012; Barro, 2013; Veigaet *al.*, (2014 and Borojo&Yushi, 2015). On the other hand, monetary economics variables investigated in the empirical growth studies include inflation and the results revealed that inflation is positively and significantly associated with economic growth (Abis 2013 and Ashagrie 2015).

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, Abis (2013) showed that based on the conditional least square technique, even though, the estimated threshold model suggests 10% as the optimal level of inflation that facilitates growth, inflation level higher or lower than the threshold level of inflation affects the economic growth negatively. However, the findings of Ashagrie (2015) showed that, the empirical result does not support the existence of threshold effect between the two variables in the period, which is contrary conclusion given by with Abis (2013) and Barro (2013).

Another variable that is estimated and analyzed is labor force. labour force either positively or negatively associated with economic growth), However, labor force to be positively and significantly associated with growth (Ahmed and Kenji 2016; Biruk 2017; Senait 2014; Admasu 2017). On the other hand, Mohanty (2017) showed that they have no significant relationship in the long run.

#### D. Summary of Related Literature and Research Gaps

From the above, numerous researchers have examined sources of economic growth for cross country differences, using 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 both for cross-countries and single countries. For instance, For cross countries case, Researches conducted by, Barro (2013); Biswas and Saha, (2014) in Asia; Florin (2015) in Central and Eastern Europe; Dewan and Hussein (2001) in 41 middle-income developing country including Africa; Upret (2015) in 76 developing countries; (Ndambiri H.K *et al.*, 2012; Patrick Enu *et al.*, 2013 and Kanuet *al.*, 2014) in Africa; and Ayanewu (2014), and regarding Ethiopia researches undertaken by researchers such as, (Tadesse, 2011; Tewodros, 2015; Khalid, Ahmed and Kenji, 2016; Biruk, 2017; Mohanty, 2017; Admasu, 2017; Mulugeta, 2017) 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. Even though the above researchers specially, (Tadesse,2011;and Tewodros,2015) have tried to identify the major factors affecting economic growth in Ethiopia, variables such as, Human Capital, Inflation , labour force, financial sector development (proxied by domestic credit ),government spending, population growth and social welfare expenditure were not addressed in the studies. However, those excluded variables were added into this study. Therefore, adding new variables into model, using large sample size which account forty six (46) years and focused on single country makes this study differed from the above studies.

Table 1 Summary of Research Gaps

Authors	Focus of the study	Findings	Research Gaps
For the case of cross-country studies the Authors such as, Barro (2013); Biswas and Saha, (2014) in Asia; Florin (2015) in Central and Eastern Europe; Dewan and Hussein (2001) in 41 middle-income developing country including Africa; Upret (2015) in 76 developing countries ;(NdambiriH.Ket <i>al.</i> , 2012; Patrick Enu <i>et al.</i> , 2013 and Kanuet <i>al.</i> , 2014) in Africa; and Ayanewu (2014) and other authors.	Those 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.	According to those researchers", Country's economic growth is influenced by several macroeconomic variables like physical capital formation ( gross investment) , population , export level, Aid, money supply, general price level (inflation), Government expenditure, external debt etc.	Even though, those studies determine the major source of economic growth, mostly focus on cross-country basis rather than on a single country. Additionally, some researchers were not included in their studies many variables such as, Human Capital, Inflation , labour force, financial sector development (proxied by domestic credit as percentage of RGDP), government spending, population growth and social welfare expenditure

<p>For the case of single country studies an Authors like, Tadesse (2011); Tewodros (2015); Khalid and Kenji (2016); and also some authors.</p>	<p>Investigated the Sources of Ethiopian economic growth.</p>	<p>Those researchers have tried to identify the major factors affecting economic growth in Ethiopia</p>	<p>Even though the above researchers have tried to find the major factors affecting economic growth in Ethiopia, these researchers did not address in their studies variables such as, Human Capital, a Inflation, labour force and financial sector development (proxied by domestic credit as percentage of RGDP).Specifically, Tadesse (2011), used the Engle-Granger's two step procedure to test for the presence of Co-integration. However, this method is criticized for its weakness when there is more than one co-integrating. Because, Autoregressive distributed lag (ARDL) model has superior advantage than Engle-Granger and Johansen Co-integration. Tewodros(2015), didn't address in his studies variables such as, labour force and financial sector development (proxied by money supply). With regarding Khalid and Kenji (2016); the Wald test causality findings surprisingly indicate that gross fixed capital formation does not cause GDP growth in short run, which is theoretically unexpected.</p>
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Source: Compiled by the Researcher (2021)

E. Conceptual Frameworks

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



Fig 1 Conceptual Framework of the Study

Source: Derived from empirical and theoretical literatures.

Even though, the double arrow from the above diagram shows the existence of bi-causal relationship between economic growth and mentioned variables. However, some economic variables have uni-causal relationship. This means that each variable affects economic growth and economic growth also affects these variables in turn. On one hand, the growth of those variables increase or decrease economic growth and the growth of one's economy contribute positively or negatively to other variables on the other hand. However, the granger causality test revealed that there is uni-directional causality between economic growth and its determinants.

## CHAPTER THREE RESEARCH METHODOLOGY

### A. Research Design

To achieve the objectives of this study, we have been used quantitative research approach to investigate the determinant of economic growth in Ethiopia from the period 1974 to 2020 based on the variables of Gross Capital Formation(GCF), Human Capital(HC), Foreign Aid(FAID), External Debt(EXD), Total Export(EXT), Labour Force(LF), Inflation Rate(INF), Financial Sector Development(FD), Government spending(GEXP), Social welfare expenditure(SWEXP), Population growth rate(PGR) and a Dummy variable for policy changes (D).

### B. Data Type and Sources

For the purpose of investigating the determinants of economic growth in Ethiopia, time series data, which, essentially based on secondary data for 46 year annual data for the variables of interest which covered from 1974 to 2020, was used. The data for the problem under investigation was collected from various journal, books and annual reports of different organizations. For instance, the data that describe about real GDP, gross capital accumulation, total export, Social welfare expenditure and External debt were collected from National Bank of Ethiopia (NBE). The other data such as, financial sector development and government spending as percentage of RGDP were own computation data from National Bank of Ethiopia (NBE) where as human capital was collected from Ministry of finance and Economic Cooperation (MOFEC). The data for inflation rate and population growth were collected from World Development Indicator (WDI). Finally the data for Foreign Aid and labour force was collected from World Bank and United Nation Conference on Trade and Development (UNCTAD). The time 1974-2020 would be chosen on the basis of the data availability. The year 1991 was chosen as the break on the basis of regime change.

### C. Methods of Data Analysis

This study uses two basic method of data analysis. These methods are descriptive and econometric methods of data analysis. Descriptive statistical methods was used to briefly explain the macroeconomic performances and trends of the variables used in the model and some descriptive statistics summaries such as mean or average values, minimum values, maximum values, and standard deviations were also included. The econometric analysis includes important tests, the estimation of the model and interpretation of results. Finally to analyze the data E-views software version 10 was used.

#### ➤ Theoretical Framework and Model Specification

The Macroeconomic theory has identified many factors that influence the economic growth from the classical, neoclassical and the new growth theories. Antwi, Mill and Zhao (2013), asserted that these factors include natural resources, investment, human capital, innovation, technology, economic policies, governmental factors, foreign aid, trade openness, institutional framework, foreign direct investment, political factors, socio-cultural factors, geography, demography, and many others. To examine the empirical evidence in Ethiopia, this study applied some macro-economic development indicators such as; Real Gross Domestic Product(RGDP), Gross Capital Formation(GCF), Human Capital(HC), Foreign Aid(FAID), External Debt(EXD), Total Export(EXT), Labour Force(LF), Inflation Rate(INF), Financial Sector Development(FD), Government spending(GEXP), Social welfare expenditure(SWEXP), population growth rate(PGR) and a Dummy variable for policy changes (D).

The general model is based on approach of extended neoclassical growth model. Studies like (Patrick Enu et al., 2013; Biswas and Saha, 2014; Pitia, 2015; and Tewodros, 2015), applied similar economic function to a determinants of economic growth in Ghana, India, Sudan, and Ethiopia, respectively. These studies did specify their economic growth function to their respective country as Real GDP is a function of physical capital, human capital, exports of goods and service, foreign aid, external debt, and inflation. They preferred these variables based on their relevance and data availability. Then the extended model is given by:

$$Y_t = F (GCF_t, EHE_t, EXT_t, AID_t, EXD_t, INF_t) \dots\dots\dots (13)$$

Where: -  $Y_t$  stands for real GDP at a time t,  $GCF_t$  represent for physical capital (formally gross investment) at a time t,  $EHE_t$  represents for human capital proxies by expenditure to health and education,  $EXT_t$  stands for total export,  $AID_t$  represents for foreign aid,  $EXD_t$  is for external debt and  $INF_t$  for the inflation rate at time t. However, this study has been improved one in comparison to other earlier studies on the basis of using forty-six years from **1974 to 2020** and considering structural break or on the basis of improved models has been used and it captures the link between economic growth and major macroeconomic variables.

So the data was analyzed on basis of both theoretical and econometrics model specifications along with the additional variables on the above model. Additionally, as theoretical and empirical studies show that these are not the only determinants of economic growth. But there are also other factors such as labour force, financial sector development d proxied by domestic credit as percentage of RGDP, Government spending, population growth, social welfare expenditure and policy change. Changes in economic policies can influence the performance of the economy through investment on human capital and infrastructure, improvement in political and legal institution and so on (Easterly, 1993). Specifically, policy changes towards the determinants of

economic growth of the country through the above channels would be incorporated into the model using a dummy variables for the policy change (Because the benefit of this approach is that it helps to keep degrees of freedom from lose due to a loss of observations.

Therefore, the final empirical model (modified model) of the economic growth equation after including new variables such as labour force, financial sector development d proxied by domestic credit as percentage of RGDP, Government spending, population growth, social welfare expenditure and policy changes would be expressed as:

$$Y_t = F(A, GCF_t, HC_t, EXT_t, FAID_t, EXD_t, INF_t, LFT, FD_t, GEXPT, POPG_t, SWEXPT, D) \dots (14)$$

Where:- **Y<sub>t</sub>** stands for real GDP at time t, **A** for factor productivity which is constant, **GCF<sub>t</sub>** for gross capital formation at time t, **HC<sub>t</sub>** for human capital at time t, **EXT<sub>t</sub>** for real export at time t, **FAID<sub>t</sub>** for foreign aid , **EXD<sub>t</sub>** for external debt, **INF<sub>t</sub>** for general inflation rate at time t, **LFT** for labour force of the country at time t and **FD<sub>t</sub>** for financial sector development at time t and proxied by domestic credit as a percentage of real GDP ratio at time t., **GEXP** for government spending as percentage of **RGDP**, **SWEXP** for Social welfare expenditure, **POPG** for population growth rate and finally **D** for a dummy variables for the policy change.

However, the variables treated here are very few when compared to the several factors affecting growth in Ethiopia this is for the sake of manageability. Additionally, Other important determinants of growth which affect economic growth positively or negatively such as, unemployment rate, imports, domestic credit, foreign direct investment, adopted technological changes, expenditure on research and development, public investment/ domestic private investment, population growth, real exchange rate, social welfare expenditure, corruption, weather condition and exploitation of natural resources are not addressed in this study. This is because, in a single country, the time series approach cannot incorporate all these factors; some are not measured annually, some change very slow over time (and would thus be poor at explaining annual growth which can vary significantly) and there is simply a limit to the number of variables that can feasibly be included. Hence, the focus of this study is only a subset of factors within the large literature on growth determinants; it focused on Gross Capital Formation(GCF), Human Capital(HC), Foreign Aid(FAID), External Debt(EXD), Total Export(EXT), Labour Force(LF), Inflation Rate(INF), Financial Sector Development(FD), Government spending(GEXP), Social welfare expenditure(SWEXP), population growth rate(PGR) and a Dummy variable for policy changes (M<sup>3</sup>Amanja D O. (2005)).Since, it is a Cobb- Douglass production function it is specified as:

$$Y_t = F(A GCF_t^{\beta_1} HC_t^{\beta_2} EXT_t^{\beta_3} FAID_t^{\beta_4} EXD_t^{\beta_5} INF_t^{\beta_6} LFT^{\beta_7} FD_t^{\beta_8} GEXP_t^{\beta_9} SWEXP_t^{\beta_{10}} POPG_t^{\beta_{11}} D)^{\beta_{12}} \dots (15)$$

Taking the logarithms on both sides of the above equation, the linear relationship of equation (15) would be reformulated. Then the empirical model of economic growth would be expressed as:

$$LY_t = \beta_0 + \beta_1 LGCF_t + \beta_2 LHCT + \beta_3 LEXT_t + \beta_4 LFAID_t + \beta_5 LEXD_t + \beta_6 INF_t + \beta_7 LLF_t + \beta_8 LFD_t + \beta_9 GEXP_t + \beta_{10} POPG_t + \beta_{11} LSWEXP_t + \beta_{12} D + \epsilon_t \dots (15.1)$$

Where: - **LY<sub>t</sub>**= Logarithm of real GDP at time t is the dependent variable, **ε<sub>t</sub>**= error term at time t, **β<sub>0</sub>**=constant value (an intercept term), **D**= a dummy variables for the policy change, **β<sub>1</sub> - β<sub>12</sub>**= are parameters (coefficient of all independent variables) that were estimated and others are logarithms of explanatory variables which are defined in the above consecutive equations.

**Using equation (15.1)** above and expressing the variables in log form, an attempt will be made to look at the relative contribution (elasticity) of each variable to the growth process. The log-linear form of specification of the model enables the researcher to interpret the coefficients directly as elasticity (Sarmad, 1988).

$$\begin{aligned} \Delta LR GDP_t = & \alpha_0 + \sum_{i=1}^{p_1} \alpha_{1i} \Delta LR GDP_{t-i} + \sum_{i=0}^{q_1} \alpha_{2i} \Delta LGCF_{t-i} + \sum_{i=0}^{q_2} \alpha_{3i} \Delta LHC_{t-i} + \sum_{i=0}^{q_3} \alpha_{4i} \Delta LEXT_{t-i} + \sum_{i=0}^{p_4} \alpha_{5i} \Delta LFAID_{t-i} + \\ & \sum_{i=0}^{q_5} \alpha_{6i} \Delta LEXD_{t-i} + \sum_{i=1}^{q_6} \alpha_{7i} \Delta INF_{t-i} + \sum_{i=0}^{q_7} \alpha_{8i} \Delta LLF_{t-i} + \sum_{i=0}^{q_8} \alpha_{9i} \Delta LFD_{t-i} + \sum_{i=0}^{q_9} \alpha_{10i} \Delta GEXP_{t-i} + \sum_{i=0}^{q_{10}} \alpha_{11i} \Delta POPG_{t-i} + \\ & \sum_{i=0}^{q_{11}} \alpha_{12i} \Delta LSWEXP_{t-i} + \beta_{13} D + \sum_{i=1}^{p_1} \beta_{1i} LR GDP_{t-i} + \sum_{i=0}^{q_1} \beta_{2i} LGCF_{t-i} + \sum_{i=0}^{q_2} \beta_{3i} LHC_{t-i} + \sum_{i=1}^{q_3} \beta_{4i} LFAID_{t-i} + \\ & \sum_{i=1}^{q_5} \beta_{6i} LEXT_{t-i} + \sum_{i=1}^{q_4} \beta_{5i} LEXD_{t-i} + \sum_{i=1}^{q_6} \beta_{7i} INF_{t-i} + \sum_{i=1}^{q_7} \beta_{8i} LLF_{t-i} + \sum_{i=1}^{q_8} \beta_{9i} LFD_{t-i} + \sum_{i=0}^{q_9} \beta_{10i} GEXP_{t-i} + \\ & \sum_{i=0}^{q_{10}} \beta_{11i} POPG_{t-i} + \sum_{i=0}^{q_{11}} \beta_{12i} LSWEXP_{t-i} + \beta_{13} D + \epsilon_t \dots (15.2) \end{aligned}$$

Where Δ is the first difference operator, **p** and **q** is the optimum lag length for dependent and independent variables respectively. Whereas, **α<sub>11</sub> --- α<sub>13i</sub>** are short run dynamics of the model and **β<sub>11</sub> --- β<sub>13i</sub>** are long run elasticity, **D**= a dummy variables for the policy change and **ε<sub>t</sub>** is the error term. We will conduct bound test based on the above equation. As per the result of the bound test, if the value of calculated F statistics is greater than the upper bound I (1), the null hypothesis will be rejected. If the calculated value of F statistics is greater than the upper bound, there exists co-integration and the study further will be preceded for error correction version of the above equation. If F statistics is less than the lower bound or inconclusive value comes between the lower bound I (0) and upper bound I (1) in this case the researcher will run ARDL short run which is based on OLS method.

$$\Delta LR GDP_t = \alpha_{0i} + \sum_{i=1}^{p1} \alpha_{1i} \Delta LR GDP_{t-i} + \sum_{i=0}^{q1} \alpha_{2i} \Delta LGCF_{t-i} + \sum_{i=0}^{q2} \alpha_{3i} \Delta LHC_{t-i} + \sum_{i=0}^{q3} \alpha_{4i} \Delta LEXT_{t-i} + \sum_{i=0}^{p4} \alpha_{5i} \Delta LFAID_{t-i} + \sum_{i=0}^{q5} \alpha_{6i} \Delta LEXD_{t-i} + \sum_{i=1}^{q6} \alpha_{7i} \Delta INF_{t-i} + \sum_{i=0}^{q7} \alpha_{8i} \Delta LLLF_{t-i} + \sum_{i=0}^{q8} \alpha_{9i} \Delta LFD_{t-i} + \sum_{i=0}^{q9} \alpha_{10i} \Delta GEXP_{t-i} + \sum_{i=0}^{q10} \alpha_{11i} \Delta POPG_{t-i} + \sum_{i=0}^{q11} \alpha_{12i} \Delta LSWEXP_{t-i} + \beta 13D + \lambda ECT_{t-1} + \epsilon_t \dots \dots (15.3)$$

Where  $q_1 \dots q_{11}$  are optimal lag length and  $\lambda$  is the speed of adjustment parameter. **ECT** represents the error correction term derived from long run relationship from the above equation and **D**: dummy variable for major political changes (Derg and EPRDF) taken in to account to see the effect of major shifts in political environment on the performance of economic growth both in long run and short run. The dummies are incorporated in to the VECM model for growth equation. For this reason, a dummy variable **D**(to capture the impact of major political shift from the Derg to EPRDF) is incorporated in the vector error correction model(VECM) to indicate the immediate impact of major political changes on economic growth. Thus, policy change dummy (D) took 1 for 1991 and 0 otherwise. Since it was not common to transfer political power in a peaceful manner in Ethiopia, political unrest and violence resulted consequently and one dummy is used for this purpose to reflect the immediate and longtime impact of such changes on growth.

### ➤ Definitions of Variables

- **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.
- **Gross Capital Formation (GCF)**: is defined as Gross capital formation the domestic investment in a country. In this study, gross investment was used of this variable and have been expected a positive impact on economic growth.
- **Human Capital (HC)**: is the collective of skills, knowledge, or other intangible assets of individuals that can be used to create economic value for the individuals, their employers, or their community. It is difficult to measure human capital in economics. As a result researchers use different proxy to human capital (i.e. school enrolment like primary, secondary, tertiary level or literacy rate and life expectancy; expenditure to education and health) to indicate as major determinants of economic growth in the long term. Therefore, this study used expenditure to health and education as a proxy of human capital. The sign also has been 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**: is defined as money, food or other resources that one country voluntarily transfers to another, which can take the form of gift, a grant or a loan. It is also defined as the international transfer of capital, goods, or services from a country or international organizations for the benefit of the recipient country or its population. Since Ethiopia is one of the poorest countries in the world, it needs foreign assistance to fill its resource gap and budget deficits. It is also used as a main source of foreign currency earnings. Foreign aid is expected to have positive impacts on economic growth as it is a source of additional finance to run capital and recurrent expenditures.
- **External Debt**: is the portion of a country's debt that was borrowed from foreign lenders including commercial banks, international financial institutions like IMF, WB and African Development Bank (ADB) etc. and from the government of foreign nations. These loans, including interest, must usually be paid in the currency in which the loan was made. External debt is expected to have a negative impact on output growth because of debt service repayment cost on loan.
- **General Inflation Rate (INF)**: inflation is defined as an increase in the overall price level in the country and measured in percent. It would be expected to have a negative impact on the Ethiopian economic growth.
- **Labor Force**: In this study the labour force is defined as the employed and unemployed labour force. Since the rate of utilization of the labour force is important in production, the researcher expected a positive relationship between economic growth and labour force. But if it couldn't be used effectively and if it is less productive, it may be a burden for the economy because of high rate of unemployment.
- **Financial Sector development**: the mostly used parameters used to measure financial sector development are broad money supply to GDP ratio and domestic private credit to GDP. Because of its accessibility the researcher used domestic credit as percentage of RGDP. Financial sector development is expected to have positive impact on economic growth.

- **Government Expenditure (GEXP)** is the capacity of Government to expend for all economic roles. So this variables implies that the capital stock capacity of Government to expend for services and goods. In order to analysis this variable the coefficient is positive impact on economic growth.
- **Population (Pop)** is defined as the total population of Ethiopian People. It is believed that population of country is one of the macroeconomic determinants of economic growth. The expected sign of this variable is expected to be either positive or negative.
- **Social welfare expenditure** comprises cash benefits, direct in-kind provision of goods and services, and tax breaks with social purposes. Benefits may be targeted at low-income households, the elderly, disabled, sick, unemployed, or young persons.
- **D:** dummy variable for major political changes (Derg and EPRDF) taken in to account to see the effect of major shifts in political environment on the performance of economic growth both in long run and short run. The dummies are incorporated in to the VECM model for growth equation. For this reason, a dummy variable **D**(to capture the impact of major political shift from the Derg to EPRDF) is incorporated in the vector error correction model(VECM) to indicate the immediate impact of major political changes on economic growth. Thus, policy change dummy (D) took 1 for 1991 and 0 otherwise. Since it was not common to transfer political power in a peaceful manner in Ethiopia, political unrest and violence resulted consequently and one dummy is used for this purpose to reflect the immediate and longtime impact of such changes on growth. Changes in political and economic policies (the dummy variables D in the model) can influence the performance of the economy through investment on human capital, and infrastructure, improvement in political and legal institution and so on (Easterly, 1993).

➤ *Estimation Techniques*

The study employed quantitative techniques and econometrics methods to analyze the data. This study used time series data. Regarding with pre-estimation test by using Augmented Ducky-Fuller and Philips Perron unit root test, data analysis begins with the testing of the unit root of the series to confirm whether the data are stationary or not, Co-integration test was employed to check the relationship of the variables under study and also ARDL estimation was employed as per the result of the co-integration test. Likewise, post estimation test like serial correlation test, normality test, heteroscedasticity test, granger causality test and cumulative sum of recursive residuals (CUSUM), cumulative sum of squares of recursive residuals (CUSUMSQ) was employed to test the stability of the model. Many economic and financial time series exhibit trending behavior or non-stationery in the mean. Therefore, it is necessary to test the stability of the series before identification of the relationship between variables. The regression analysis among the variables would not be consistent and spurious regression problem would occur if unstable data are used. So the data must be transformed to stationary form prior to analysis.

- *Pre-Estimation Tests*

Pre-estimation test are parametric test carried out on the time series data to meet the assumptions of the model to be estimated. The pre-estimation tests are normality test (Jarque-Bera test), stationarity test (Augmented Dicker Fuller test), co-integration test (ARDL Bounds test) and optimal lag length determination.

- ✓ *Stationary Test (Unit root)*

Time series data is said to be stationary when its value tends to revert to its long-run average value and its other properties like the variance and co-variance of the data series are not affected by the change in time (i.e. time invariant) (Shrestha and Bhatta, 2018).The most common method for testing unit root for parametric analyses is the Augmented Dickey Fuller (ADF) and Phillips Perron (PP) test. Let’ s assume we have a series for testing unit root. ADF model tests unit root as follows:

$$\Delta y_t = \mu + \delta y_t + \sum_{i=1}^k \beta_i \Delta y_{t-i} + \epsilon_t \dots \dots \dots (16)$$

Where:  $\delta = \alpha - 1$ ,  $\alpha$  = coefficient of  $y_{t-1}$  and  $\Delta y_t$  = First difference of  $y_t$  i.e.  $y_t - y_{t-1}$

The hypothesis of ADF is

- $H_0: \delta = 0$  (There is unit root, i.e. the series is non-stationary)
- $H_1: \delta < 0$  (There is no unit root, i.e. the series is stationary)

If we do not reject the null hypothesis, the series is non-stationary otherwise the series is stationary.

- ✓ *Co-integration Test (ARDL Bounds Test)*

There is co-integration between two or more variables if there are forms of equilibrium relationship spanning the long-run (Shrestha and Bhatta, 2018). The Bounds test is guided by the assumption of stationary variables at level I(0), at first difference I(1) and never at second difference I(2) (Giles, 2013).The bounds test for co-integration, conditional ARDL( $q_1, q_2, q_3, q_4, q_5, q_6, q_7, q_8, q_9, q_{10}, q_{11}, q_{12}, q_{13}, q_{14}$ ) model with 13 variables, would be the hypothesis as:

- H0:  $b_{ji}=0$  where  $ji=1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13$

$$H_1: b_{ji} \neq 0 \dots \dots \dots (17)$$

The null hypothesis is saying that the co-efficient of the long-run equations are all equal to zero, which implies there is no co-integration against the alternative hypothesis which, say the coefficient of the long-run equation is all not equal to zero, which implies there is co-integration. In order to test the existence of long-term relationship among the variables, equation (21) had been estimated applying ARDL. 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.

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 (I (1)), 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 (I (0)), we can't reject the null hypothesis rather accept the null hypothesis of no co-integration 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 underlying 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 46 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 we are unable to reject the null hypothesis rather accept the null hypothesis of no co-integration among the variables then we can only specify the short-run model otherwise we go ahead to specify a standard ARDL model. If there is no co-integration the ARDL bound testing with 13 variables ( $q_1, q_2, q_3, q_4, q_5, q_6, q_7, q_8, q_9, q_{10}, q_{11}, q_{12}, q_{13}, q_{14}$ ) model would be estimated.

ARDL bound testing would be specified as:

$$\begin{aligned} \Delta LR GDP_t = & \alpha_0 + \sum_{i=1}^{p_1} \alpha_{1i} \Delta LR GDP_{t-i} + \sum_{i=0}^{q_1} \alpha_{2i} \Delta LGCF_{t-i} + \sum_{i=0}^{q_2} \alpha_{3i} \Delta LHC_{t-i} + \sum_{i=0}^{q_3} \alpha_{4i} \Delta LEXT_{t-i} + \sum_{i=0}^{p_4} \alpha_{5i} \Delta LFAID_{t-i} + \\ & \sum_{i=0}^{q_5} \alpha_{6i} \Delta LEXD_{t-i} + \sum_{i=1}^{q_6} \alpha_{7i} \Delta INF_{t-i} + \sum_{i=0}^{q_7} \alpha_{8i} \Delta LLLF_{t-i} + \sum_{i=0}^{q_8} \alpha_{9i} \Delta LFD_{t-i} + \sum_{i=0}^{q_9} \alpha_{10i} \Delta GEXP_{t-i} + \sum_{i=0}^{q_{10}} \alpha_{11i} \Delta POPG_{t-i} + \\ & \sum_{i=1}^{q_{11}} \alpha_{12i} \Delta LSWEXP_{t-i} + \beta_{13} D + \sum_{i=1}^{p_1} \beta_{1i} LR GDP_{t-i} + \sum_{i=0}^{q_1} \beta_{2i} LGCF_{t-i} + \sum_{i=0}^{q_2} \beta_{3i} LHC_{t-i} + \sum_{i=1}^{q_3} \beta_{4i} LFAID_{t-i} + \\ & \sum_{i=1}^{q_4} \beta_{5i} LEXD_{t-i} + \sum_{i=1}^{q_5} \beta_{6i} LEXT_{t-i} + \sum_{i=1}^{q_6} \beta_{7i} INF_{t-i} + \sum_{i=1}^{q_7} \beta_{8i} LLLF_{t-i} + \sum_{i=1}^{q_8} \beta_{9i} LFD_{t-i} + \sum_{i=0}^{q_9} \beta_{10i} GEXP_{t-i} + \\ & \sum_{i=0}^{q_{10}} \beta_{11i} POPG_{t-i} + \sum_{i=0}^{q_{11}} \beta_{12i} LSWEXP_{t-i} + \beta_{13} D + \epsilon_t \dots \dots \dots (18) \end{aligned}$$

If there is co-integration, the error correction model (ECM) representation is specified as:

$$\begin{aligned} \Delta LR GDP_t = & \alpha_0 + \sum_{i=1}^{p_1} \alpha_{1i} \Delta LR GDP_{t-i} + \sum_{i=0}^{q_1} \alpha_{2i} \Delta LGCF_{t-i} + \sum_{i=0}^{q_2} \alpha_{3i} \Delta LHC_{t-i} + \sum_{i=0}^{q_3} \alpha_{4i} \Delta LEXT_{t-i} + \sum_{i=0}^{p_4} \alpha_{5i} \Delta LFAID_{t-i} + \\ & \sum_{i=0}^{q_5} \alpha_{6i} \Delta LEXD_{t-i} + \sum_{i=1}^{q_6} \alpha_{7i} \Delta INF_{t-i} + \sum_{i=0}^{q_7} \alpha_{8i} \Delta LLLF_{t-i} + \sum_{i=0}^{q_8} \alpha_{9i} \Delta LFD_{t-i} + \sum_{i=0}^{q_9} \alpha_{10i} \Delta GEXP_{t-i} + \sum_{i=0}^{q_{10}} \alpha_{11i} \Delta POPG_{t-i} + \\ & \sum_{i=0}^{q_{11}} \alpha_{12i} \Delta LSWEXP_{t-i} + \beta_{13} D + \lambda ECT_t + \epsilon_t \dots \dots \dots (19) \end{aligned}$$

**Where;**  $\lambda$  = the speed of adjustment parameter with a negative sign which shows convergence in the long-run else the model is explosive,  $ECT$  = the error correction term, the ordinary least squares (OLS) residuals series from the long-run co-integrating regression  $\alpha_{1i}, \alpha_{2i}, \alpha_{3i}, \alpha_{4i}, \alpha_{5i}, \alpha_{6i}, \alpha_{7i}, \alpha_{8i}, \alpha_{9i}, \alpha_{10i}, \alpha_{11i}, \alpha_{12i}$  are the short-run dynamic coefficient of the model's adjustment long-run equilibrium and  $D$  = A dummy variable for policy change.

Where we have the differences ( $\Delta$ ), it captures the short-run and where we have the  $ECT$ , it captures the long-run. The short-run causal effect is represented by the statistical significance of the t-statistic on the explanatory variables (short-run coefficients). If the t-statistic of the coefficients  $\alpha_{1i}, \alpha_{2i}, \alpha_{3i}, \alpha_{4i}, \alpha_{5i}, \alpha_{6i}, \alpha_{7i}, \alpha_{8i}$  and  $\alpha_{9i}$  are significant, then we can know the direction of causality from the regressor to the dependent variable (Giles, 2013). The long-run causal effect is captured by the significance of the  $\lambda$  which is the parameter for the error correction term ( $ECT$ ). If  $\lambda$  is significant then it tells us that there is long-run causality among the variables.

✓ *Lag Length Selection.*

Akaike Information Criterion (AIC), the Schwartz Bayesian Criteria (SBC) or Hannan-Quinn Criterion (HQC) can be used in order to choose the lag order. Then the estimation of the model should be carried out based on the number of lags suggested by the information criteria suggested. However, the AIC criterion was used in this study to select the optimum lag in the ARDL model.

- *Post-Estimation Tests*

- ✓ *Auto-correlation (Breusch-Godfrey serial correlation LM) Test*

Breusch-Godfrey test (Godfrey, 1978) is applied to test the serial correlation. Mathematically the following should hold true; Covariance ( $\varepsilon_i, \varepsilon_j$ ) = 0,  $\forall i, j$  otherwise the series has a serial correlation. Serial correlation does not affect the unbiasedness of the regression estimators but rather affect the efficiency i.e. the estimators are not BLUE (Brooks 2014). The test has the following general null hypothesis and alternative hypothesis:

- $H_0: \rho = 0$ , No serial correlation in the model,
- $H_1: \rho \neq 0$ , There is serial correlation in the model.

- ✓ *Test for Heteroscedasticity*

Test that all residuals have a constant variance. In the regular OLS estimation as well as for the ARDL model it is assumed that the residuals have a constant variance (homoscedasticity). If the model does not have a constant variance (heteroscedasticity) in the residuals the estimated coefficients will no longer be BLUE and will not have the minimum variance of the unbiased estimators. For the test of heteroscedasticity this study will use the Breusch-Pagan test for heteroscedasticity which has the following very general null and alternative hypothesis:

- $H_0$ : Constant variance of the residuals –Homoscedasticity,
- $H_1$ : Non-constant variance of the residuals –Heteroscedasticity.

Decision: If the probability of observed R-square is higher than a probability at five percent level of significance then the null hypothesis is accepted (it means there is homoscedasticity) and if the probability value of observed R-square is lower than a probability at five percent level of significance then the null hypothesis is rejected (it means there is heteroscedasticity).

- ✓ *Normality Test (Jarque-Bera Test)*

The basic assumption that sampled data are normally distributed is what many methods of time series analysis depend on (Thode, 2002). This assumption is very vital for the reliability of parametric tests results.

- ✓ *Regression Specification Error Test (Ramsey, 1969)*

Ramsey Regression Specification Error Test (RESET) (Ramsey, 1969) for functional form i.e. it tests if non-linear combinations of the fitted values can describe the explanatory variable. If non-linear combinations of the fitted values have power in describing the explanatory variable the model is said to be miss-specified and needs adjustments. Thus, it is used to check whether the specified functional form is correct or not. The non-mathematical null and alternative hypotheses are as follows:  $H_0$ : No power in non-linear combinations-No misspecification,  $H_1$ : The non-linear combinations have power–Misspecification.

- ✓ *Stability Test (CUSUM and CUSUMSQ Graph)*

To assess the stability of the long-run and short-run coefficients CUSUM and CUSUMSQ tests proposed by Brown et.al (1975) can be used. If there is instability in the coefficients one may increase the sample size or introduce dummy variables (Naiya&Manap2013; Juselius2006; Fuinhas& Marques2012). The tests are based on the cumulative sum of the recursive residuals (CUSUM) and the cumulative sum of squared recursive residuals (CUSUMSQ) and are of a graphical nature whereby the residuals are updated recursively and are plotted against the break points for the 5% significance line.

The cumulative sum of recursive residuals is plotted against the upper and lower 95% confidence bounds. The concept remains the same for CUSUMSQ. The long-run and short-run coefficients are stable if the plot of CUSUMSQ and CUSUM stay within the 5% significance level. In detail, both tests analyze if the residuals do not significantly deviate from its mean value by imposing parallel critical lines on a 5% significance level.

- *The Autoregressive Distributed Lag Model (ARDL)*

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

Autoregressive Distributed Lag Model (ARDL) plays a key role when faced with making vital economic decision from past data. Change in economic variables may bring change in other economic variables beyond the time (Kripfganz and Schneider, 2018). This is termed as changes distributed over future periods. This is a model containing the lagged values of the dependent variable, the current and lagged values of the regressors as explanatory variables. The ARDL model uses a combination of endogenous and exogenous variables. It is often necessary for stationary (unit root) test to be conducted to ascertain that no variable is integrated of order 2 i.e. I (2). The ARDL model can be specified if the variables are integrated of different orders. That



is, a model having a combination of variables with I(0) i.e. level stationary variables and I (1) i.e. 1<sup>st</sup> difference stationary variables order of integration (Nkoro and Uko, 2016). ARDL model can also be used if all the variables are integrated of order one i.e. stationary after first difference I (1).The general model of the ARDL (p, q) is as follows:

$$y_t = \alpha_0 + \sum_{i=1}^p \alpha_i y_{t-i} - 1 + \sum_{i=0}^q \beta_i \chi_{t-i} + \beta_{13} D + \epsilon_t \dots \dots \dots (20)$$

Or broken as;

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \dots + \alpha_p y_{t-p} + \beta_0 \chi_t + \beta_1 \chi_{t-1} + \beta_2 \chi_{t-2} + \beta_0 \chi_{t-1} + \dots + \beta_q \chi_{t-q} + \beta_{13} D + \epsilon_t \dots \dots \dots (21)$$

Where:-

- $y_t$ : Dependent variable (RGDPt)
- $Y_{t-1}$ : Lag of the dependent variable (RGDPt-i)
- $\chi_t$ : Independent variable (GCFt,HCt, EXTt, FAIDt, EXDt, INFt, LFt, Fdt, GEXPt, POPGt, SWEXP, POLICH CANGE DUMMY(D))
- $\chi_{t-i}$ : Lag of the independent variable(GCFt-i, HCt-i, EXTt-i, FAIDt-i, EXDt-i, INFt-i, LFt-i, Fdt-i,GEXPt-i, POPGt-i, SWEXPt-i)
- p: Optimal lag order associated with the dependent variable in years
- q: Optimal lag order associated with the independent variable in years
- $\alpha_0$ : Constant
- $\alpha_i$ : Coefficient for dependent variable(coefficients for short-run)
- $\beta_i$ : Coefficient for Independent variable (coefficient for long-run)
- $\epsilon_t$ : Error Term
- D=A dummy variable for policy changes.

➤ *Causality Test*

A granger causality test has been made to the selected ARDL model to identify the direction of causality between the dependent variables real GDP and the independent variables. That is a pair wise granger causality test was applied on the selected model to know the direction of the causality of real GDP with independent variables such as Physical capital, human capital, Export, foreign aid, external debt, inflation rate, labor force, financial development, government expenditure, population growth rate and social welfare expenditure. .In order to estimate the above specified equations (models) and to perform the pre-estimation and post estimation diagnostics tests Eview 10 statistical packages was used.

## CHAPTER FOUR DESCRIPTIVE AND ECONOMETRIC ANALYSIS

### A. Overview of Ethiopian Economy

In this section, the research attempt to present an overview of the Ethiopian Economy with a focus on the economic structure and trends real GDP, gross capital formation, human capital, export, foreign aid, external debt, inflation, labour force, financial sector development, government spending, population growth and social welfare expenditure. This chapter contains both the descriptive and econometrics analysis. Under the descriptive statistics the trends and overall performances of the variables of interest are presented. The statistical tools such as tables and graphs are used to describe the variables used in the model. The econometric analysis begins by testing the necessary tests such as stationary tests, diagnostic tests and bound test. After passed the necessary tests both the long run and short run models are estimated using ARDL and Error Correction respectively. After estimation has been made the interpretation and discussion are continued based on the model results.

#### ➤ Trends of Real GDP in Ethiopia from 1974 to 2020

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

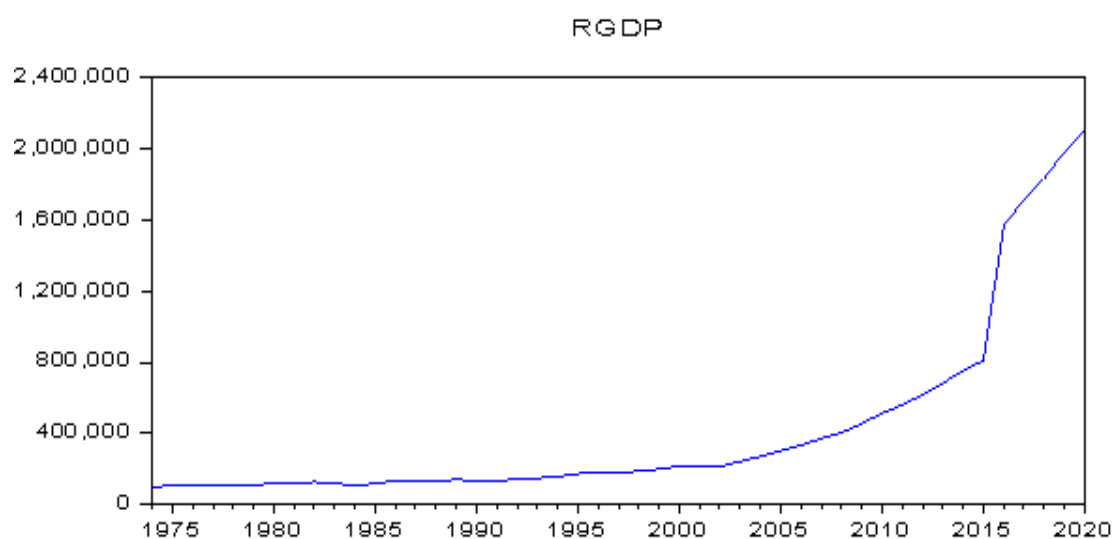


Fig 2 Trends of Total Real GDP at constant market price (in Million Birr) in Ethiopia From 1974-2020

Source: Own Computed based on NBE data, 2022.

According to NBE, (2020/21) the real GDP of Ethiopia was 102,407 million birr in 1974 and it reaches 2,228,081 billion birr in 2020. However, the annual growth rate of real GDP between the two periods was experiencing both negative and positive growths.

The figure 2 shows that some fluctuations of total real output from the beginning up to the year 1990 whereas relatively consistent increment from 1991 onwards. In addition to that from 2002 onwards the graph is sharply upward indicating higher rate of growth. This unprecedented high growth rate is attributed due to a combination of pro poor growth policy (since 2003 onwards) and state led development program (since 2005 onwards) and the present government implementing a development program aimed at poverty reduction through rapid economic growth and macroeconomic stability (Zerayehu 2013).

#### ➤ Gross Capital Formation

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

The gross capital formation was 19,176 million birr in 1974 and 1,216,585 million birr in 2020 (NBE, 2020). However like GDP the rate of capital formation is no consistent throughout the periods. There are ups and downs on the levels of gross capital formation in the country for last forty years. As we see from the figure (3) gross capital formation was at the beginning seems stable for ten years and decline and increase up to 1990. However, it starts to increase from 1991 to 2000 and finally it increases at increasing rate starting from 2001 onwards. Even though there are improvements in recent few years the gross capital formation was lower in many years. Based on the gross capital formation the current government is better than the Derg regime.

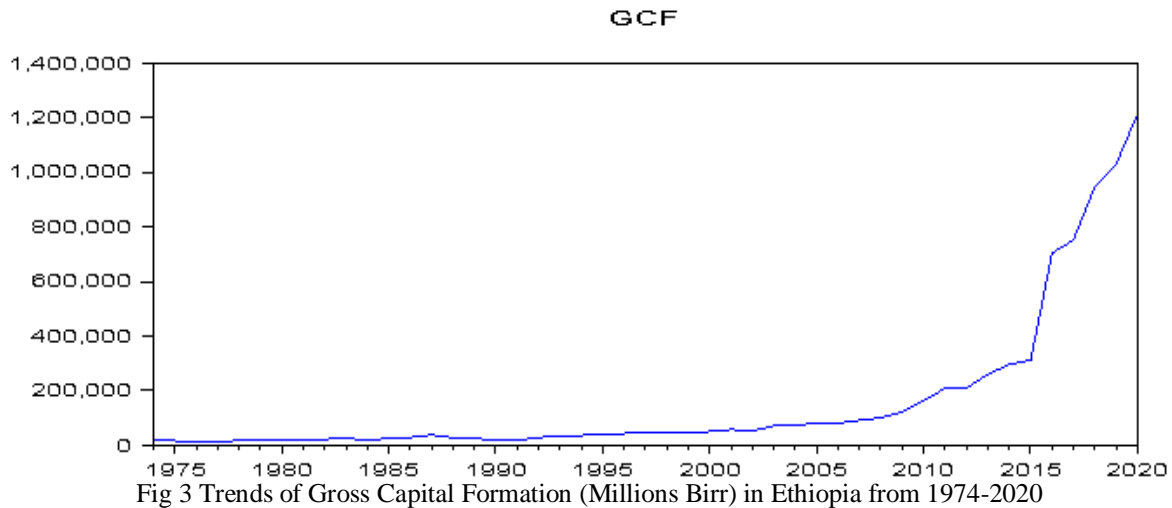


Fig 3 Trends of Gross Capital Formation (Millions Birr) in Ethiopia from 1974-2020

Source: Own Computed based on NBE data, 2022.

➤ *Social Sector Development and Economic Growth*

Most of the time expenditures (both recurrent and capital) of health, education and training were employed to measure human capital, which is the major driving force of economic growth. During the military power, the coverage and well distribution of education and health were very low comparing to current government. More over the life expectancy at birth was 44 years in 1974 and 64.8 years in 2020 (WB, 2020).The amount of budget allocated to this sector were insignificant comparing to GDP instead for military force were more. The total budget allocated to health, education and training in 1974 was 208 million birr (i.e. 0.2 percent of real GDP) and reached 717 million birr (0.6 percent of real GDP) in the year of 1991 while military expenditure ratio to real GDP was 5.8% during the same period (WB, 2020).

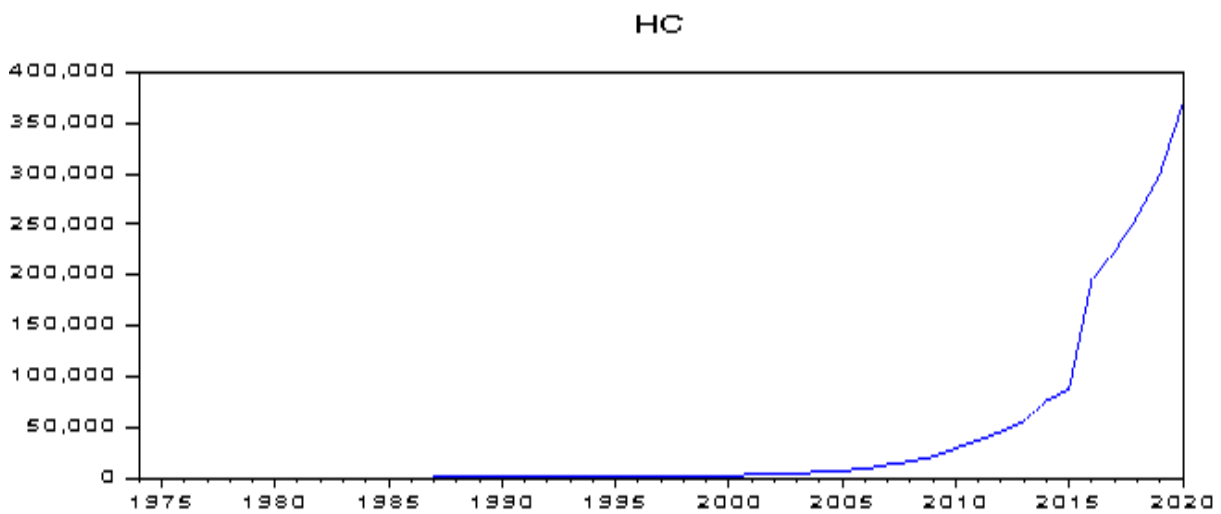


Fig 4 Trends of Human Capital (in Millions Birr) from 1974-2020

Source: Computed Based on MOFED and EEA Data

The trend of expenditure in health, education and training at the starting period was very low and starts slightly increase until 2009. After 2009 onwards it was increased by higher rate and it reached its peak in recent years. Post 1992, the Ethiopian government developed 20 years plan of health and education to improve health and education of citizens. To achieve this 20 years plan the government has been doing its homework by investing relatively more budget. The total amount of budget allocated in 1992 was 948 million birr (0.65 percent of real GDP) and reached 368 billion and 640 million birr which is 16.55 percent of real GDP in 2020.

➤ *Export of Goods and Services*

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 556 Million Birr. It has steadily increased to 930 Million Birr in 1983 at constant value. In the year 1984, however, it was fluctuated and starts to decline and reached 745 Million Birr in 1991. After the reform period i.e. 1992, export earnings increased with little fluctuations and recorded 128,869 Million Birr in 2020.

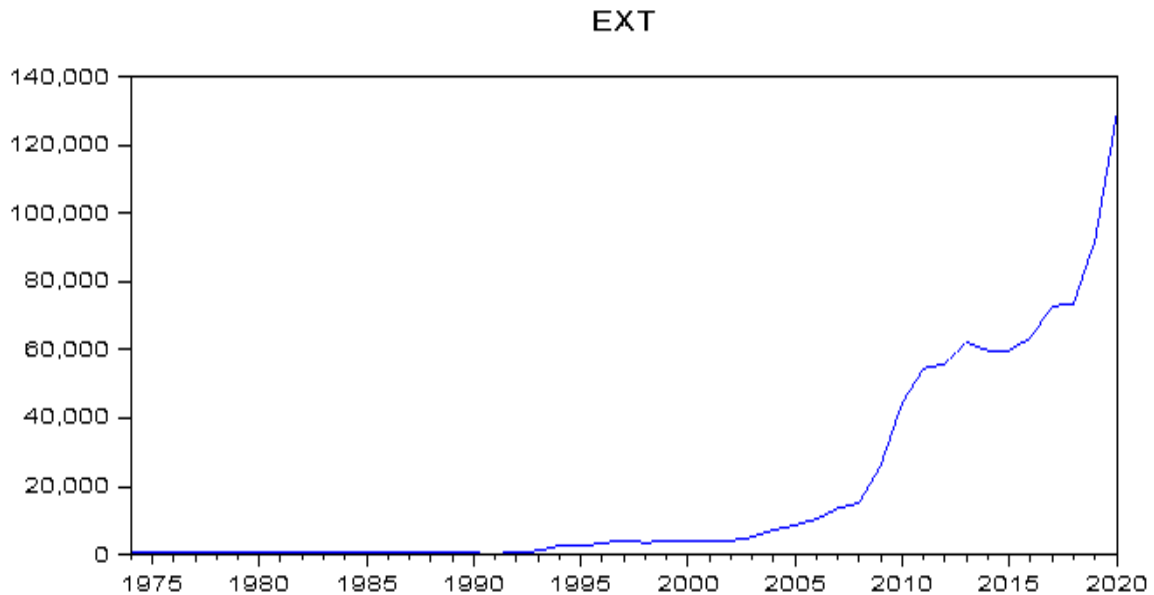


Fig 5 Trends of Export from 1974-2020 in (Million Birr)

Source: Computed Based on 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 to 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 figure 5) 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.

#### ➤ Foreign Aid

Foreign aid is one of the prominent sources of finance for developing countries in Africa in general and Ethiopia in particular. As we know that, Ethiopia is one of the poorest countries in the world, which depend its export sector on agricultural primary commodities (68 percent) that suffers from low levels of domestic saving and insufficient amount of foreign exchange required to purchase capital goods (Tewodros,2015). Not only this but also the country suffers from budget deficit which required external assistance to enhance economic growth. Foreign aid could fix this problem by supplementing domestic saving or foreign exchange reserves. Being a source to fill the gap between domestic resources and investments, foreign aid has played a major role over the past forty years. Ethiopia has received a tremendous amount of foreign aid over the past few decades. Foreign aid donated to Ethiopia from different donors increased during the study period starting from 1,089 million of birr in 1974 and reached to 93,632 million in 2020 (WB,2020).

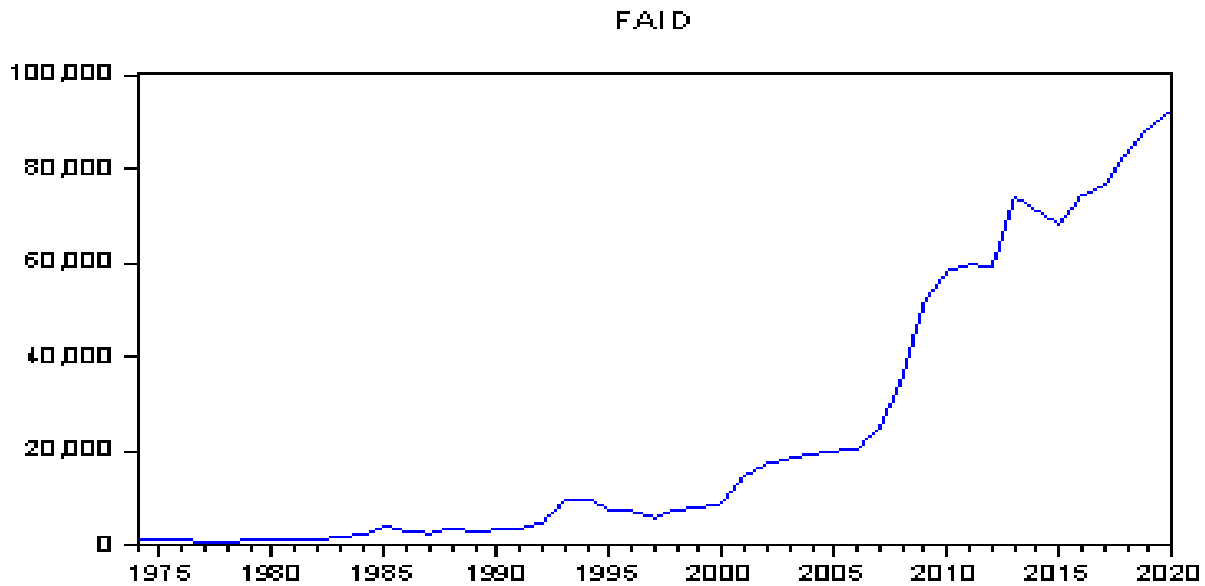


Fig 6 Trends of Foreign Aid Assistance Received by Ethiopia from 1974-2020(Million Birr)  
 Source: Own Computation Based on WB Data, 2022

As depicted from figure 6 the amount of aid received was very low from the starting period (1974) i.e. about 1089 million Birr up to 1984 (3395 million Birr). However in recent years of the study period the amount of foreign aid is very high compared to the Derg regime. The highest amount of foreign aid receipt was registered in 2013 and 2020 which accounts 74,096 and 93,632 million Ethiopian birr respectively.

➤ *External Debt*

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

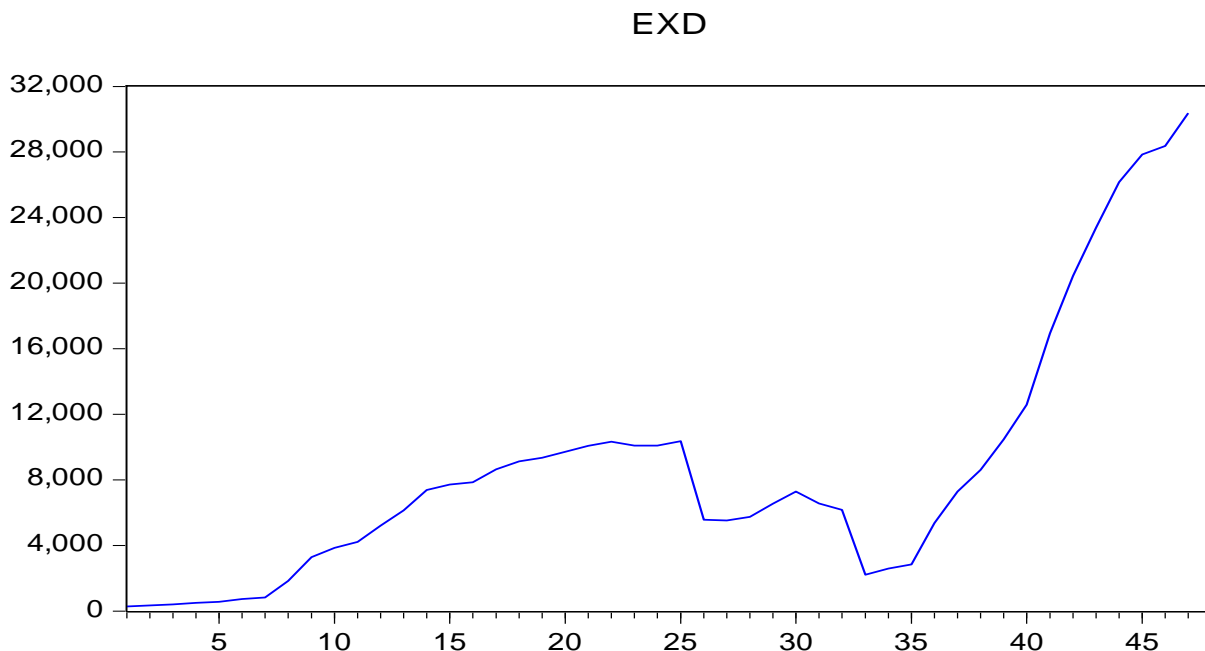


Fig 7 Trends of External Debt in Ethiopia from 19974-2020(Million Birr)  
 Source: Own Computed Based on NBE Data, 2022.

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

➤ *General Inflation Rate*

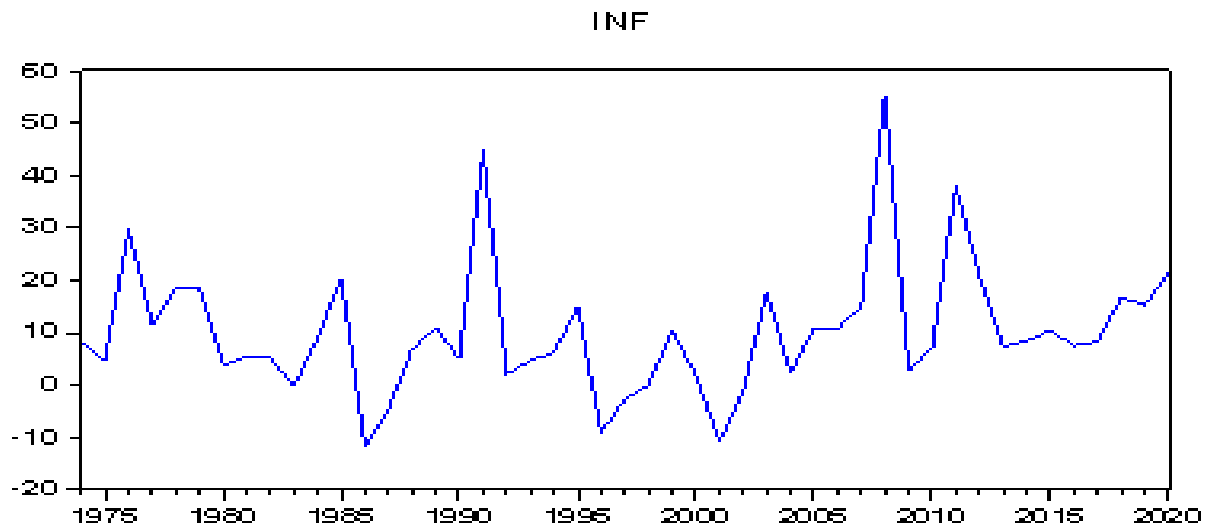


Fig 8 Trends of General Inflation Rate (Percentage)  
Source: Source: Own Computed based on WDI data, 2022

In Ethiopian history inflation was not a problem of economic growth however; relatively it was high from the starting period of the Derg regime and the beginning of the current government as we clearly observed from figure (8) inflation remained at reasonable low level rate before 2000/03. However, post 2003/04 shows sharp increases despite the rapid economic growth during the same period and in 2008/09 it was a serious problem. This is a period when the financial crisis was happened due to oil price increase or shock. In addition the sharp increasing of general inflation was primarily caused by food inflation which is the effect of food demand triggered and international price hike. According to NBE (2020/21), the official headline inflation during 1991/92 and 2008/09 stood at about 55.2 percent and 45 with food inflation being about 78.3 percent and 54.3 percent respectively.

➤ *Labour Force*

According to world economic outlook, (2020) the total population in Ethiopia is 114,963,588. Ethiopia is one of the labor abundant countries in the world with total labor force of 54.7 million (WB; and WDI, 2020). Economic theorist give heavy hand to economic growth of a country as it depends on labor force availability. The labor force in Ethiopia grows continually owing the fast growth of population. According to World Bank development indicators the total labor force in Ethiopia was 16.7 million in 1974 and reaches 53.55 million in 2020.

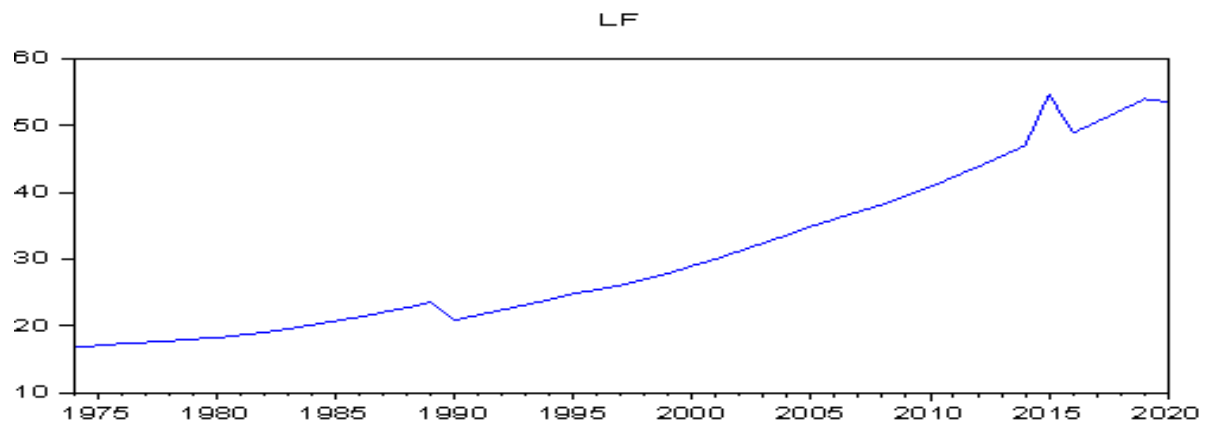


Fig 9 Trends of Labor Force Growth in Ethiopia from 1974-2020(Percentage)  
Source: Own Computed Based on WB Data, 2022

➤ *Domestic Credit as Percentage of RGDP*

Domestic credit to GDP ratio is a proxy measure of financial development through financial deepening. The financial system in developing countries faces several difficulties that prevent it from operating efficiently. These countries usually suffer from financial crises due mainly to increases in interest rates and increases in uncertainty. But as the figure (10) indicates there are some improvements in financial depth in Ethiopia from time to time relatively with constant increasing rate until 2010 and increase by increasing rated onwards. This is due to the proper management of and better policy of the existing government compared to the previous one.

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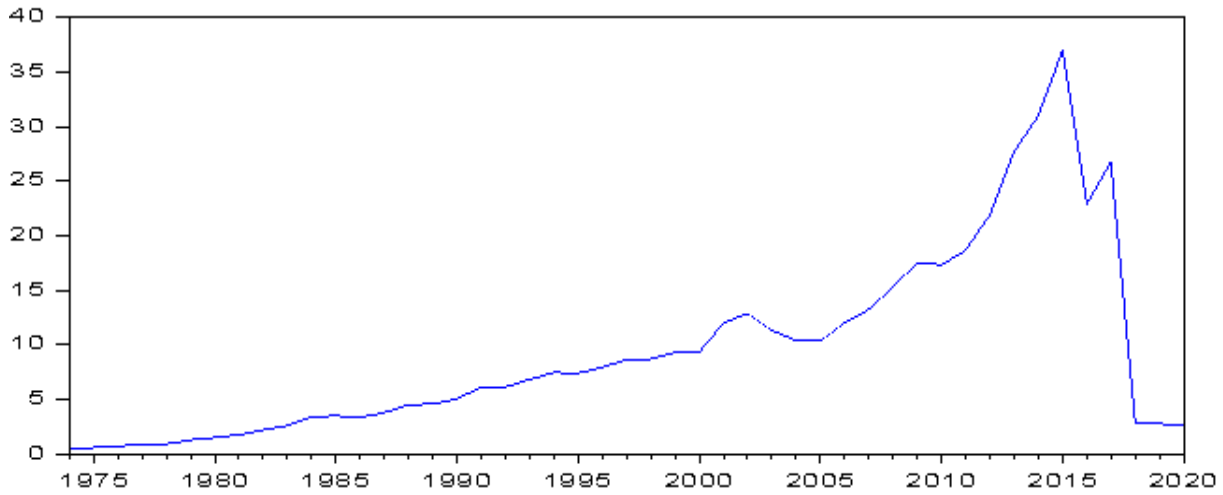


Fig 10 Trends of Domestic Credit as a Percentage of RGDP  
 Source: Own Computed Based on NBE Data, 2022

➤ Trends of Government Expenditure and Ethiopian Economy (1974-2020)

Ethiopian Government performs two functions- protection (security) and provision of certain public goods. Protection function consists of the creation of rule of law and enforcement of property rights. This helps to minimize risks of criminality, protect life and property, and the nation from external aggression. Under the provision of public goods are defense, roads, education, health, and power, to mention few. The facts argue that increase in government expenditure on socio- economic and physical infrastructures encourages economic growth.

Ethiopian government expenditure spillover economic growth for example, government expenditure on health and education raises the productivity of labor and increase the growth of national output. Similarly, expenditure on infrastructure such as roads, communications, power, etc., reduces production costs, increases private sector investment and profitability of firms, thus fostering economic growth. To Investigates of the relationship between government expenditure and economic growth in Ethiopia, to test Wagner’s Law which postulates that as real income increases there is a tendency for the share of public expenditure to increase relative to national income.

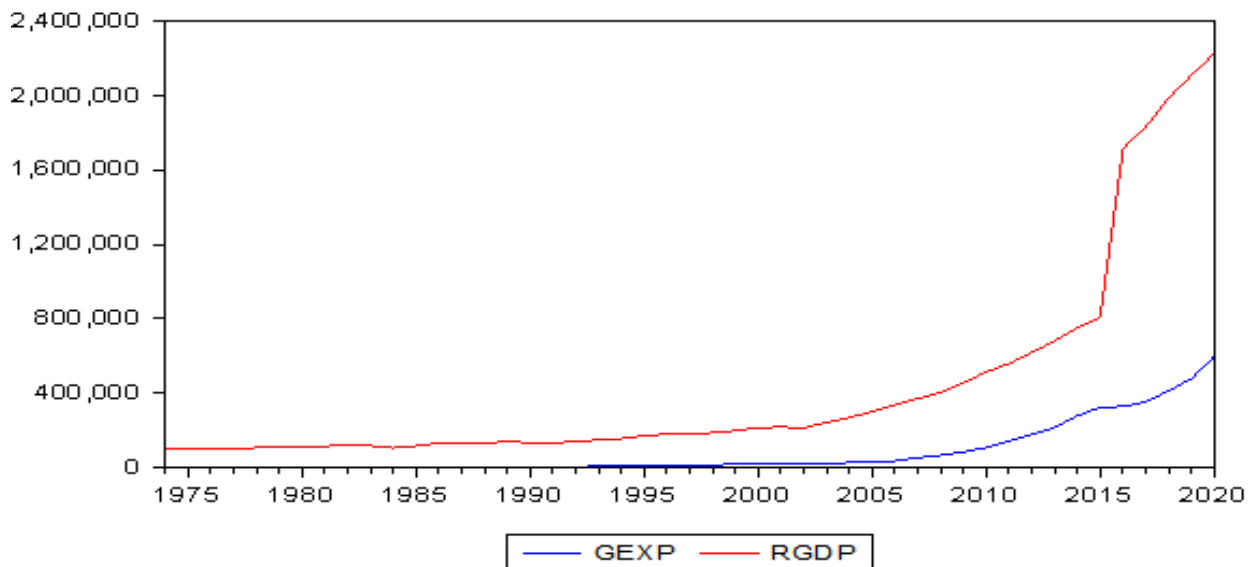


Fig 11 Trends of Government spending as a percentage of RGDP  
 Source: Own Computed Based on NBE Data, 2022

➤ Trends of Population Growth and Ethiopian Economy (1974-2020) (in Percentage)

The idea behind measuring aggregate output of the country in terms of GDP is to show the total economic activity of the country. RGDP measures the market value of final goods and services produced by a country in a given year. It shows what the country paid for the final goods and services in a year and the more the country can afford higher cost the more benefits it gets.

It is commonly observed that countries with higher GDP are better-off than countries with lower GDP. Ethiopian population has grown along with economic expansion; increases in GDP do not necessarily result in an improvement in the standard of living. Economic growth in Ethiopia should be measured in terms of a sustained increase in GDP per capital over time. GDP per capital is used when economic growth focuses on standard of living of population. It shows the level of goods and services that, on average, individuals purchase or otherwise gain access to. This type of measuring economic growth at least takes into account the effects of population growth in the country *TsegayeTegenu October 27, 2011*.

Ethiopian population is 114 million that is growing at 2.5 % resulting in 2 million people added per year as *EIA forecasting*. Households which have higher consumption requirements and lower economic support ratio are growing by a constant average growth rate of 2.6% in rural areas requiring more land for production. Also know that the absolute size of the national labor force is estimated more than 30 million, with an annual average increase of 1.3 percent. Know that urbanization, as a result of rural-urban migration, is growing at higher speed (4.3%) affecting livelihood positions and infrastructure development.

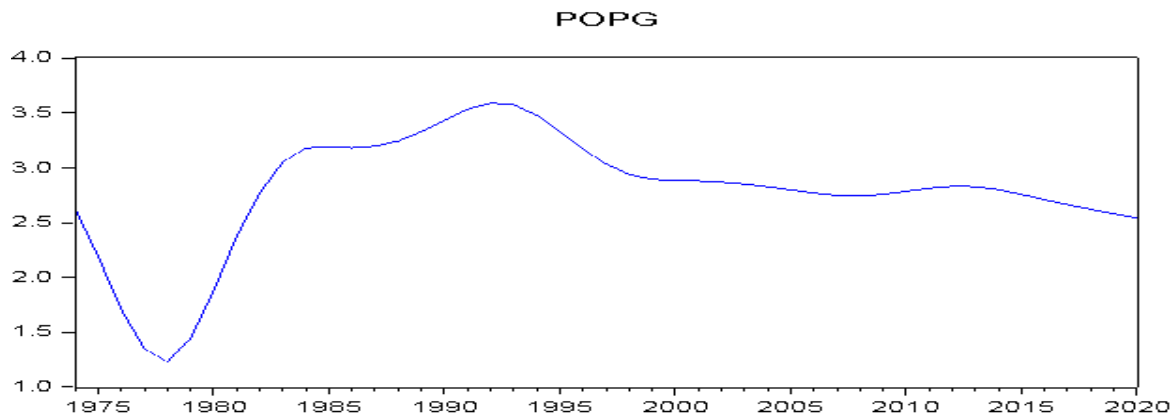


Fig 12 Ethiopian Population Growth (in %) Trends from 1974-2020

Source: Own Computation, 2022

➤ *Summary Statistics*

Figure 13 depicts the trends of all variables which are used in the model together. From the figure RGDP represents for real GDP, GCF for gross capital formation, HC for human capital, EXT for real export, FAID for foreign aid, EXD for external debt, INF for inflation, LF for labor force, FD for financial sector, GEXP for government expenditure, POPG for population growth and SWEXP for social welfare expenditure . General inflation rate, financial sector development, population growth and social welfare expenditure were measured in percent, labor force is expressed in millions of working age population and all the remaining variables are measured in millions of birr. The Y-axis represents all variables used in this study and the X-axis represents time ranging from 1974-2020. The result shows real GDP has higher value than the remaining variables during the study period while external debt and gross capital formation follows it with greater difference.

However, other variables such as human capital, export and foreign aid are relatively in their infant stage in Ethiopia. As we observed from figure 13 the trends of all variables used in the model are different from one another with different increasing or decreasing rate at different time periods. Even if some variables are measured in different units like general inflation rate, financial sector development and labor force which are not expressed in millions of birr unlike real GDP and other remaining variables, the researcher depicts these variables in this summary statistics since they are considered as determinants of economic growth.

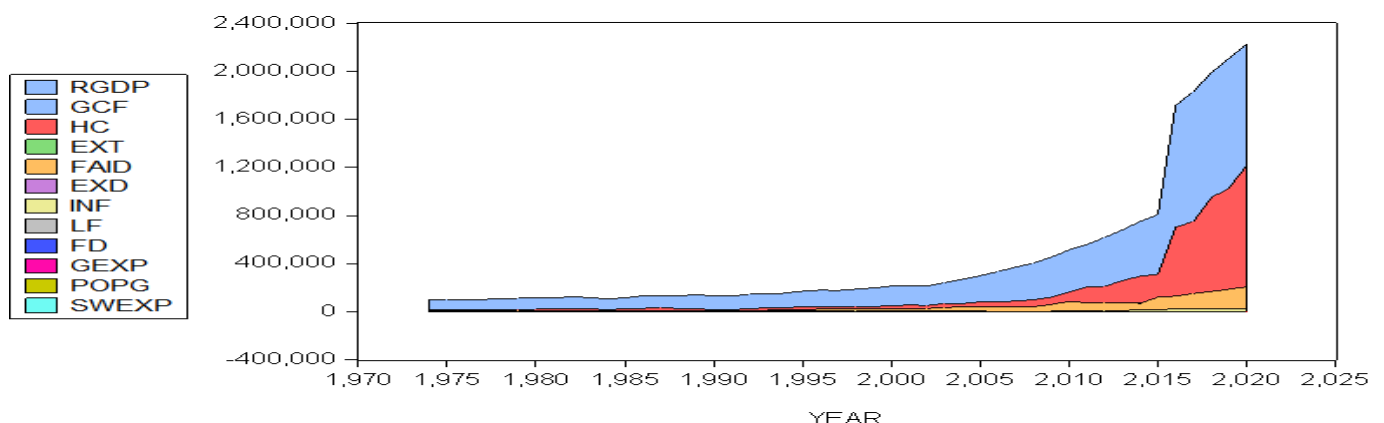


Fig 13 Summary Statistics

Source: Own Computation, 2022.



**B. Descriptive Statistics Results.**

In this study the data are summarized in descriptive analysis approach as follows:

**Table 2 Descriptive Statistics**

Variables	Observations	Mean	Maximum	Minimum	Std. Dev.
Real GDP	47	433,301.30	2,228,081.00	102,407.00	570,735.40
Gross capital formation	47	161,559.70	1,216,585	14,116.00	284,940.10
human capital	47	25,365.98	204,172.00	208.00	48,635.14
export	47	43,905.78	208,857.00	4,727.00	52,055.90
Foreign aid	47	24,171.85	92,485.00	801.00	29,607.11
External debt	47	142,332.90	1,290,519.00	648.00	282,409.30
Inflation	47	10.18	44.39	(9.81)	10.65
Labour force	47	30.38	54.70	16.70	11.92
financial development	47	9.47	36.99	0.52	8.77
government spending	47	11.06	40.12	1.14	10.13
population growth	47	2.79	3.59	1.23	0.54
social welfare expenditure	47	154.19	2,327.80	0.30	412.43

Source: Own computation 2022.

From the Table 2 above we observe that the means show where the center of the data is located, it also show that the averages of the data sets. The standard deviations give us information about how close or far from the mean are the values of the statistical data sets (how concentrated data are around the mean).Based on the table value the mean (average) value of real GDP over the forty seven year period is 433,301.3 million birr with maximum and minimum being 222, 8081.0 and 102407.0 million birr respectively and its standard deviation from the mean values of 433,301.3 is 570,735. In terms of the INF rate the average value stands at 10.18 with a maximum of 44.40 and crashes to the negative minimum value of -9.81 while the dispersion from the mean value stands at 10.65. The mean value of foreign aid is 24171.85 which is a reflection of the extent of aid received from abroad in Ethiopia. The maximum is as high as 92485 and as low as 801 but with a wider dispersion from mean of 29607.11.The mean value of Gross capital formation, human capital, export, External debt, Labour force, financial development, government spending, population growth and social welfare expenditure are 161559.7, 25365.98, 43905.78 ,142332.9 ,30.37936, 9.470552, 11.05623, 2.786,55 and 154.1872 respectively. Among the mean value of Gross capital formation, human capital, export, foreign aid, External debt, inflation, Labour force, financial development, government spending, population growth and social welfare expenditure we observed in the above table the gross capital formation has average value of 161,559.70, this value is larger value among the other explanatory variables which indicate that a gross capital formation has high impact on economic growth.

➤ *Pre-Estimation Tests*

• *Stationary (Unit Root) Test.*

In order to determine the degree of integration, a unit root test is carried out using the standard Augmented Dickey Fuller (ADF) and Philips-Perron (PP) tests. These tests are undertaken for three alternative specifications: with a constant but no trend, with both constant and trend and without trend and constant (See Table 3 and 4). All variables except INF, GEXP and POPG are in logarithmic forms. The rejection of the null hypothesis (that is there is a unit root) is based on ADF and Philips-Perron (PP) critical values.

The unit root test in Table 3 shows that inflation, population growth rate and social welfare expenditure are stationary at level 1(0), since the ADF F-statistic value of each of the variables at level is greater than the MacKinnon 5% critical values, while all other variables are stationary at first difference because the ADF F-statistic value of each variable at first difference is greater than the MacKinnon 5% critical values.

**Table 3 Unit Root Test (ADF) Results**

<b>Unit Root Test Table (ADF)</b>													
Variable s	<b>At Level</b>						<b>At First Difference</b>						
	With Constant		With Constant & Trend		With Constant & Trend		With Constant		With Constant & Trend		Without Constant & Trend		
	t-Statistic	Prob.	t-Statistic	Prob.	t-Statistic	Prob.	t-Statistic	Prob.	t-Statistic	Prob.	t-Statistic	Prob.	
LRGDP	4.26	1	3.442	1	4.1	1	-6.013	0.000** *	-7.158	0.000** *	1.279	0.9465	
LGCF	3.66	1	1.349	1	3.492	1.000	-8.106	0.000** *	-4.879	0.0016* **	0.149	0.7236	

LHC	3.21	1	-1.464	0.828	10.879	1.000	-2.823	0.0632*	-3.341	0.0730*	-0.991	0.2835
LEXT	0.60	0.988	-2.293	0.429	2.439	0.996	-6.309	0.0000**	-6.511	0.0000**	-5.724	0.0000**
LFAID	-0.85	0.796	-2.412	0.369	1.525	0.967	-7.788	0.0000**	-7.695	0.0000**	-7.350	0.0000**
LEXD	-2.06	0.261	-2.839	0.193	2.265	0.994	-4.863	0.0002**	-4.907	0.0013**	-4.467	0.0000**
INF	-2.47	0.131	-5.253	0.0005**	-1.367	0.157	-9.512	0.0000**	-9.480	0.0000**	-9.630	0.0000**
LLF	0.78	0.993	-2.487	0.333	5.156	1.000	-8.855	0.0000**	-8.947	0.0000**	-1.302	0.1751
LFD	-2.15	0.225	-0.975	0.937	-0.538	0.479	-6.526	0.0000**	-7.392	0.0000**	-6.543	0.0000**
GEXP	3.22	1.000	1.509	1.000	3.995	1.000	-6.316	0.0000**	-4.233	0.0098**	-6.235	0.0000**
POPG	-1.81	0.369	-5.519	0.0003**	-1.507	0.122	-3.762	0.0070**	-3.128	0.115	-3.675	0.0005**
LSWEX P	0.43	0.982	-3.714	0.0313*	1.522	0.967	-8.221	0.0000**	-8.482	0.0000**	-7.949	0.0000**

Source: Own computation, 2022.

The results obtained in Augmented Dickey Fuller tests (ADF tests) show mix results in terms of the order of integration of the variables. In other words there is no variable that is stationary in second difference and such result of the ADF unit root test is one justification for using the ARDL approach (bounds test approach of co-integration).

Table 4 Philips-Perron (PP) Unit Root Test Results

Variable s	At level						At First Difference					
	With Constant		With Constant & Trend		Without Constant & Trend		With Constant		With Constant & Trend		Without Constant & Trend	
	t-Statistic	Prob.	t-Statistic	Prob.	t-Statistic	Prob.	t-Statistic	Prob.	t-Statistic	Prob.	t-Statistic	Prob.
LRGDP	4.94	1	0.12	1.00	3.92	1	-6.02	0.000***	-8.11	0.000**	-4.99	0.000**
LGCF	4.21	1	-0.75	0.96	3.50	1	-8.11	0.000***	-10.77	0.000**	-6.82	0.000**
LHC	2.83	1	-1.47	0.82	9.66	1	-5.37	0.000***	-6.34	0.000**	-1.91	0.054**
LEXT	1.29	1.00	-1.89	0.64	3.13	1.00	-6.39	0.000***	-7.76	0.000**	-5.72	0.000**
LFAID	-0.77	0.82	-2.58	0.29	1.69	0.98	-7.77	0.000***	-7.68	0.000**	-7.32	0.000**
LEXD	-2.11	0.24	-2.01	0.58	1.76	0.98	-4.92	0.0002**	-4.96	0.001**	-4.47	0.000**
INF	-5.22	0.0001**	-5.28	0.0004**	-3.21	0.0019***	-12.49	0.000***	-12.71	0.000**	-12.98	0.000**
LLF	0.88	0.99	-2.49	0.33	7.31	1	-9.01	0.000***	-9.37	0.000**	-6.15	0.000**
LFD	-2.16	0.22	-0.30	0.99	0.62	0.44	-6.56	0.000***	-7.39	0.000**	-6.57	0.000**
GEXP	-0.82	0.80	-2.52	0.32	0.27	0.76	-6.32	0.0000**	-6.26	0.000**	-6.21	0.000**
POPG	-1.81	0.37	-1.75	0.71	0.39	0.54	-2.98	0.0441**	-2.97	0.15	-3.06	0.003**
LSWEX P	-1.73	0.41	-3.75	0.029**	0.32	0.78	-11.94	0.000***	-30.95	0.000**	-10.20	0.000**

Source: Own Computation, 2022.

Philips- Perron (PP) unit root test also shows, unlike that of ADF table result two variables INF and SWEXP are stationary in level and the remaining variables are stationary in their first difference; with constant and/or intercept and trend and also without constant and trend. Thus, both tests revealed that, the model is a mixture of variables that are integrated of order one and zero i.e. I (1) and I (0), none of the variables are found to be integrated of order two. Therefore, ARDL or bound testing approach to co-integration is the preferred and appropriate method of regression in this case.

▪ *Notes: for Both ADF and PP Unit Root Test.*

a: (\*) Significant at the 10%; (\*\*) Significant at the 5% and (\*\*\*) Significant at the 1% b: Lag Length based on AIC; C: Probability based on MacKinnon (1996) one-sided p- values and d: This Result is the Out-Put of Program Has Developed By: Dr. Imadaddin ALMosabbeh ;College of Business and Economics. Where; L= represents logarithm and D= represents the first difference and all the others are variables mentioned before this chapter.

• *Optimal Lag Length Selection Criteria.*

In this study Akaike information criterion (AIC) is used to determine the optimal lag length of each variable automatically because it is a better choice for small sample size data. Moreover, according to Pesaran and Shin (1999), for the annual data a maximum of two lag length is recommended to choose the optimal lag for each variable. Therefore, in this paper a maximum lag length of 2 was chosen for the conditional ARDL model. Finally, in this model, AIC selects the optimal lag length of each variable (LGCF, LHC, LEXT, LFAID, LEXD, INF, LLF, LFD, GEXP, POPG, LSWEYP) respectively and it is ARDL (1, 1, 1, 1, 2, 2, 0, 1, 0, 2, 2, 0). This automatical determination of the lag length is to get the valid result and inferences.

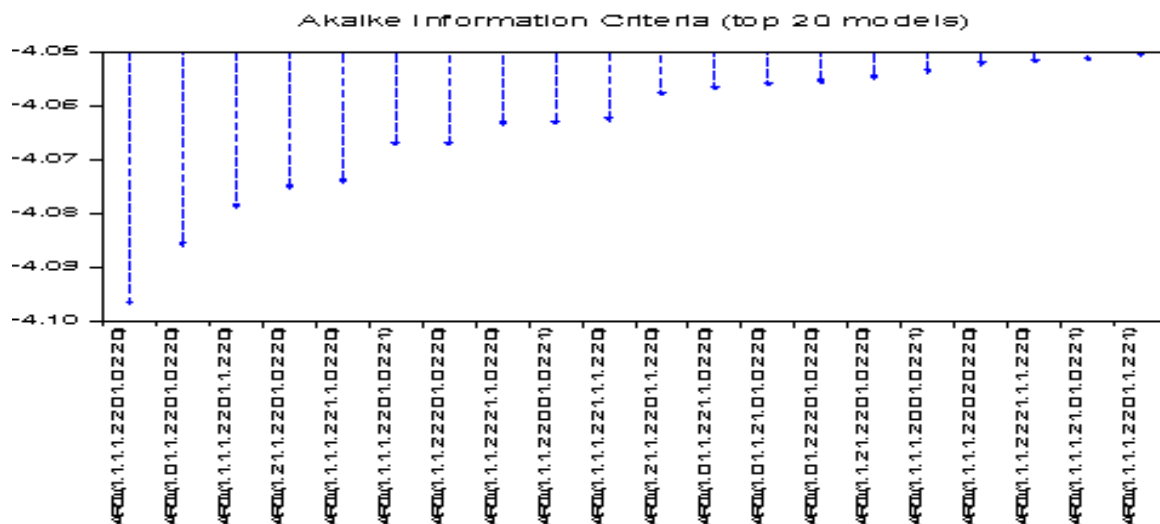


Fig 14 Optimal Lag Length for Each Variable (Top 20 Models).Co-Integration Developed by Pesaran, Shin, and Smith (2001 Source: Own Computation, 2022

• *Tests for Long Run Relationship (Bound Testing Approach to Co-Integration)*

To apply the bound test approach of co-integration, first estimating the ARDL model specified is needed. Then the value of F-statistics is found through the Wald-test (bound test) by restricting the long-run equation coefficients to be equal to zero. That is, the bound test is conducted by imposing restrictions on the estimated long-run coefficients of variables of interest. Then, the computed F-statistic value is compared with the lower bound and upper bound critical values tabulated in tables of Pesaran, Shin, and Smith (2001) and Narayan (2005). Since, the lower bound and upper bound values of Narayan (2005) is appropriate for small sample sizes (30-80 observations), in this study these upper and lower bound critical values are used for scenario of comparison with the F-statistic value.

Table 5 Results of Bound Test for Co-Integration

Test Statistic	Value	K	
F-statistic	9.860365	11	
Critical Value Bounds			
Significance	I(0) Bound	I(1) Bound	
10%	1.83	2.94	
5%	2.06	3.24	
2.5%	2.28	3.5	
1%	2.54	3.86	

Source: Own Computation, 2022

As Table 5 indicates, the calculated F-statistics is 9.860 and this value is higher than the upper bound critical values at 1%, 5% and 10% level of significance F-statistic (see Table 5). The results indicate that there is strong evidence of long-run relationship or co-integration between log of RGDP and the remaining macro variables. Thus, the null hypothesis of no co-integration between RGDP and its fundamentals is rejected.

• *ARDL Long Run Model Estimation*

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

Table 6 Estimated Long Run Coefficients Using ARDL (1, 1, 1, 1, 2, 2, 0, 1, 0, 2, 2, 0)

Dependent Variable(LRGDP)				
Regressors	Coefficient	Std. Error	t-Statistic	Prob.
LGCF	0.206071	0.07296	2.824588	0.0108**
LHC	0.43165	0.06819	6.330014	0.0000***
LEXT	-0.18242	0.06099	-2.99094	0.0075***
LFAID	-0.16219	0.04764	-3.40448	0.003***
LEXD	-0.06886	0.02814	-2.44684	0.0243**
INF	0.00084	0.00067	1.255271	0.2246
LLF	0.493181	0.25521	1.932468	0.0683*
LFD	-0.2561	0.04207	-6.08798	0.0000***
GEXP	0.010105	0.00501	2.018128	0.0579*
POPG	0.242597	0.09265	2.618534	0.0169**
LSWEXP	-0.00184	0.00713	-0.25846	0.7988
C	8.3814	0.6329	13.24296	0.0000***

Source: own computation, 2022

Note: The signs \*\*\*, \*\* and\* indicate the significance of the coefficients at 1%, 5% and 10% level of significance respectively.

As we seen from table (6) above the estimated coefficients of gross capital formation, human capital, external debt, labor force, Government spending and population size growth have the expected signs while export, foreign aid, inflation ,financial sector development proxied by domestic credit as percentage of RGDP and social welfare expenditure as percentage of RGDP have unexpected signs. In addition the estimated coefficients of gross capital formation, human capital, export, foreign aid, external debt, labour force, financial development population growth rate and Government spending are all statistically significance while inflation and social welfare expenditure are statistically insignificance irrespective of their sign changes.

Since the researcher has specified the growth model in a log-linear form, the coefficients of the dependent variable is interpreted as elasticity with respect to real GDP. As the long run estimated result of the above table 6, showed, the estimated coefficients of gross capital formation has an expected positive sign and statistically significant at one percent significant level, the positive coefficients of estimated long run result of gross capital formation 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; (Ndambiri H.K. et al., 2012) and (Patrick Enu et al., 2013) in Africa; (Tadesse, 2011) and (Tewodros, 2015) in Ethiopia. In the long run, holding other things constant, a one percent change in gross capital formation which is proxied by gross investment brought to approximately 0.2061 percent change in real GDP during the study period.

The long run coefficient of human capital formation/expenditures for education and health revealed that, has an expected long run positive impact on the Ethiopian economy growth and statistically significant at one percent significant level. A one percent increase in human capital formation which is proxied by expenditures to education and health in the long run, holding other things constant, has resulted in 0.4317 percent change in real GDP during the study period. It is 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 (Tadesse, 2011; and Tewodros, 2015).

The result of this study revealed that; total exports of goods and service has a significant negative impact on Ethiopian economic growth. This negative coefficient might be associated with more than 68 percent of export level in the country comes from agricultural primary product, which suffered from international price shock. Moreover, the significant impact of this result is in line with the research conducted in Ethiopia by (Gezehegn, 2012; and Tewodros, 2015), they found that, the insignificant

impact of total exports of goods and service on Ethiopian economic growth while there is an inverse relationship between economic growth and export volatility. Furthermore, this implies that the unexpected significant negative sign impact on economic growth in the long run.

Foreign aid is the central variable in this study, as it is shown in the table above; it has negative impact on Ethiopian economic growth and it was statistically significant at one percent significant level. The negative coefficient of the empirical result of foreign aid is also consistency with the study of (Tasew, 2011; Tofik, 2012; Haile, 2015; Kidanemariam, 2015; and Admasu, 2017) in Ethiopia. The long run result shows that, a one percent increase in foreign aid in the long run, which is holding other things constant, has resulted in 0.1622 percent decrease in real GDP during the study period. This negative and insignificant impact is because of most of foreign aid received in the form of loan and grant coming to least developing country such as Ethiopia sent towards consumption. Because, foreign aid only promotes economic growth if it is spent towards investment this will job opportunities and improve quality of life and also Foreign aid enhances the economic growth and become more effective for countries with sound institutional and economic policy initiatives.

The other variable is the debt burden, which is measured by total external debt. It has an expected significant negative relationship with real GDP at one percent significant level. The estimated coefficient of the long-run relationship shows that a one percent increase in the external debt holding other things constant, leads to approximately 0.0689 percent decrease in real GDP in the long-run during the study period. This result indicates that the existence of debt overhang problem in the country during the study periods. The negative impact of external debt on economic growth might be linked 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 borrows from different external financial institutions and governments; this implies that the government with heavy debt burden. In order to pay the debt service the government must be forced to increase taxes and encourage domestic saving system in the future.

Labor force has a significant positive relationship with economic growth suggesting that its contribution to economic output is very high as results of having productive workers. One percent increase in total labor force, ceteris paribus, will lead to about 0.4932 percent increase in Ethiopian economic growth. This implies that labor force has important role in the growth of Ethiopian economy. The finding is in line with the Solow growth model which states that economic growth is a function of labor and capital and other studies like Mahmud (2014), Mamoudou (2011), Patrick Enu et al. (2013), Hossain (2006) and Mehrara and Rezaei (2015).

Financial development proxied by broad Domestic credit as a percentage of RGDP and its one year lagged have negative sign but it is significant in the long run. This implies that the financial development is still not well developed.

The government expenditure is significant in the long run, relation of economic growth with 10 percent positive 0.01011 coefficients, which indicates the positive relationship between Government expenditure and Ethiopian economic growth. However, government Expenditure is significant at 10 percent significance level with coefficient at 0.01011 positive relationships of Ethiopian economy and Government Expenditure in the period of the study. The finding is in line with the Keynesian economists which states that, the government can alleviate unemployment by increasing the total amount of spending in the economy. Additionally, Keynesian theory postulates that expansion of government spending accelerates economic growth. Regarding the link between public expenditure and economic growth, the theory of Keynesian macro economy assumed that high public spending leads to increase aggregate demand and in turn, increase the growth of the economy. On the other hand, the theory of Wagner inclined towards the opposite view. The second theory argues that an increase in the national income cause more public spending (Mwafaq M. Dandan 2011).

As expected from economic theory, a population growth has positive impact and significantly affects RGDP in Ethiopia. The long run responsiveness of real growth domestic product (RGDP) to the change in the total population is 0.24260. This coefficient shows that assuming other things held constant, a percentage change in population size would increase real growth domestic product by on average 0.24260 percent in the long run. The justification for positive impact represent that economy can adjust in the long run and absorb existing people as labor force and that the burden of population can be avoided so that people can play as active actor of economic development of the country. Finally the long run estimated model is presented as follows with figures in the parenthesis indicates the calculated t-value.

$$\text{LRGDP}=8.3814+0.2061*\text{LGCF}+0.4317*\text{LHC}-0.1824*\text{LEXT}-0.1622*\text{LFAID}+0.0689*\text{LEXD} + 0.4932*\text{LLF} -0.2561*\text{LFD} \\ +0.0101*\text{GEXP} + 0.2426*\text{POPG}$$

$$(13.2430) (2.8246) (6.3300) (-2.9909) (-3.4045) (-2.4468) (1.9325) (-6.087981) (2.0181) (2.6185)$$

- *Short Run Error Correction Model (Ecm)*

After the acceptance of long run coefficients of the growth equation the short run Error Correction Model (ECM) is estimated. ECM indicates the speed of adjustment to restore equilibrium in the dynamic model. It is one lagged period residual obtained from the estimated dynamic long run model. The coefficient of error correction term indicates how quickly variables

converge to equilibrium. Moreover it should have a negative sign and statistically significant at standard significant level. (I.e. p-value should less than 0.05).

Table 7 Error Correction Representation using ARDL (1, 1, 1, 1, 2, 2, 0, 1, 0, 2, 2, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGCF)	0.137194	0.022201	6.179664	0.0000***
D(LHC)	0.194983	0.03727	5.231598	0.0000***
D(LEXT)	-0.011131	0.022112	-0.503398	0.6205
D(LFAID)	-0.087621	0.016834	-5.204859	0.0001***
D(LFAID(-1))	0.079827	0.017349	4.601263	0.0002***
D(LEXD)	-0.019104	0.014166	-1.348513	0.1933
D(LEXD(-1))	0.040272	0.01289	3.124294	0.0056***
D(LLF)	-0.177121	0.124174	-1.426392	0.1700
D(GEXP)	-0.014133	0.001315	-10.7479	0.0000***
D(GEXP(-1))	-0.022573	0.002094	-10.77833	0.0000***
D(POPG)	0.681756	0.06411	10.6341	0.0000***
D(POPG(-1))	-0.527335	0.051669	-10.20594	0.0000***
POLICYCHANGE DUMMY(D)	-0.012639	0.010157	-1.244402	0.2285
<b>CointEq(-1)*</b>	<b>-0.934861</b>	<b>0.06717</b>	<b>-13.91786</b>	<b>0.0000***</b>
R-squared	0.977437	Mean dependent var		0.068293
Adjusted R-squared	0.967976	S.D. dependent var		0.117886
S.E. of regression	0.021096	Akaike info criterion		-4.62992
Sum squared resid	0.013796	Schwarz criterion		-4.067847
Log likelihood	118.1732	Hannan-Quinn criter.		-4.420385
Durbin-Watson stat	2.247117			

Source: own computation, 2022

Note: the sign \*\*\* denotes the coefficients are statistically significant at 1% level of significance respectively.

The coefficient of the lagged error-correction coefficient, estimated at -0.9349 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 by (Kidanemariam, 2014; and Tewodros, 2015), the highly significant error correction term further confirms the existence of a stable long-run relationship among the variables. 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 93.49 % percent in the next period to bring back equilibrium when there is a shock to a steady state relationship among the variables.

The coefficient of determination (R-squared) is high explaining that about 97.74% of the variation in the real GDP is attributed or explained by the variations of the variables that are used in the model. In addition the F-statistics is significant that shows the model is good to explain the relationship between the variables in the short run.

Most of the results are similar in both long-run and short-run. Gross Capital formation/gross investment has a significant positive impact on economic growth with expected coefficient sign in the short run at one percent significance level in the short term. This shows that, holding other things remain constant a one percent increase in capital formation will result approximately in 0.1372 percent increases in real GDP in the short run during the study period. This result is consistent with the classical and neo-classical foundations in the theory of economic growth. Other empirical studies like Biswas and Kumar, 2014; and Tewodros, 2015).

Human capital formation/expenditures to health and education/ showed similar result with the long-run, has significant positive impact on Ethiopian economic growth and statistically significant at one percent significance level, in the short term. As a result holding other things constant a one percent increases in human capital expenditure will result in approximately 0.1950 percent increases in real GDP in the short run.

Foreign aid is similar to in the long run model has significant negative impact on Ethiopian economic growth with unexpected coefficient sign and statistically significant at one percent significance level, in the short term, but one year lagged of foreign aid has positive significant impact on Ethiopian economy in the short run. As a result holding other things constant a one percent increase in foreign aid and its one year lagged will result in approximately 8.76 and 7.98 percent decreases and increase in real GDP respectively in the short run.

From the above table we observed that one year lagged of external debt variable in the short-run is found not similar to the long run effect, to have an unexpected positive relationship with real GDP and statistically significant at one percent significance level. As a result holding other things constant a one percent increase in external debt will result in approximately a 4.03 percent increase in the real GDP in the short run. However, the estimated external debt variable has expected negative impact on real GDP, but it is not significant. The short run external debt effect indicates that, in Ethiopia under the study periods is permanent as well as transitory and overhang occurs both in short and long run. This is also consistent with the result of long-run model and also it is consistent with (Wessene, 2014; and Tewodros, 2015) studies for Ethiopia. According to their 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 be the case in this study.

The general government expenditure and its one year lagged have unexpected negative impact on Ethiopian economic growth and statistically significant at one percent significance level, unlike positive significant impact in the long run. We can conclude from this result, both in the long run and in the short run, government expenditure, have negative significant impact on the Ethiopian economic growth under the study period. The above table shows that, population growth is significantly affect Ethiopian economic growth during the Study period, despite their relationship is positive in the long run and short run. But one year lagged of population growth has negative significant impact on economic growth. From this can understand that under the study period, whether in the long run or in the short run, general population rate, does have significant at 1 percent and at positive coefficient of 0.6818 positive impact on the Ethiopian economic growth.

- *The Pair Wise Granger Causality Results*

To identify the direction of causality between the dependent variable Real Gross Domestic Product(LRGDP) and the targeted independent variables Gross Capital Formation(LGCF), Human Capital(LHC), Foreign Aid(LFAID), External Debt(LEXD), Total Export(LEXT), Labour Force(LLF), General Inflation Rate(INF), Financial Sector Development(FD), Government spending(GEX), Social welfare expenditure(LSWEXP), population growth rate(LPOPG) and a Dummy variable for policy changes(D), a granger causality test was undertaken (see Table 8).

The result revealed that, at lag length of one and two, there is significant mix direction (uni-directional and bi-directional) causality between real GDP and dependent variables such as, Gross capital formation, human capital, labour force, financial sector development, Government expenditure and Social welfare expenditure (see Table 8).

Table 8 Pair Wise Granger Causality Test Both for Long and Short Run Co-Integration for the Selected ARDL (1, 1, 1, 1, 2, 2, 0, 1, 0, 2, 2, and 0) Based on Akaike Information Criterion:

Table 8 Pair Wise Granger Causality Test Result

Null Hypothesis:	Lag:1			Lag:2		
	Obs	F-Statistic	Prob.	Obs	F-Statistic	Prob.
LRGDP does not Granger Cause LGCF		9.19286	0.0041***		2.643	0.0836*
LHC does not Granger Cause LRGDP	46	7.1206	0.0107**	45	3.197	0.0515*
LRGDP does not Granger Cause LHC		4.06612	0.05*		1.884	0.1652
LEXT does not Granger Cause LRGDP	46	3.29759	0.0764*	45	3.02	0.0601*
LFAID does not Granger Cause LRGDP	46	3.21294	0.0801*	45	1.686	0.1982
LLF does not Granger Cause LRGDP	46	10.0644	0.0028***	45	12.81	0.00005***
LRGDP does not Granger Cause LLF		0.00104	0.9744		0.93	0.4031
FD does not Granger Cause LRGDP	46	17.08	0.0002***	45	8.966	0.0006***
LRGDP does not Granger Cause FD		0.22623	0.6367		2.121	0.1331
GEXP does not Granger Cause LRGDP	46	19.6663	0.00006***	45	10.5	0.0002***
LRGDP does not Granger Cause GEXP		5.27749	0.0265**		6.565	0.0034***
LRGDP does not Granger Cause LSWEXP		28.1435	0.000004***		12.15	0.00008***

Source: own computation 2022

Note: The signs\*\*\*, \*\* and\*indicate the significance of the coefficients at 1%, 5% and 10% level of significance respectively.

There is a unidirectional causal relationship from Labour force and financial sector development proxied by Domestic credit as percentage of RGDP to RGDP at both lag length one and two and this is consistent with the long-run regression result. The unidirectional relationship between Labour force and financial sector development proxied by Domestic credit as percentage of RGDP implies that Labour force and financial sector development proxied by Domestic credit as percentage of RGDP causes only for RGDP per capital change and RGDP doesn't causes Labour force and financial sector development proxied by Domestic credit as percentage of RGDP to change. This is inconsistent with the finding of study by Apere (2014) for the Nigeria's economy but it is consistent with Korkmaz (2015) for Turkish economy.

On the other hand, the unidirectional relationship between RGDP and gross capital formation at lag one and social welfare expenditure at both lag one and two respectively. This relationship implies that gross capital formation and social welfare expenditure causes only for RGDP change but RGDP per capital cannot cause gross capital formation and social welfare expenditure to change. Therefore, there is a uni-directional causal relationship from gross capital formation and social welfare expenditure to GDP per capital in Ethiopia. But there is a bi-directional causal relationship from Government spending as percentage of RGDP to RGDP at both lag length one and two and this is consistent with the long-run regression result.

This implies that Government Expenditure as percentage of RGDP cause to change RGDP and also RGDP cause Government spending as percentage of RGDP to change Government spending as percentage of RGDP at both lag length one and two. That means both variables cause each other. From the above table we observed that, Pair wise granger causality test, shows mixed result. However, As Chandran et al. (2010), which is quoted in (Tewodros, 2015), the long run effect of the model can be captured by the error term (ECM). Thus, in the long run LGCF, LHC, LEXT, LFAID, LEXD, INF, LLF, LFD, GEXP, POPG, LSWEXP and POLICY CHANGE DUMMY (D) granger cause LR GDP (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 endogeneity problem in the model (Wessene, 2014).

➤ *Post-Estimation Test*

• *Diagnostic Testing and Model Stability*

Model stability and diagnostic checking to detect serial correlation (Brush & Godfray LM test), functional form (Ramsey's RESET), and conflict to normality (Jaque-Bera test) and heteroscedasticity (Breusch-Pagan-Godfrey test) and also CUMSUM recursive residuals and CUMSUM square were performed. Accordingly, the following table presents the diagnostic tests result (see. Table 9)

Table 9 Diagnostic tests for the long run ARDL Model

Test	Null hypothesis	F-Stat DF	F-Statics prob.	Observed R- squared (Chi-sq. prob.)	Decision
Serial correlation	No correlation among	<b>F(2,17)</b>	( 0.1162)	( 0.0065)	(0.1162)
RESET TEST	No miss specification	F (1,18)	(0.9308)	Not applicable	Fail to reject
Normality test	Residual are normality Distributed	-	(0.3787)	Not applicable	Fail to reject
Heteroscedasticity	Residual Homoscedastic	Prob. F (25, 19)	(0.3103)	( 0.3074)	Fail to reject
I: Lagrange multiplier test of residual serial correlation					
II: Ramsey's RESET test using the square of the fitted values					
III: Based on a test of skewness and kurtosis of residuals					
IV: Based on the regression of squared residuals on squared fitted values					

Source: Own Computation, 2022.

Note: The sign\*\* indicates the significance of each diagnostic tests or the acceptance of the null for each test at 5% level of significance.

The results indicate that the F version of the statistics is unable to reject the null hypothesis specified for each test. Hence, there is no serial correlation problem and the Ramsey functional form test confirms that the model is specified well. Likewise the errors are normally distributed and the model doesn't suffer from heteroskedasticity problem.

The null hypothesis of no serial correlation (Brush and Godfray LM test) is failed to reject for the reason that the F-test associated is greater than the standard significant level ( $0.1161 > 0.05$ ). Since the lagged dependent variable appear as a regressor in the model, LM test avoid the use of the traditional Durbin Watson test statistic. ii) For Ramsey's RESET test, which tests whether the model suffers from omitted variable bias or not we failed to reject the null hypothesis of this test which says that the model is correctly specified, because the F-test which is larger than the conventional significance value ( $0.9308 > 0.05$ ). iii) Similarly, we could not reject the null hypothesis for the Jaque-Berra normality test which says that the residuals are normally distributed, for the reason that the F-test associated is larger than the standard significance level ( $0.3787 > 0.05$ ), which show the error term is normally distributed.

The last diagnostic test is heteroscedasticity test and as we can understand from the result, the null hypothesis of no heteroscedasticity is failed to be rejected at 5% significant level due to its p-value associated is greater than the standard significance level ( $0.3103 > 0.05$ ).

The stability of the model for the long run and short run relationships is detected using the scenario CUSUM and CUSUM square test as suggested by Pesaran and Shin (1997). The test statistics of these stability tests can be graphed and hence we can identify not only their significance but also at what point of time a possible instability or structural break is occurred. If the plot of



CUSUM recursive residual and CUSUMSQ recursive residual statistic moves between the critical bounds at 5% significance level, then the estimated coefficients are said to be stable and efficient.

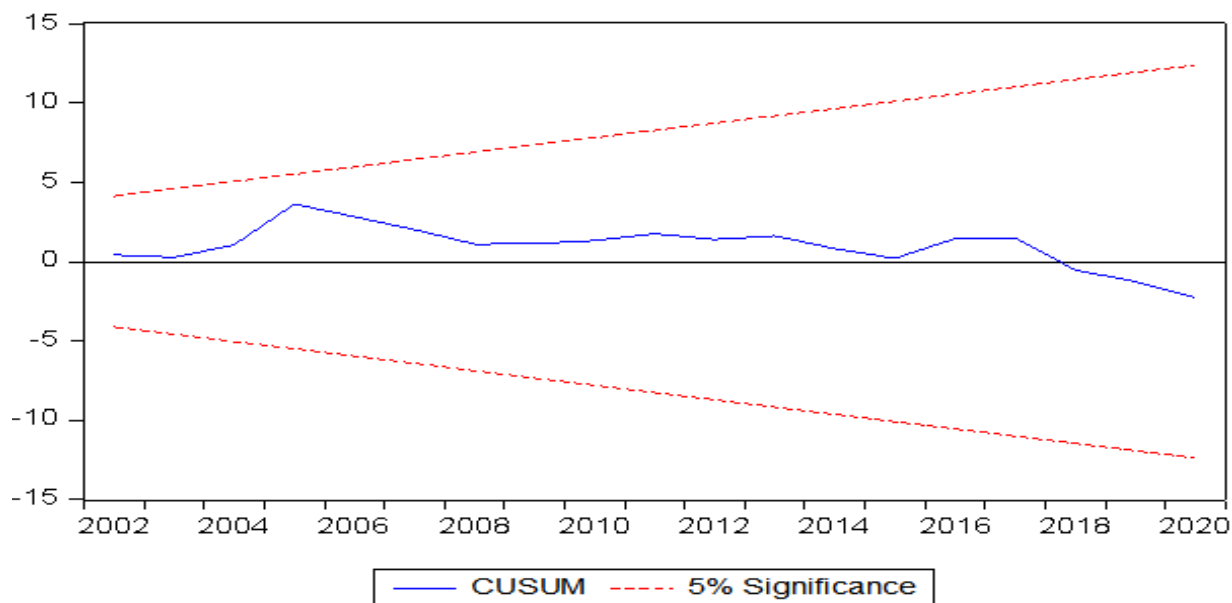


Fig 15 A Plot of Cumulative Sum of Recursive Residuals.

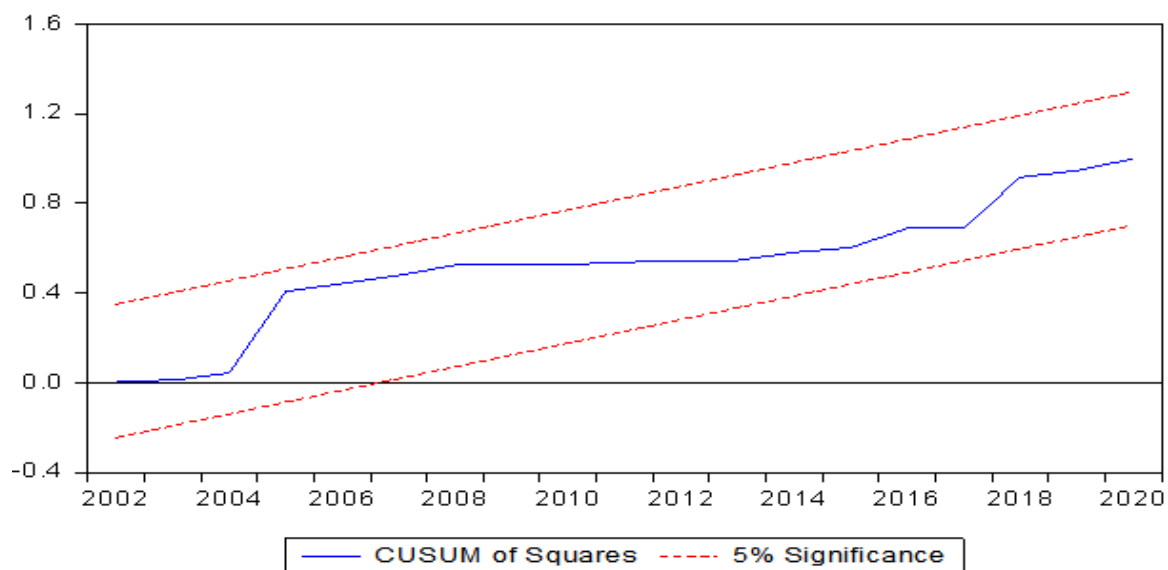


Fig 16 Plot of Cumulative Sum of Squares of Recursive Residuals  
Source: Own Computation, 2022.

Therefore, the plot of CUSUM recursive residual and CUSUMSQ recursive residual shows that there is no structural instability in the model during the period under investigation. From this, the model appears to be stable and efficient in estimating short run and long run relationship between the dependent variable and the included explanatory variables.

## CHAPTER FIVE

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### ➤ *Introduction*

This chapter contains four sections main sections, which basically based on Main body of chapter four. section 5.1 This section contains and presents a brief summary of the main substance of the chapter, section 5.2 proceeds to present concisely, about summary of major findings, section 5.3 presents a conclusions, and finally, section 5.4 tell us about recommendations of the study paper is written on the basis of Chapter-4.

#### ➤ *Summary of the Major Findings.*

The main objective of this study is to investigate the determinants of economic growth in Ethiopia ranging the time from 1974 to 2020. The study has investigated the long run and short run relationships between real GDP and other economic variables such as gross capital formation, human capital, export, foreign aid, external debt, inflation, labor force, financial sector development proxied by domestic credit as percentage of RGDP, government spending as percentage of RGDP, population growth and social welfare expenditure as percentage of RGDP by using Autoregressive Distributed Lag (ARDL) bound test approach to co-integration and error correction. Before applying the ARDL model, all variables were tested for their time series properties (stationary properties) using ADF and PP tests. ADF test result shows three variables (i.e. inflation, population growth and log of social welfare expenditure) are stationary at level and the remaining variables are stationary at their first difference and the PP test indicates that inflation and log of social welfare expenditure are stationary on their level while all the remaining variables are used in the model are stationary at first difference. This confirms the reason why the researcher uses ARDL model.

After checking all the necessary tests and accepting the results; the results of the model have shown that gross capital formation and human capital are statistically significant both in the long run and in the short run. These are the main engines of economic growth. As we have seen from the finding part a one percent increases in gross capital formation will increase real GDP by 0.2061 percent and 0.20 percent in the long run and short run respectively during the study period. Similarly one percent increase in human capital will result the increase of real GDP by 0.4317 and 0.1950 percent in the long-run and short run respectively during the study period, keeping other explanatory variables constant. Therefore, the endogenous growth model is applicable in Ethiopia.

However, the study found out that export of goods and service has statistically significant impact on economic growth with negative sign in the long run but insignificant in the short run with negative sign. 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.

Similarly, the study found out that foreign aid has statistically significant impact on economic growth with negative sign in the long run and short run at percent of one. But in the short run the one year lagged of foreign aid has positive significant impact on economic growth in Ethiopia. A one percent increase in foreign aid will lead to -0.1622 and 0.0876 percent decrease of real GDP both in the long run and short run respectively, but the one year lagged of foreign aid will leads to increase real GDP by 0.0798 percent only in the short run during the study period, *ceteris paribus*. The other variable which has negative influences on real GDP in the long run is financial development proxied by domestic credit as percentage of RGDP.

The external debt also has negative impact in economic growth during the study period in both long run and short run, but the one year lagged of external debt has positive and statistically significant impact on economic growth in Ethiopia. A one percent increase in external debt and its lagged will result at 1 percent decline and increase in real GDP both in the long run and short run respectively. A one percent increase in external debt will lead to decrease in Real output by 0.186 percent while a one percent increase in one year lagged of external debt will tend to increase the real output by 0.043 percent.

Financial development proxy (domestic credit as %GDP) is significantly negative in the long run. A one percent increase in Financial development and its lagged will result at 1 percent decline and increase in real GDP in the long run.

The other study is the significant impact of government Expenditure in Ethiopian economic growth during the study period. Despite its sign is consistent relation in long run and short run, it has significant at percent of 5 and 1 in long-run and short run that have positive impact on Ethiopian economic growth. From this Government Expenditure has positive impact on the Ethiopian economic growth during the study period. However, social welfare expenditure has negative impact in the long run. But its lag value has positive and significant impact on real GDP of Ethiopia.

The empirical results revealed that population growth has significant positive relationship with economic growth both in the short run and long run. More specially, at *ceteris paribus*, one percent increase in Ethiopian population will lead to 0.242597Percent increase on economic growth in the long run. The results of impulse response function supported these results by showing that impact of population on economic growth is permanent.

### ➤ *Conclusions*

The study is investigated on the determinants of the Ethiopian economic growth. The study used autoregressive distributed lag (ARDL) model under bound test on the annual time series data ranging from 1974-2020. In this study, Eview version 10 was employed. The variables were tested for stationary and co-integration analysis was also carried out via the Augmented Dickey Fuller (ADF) and Philips-Perron (PP) method. Also error correction test was performed. The study found that the economic growth and the selected economic determinant variables included have a significant long run relationship with economics output performance. The study also reveals that gross capital formation, Human capital, Export, foreign aid, external debt, labor force, financial development, total government expenditure and population growth are the variables that determined Ethiopian economic growth but, inflation and social welfare expenditure have a negative an insignificant impact on determined Ethiopian economic growth. These variables i.e. gross capital formation, Human capital, labor force, government expenditure and population growth will have positive impact on the real GDP of Ethiopian in the long run. External debt also has expected negative sign. However, Export, foreign aid, and financial development have unexpected negative significant impacts on the real GDP of the Ethiopian economy in the long run. Contrary to our expectation, inflation and social welfare expenditure has negative impacts on the real GDP of the Ethiopian economy in the long run but insignificant. That means that a change in these variables will does not affect the real GDP of the country. Unfortunately, none of the above (i.e., inflation and social welfare expenditure) impacts are statistically significant at 5% level of significance. That is to say, statistically all the variables considered in the model does not impact the real gross domestic product of Ethiopia in the long run. The short run error correction model shows that the gross capital formation, Human capital, one year lagged of foreign aid, one year lagged of external debt and population growth have positive impact, but foreign aid, government expenditure and one year lagged of government expenditure have a negative and significantly effects on Ethiopian economic growth in the short run.

Moreover, this study is found out that economic growth during EPRDF (1992-2020) relatively robust in growth compared to the military regime (1974-1991). During the military period, the average growth rate of real GDP was 1.54 percent (real GDP was -0.9%), while the average population growth was 2.61 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 7.74 percent (real GDP per capita was 3.4%) during 1992 to 2020, while the average population growth was 2.73 percent. Moreover, since 2004, the growth rate in real GDP on average registered 9.74 percent (NBE, 2020/21) and by far more than the average growth rate for Sub-Sahara African Countries.

### ➤ *Policy Recommendation*

Based on the finding of the study, the following policy recommendations are made:

- In order to enhance and sustain the economic development develop the contribution of the gross capital formation, the government of Ethiopia has to set policies to increase domestic saving which is believed as a backbone of growth and 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), develop specialized structural bond of the Government for Further Development of Gross Capital formation.
- In order to enhance the contribution of human capital the government of Ethiopia should allocate adequate finance in order to increase both the quantity and quality of education and to provide basic and improved health services to the society. This will bring the technological transfer, innovation and efficiency since education and health are the two main complementary pillars for development.
- The result shows that the coefficient of export is negative and significant such that one percent increase in export of the economy will leads to -0.18242 percent decrease in Ethiopian economic growth. This suggests that the country export has negative impact on the nation economic performance. The implication of this result is that the Ethiopian external trade which is dominated by export of primary product is price inelastic and has not increase growth in the country due to its greatly influenced by instability in the world market price. 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.
- Foreign aid is having negative impact on Ethiopian economic growth, the federal government should work to relatively regulate implementation of foreign aid depend on further economic Growth issues. But for developing countries like Ethiopia, where capital is scarce it is inevitable to depend on alternative sources to finance its mega projects and to fill its resource and budget gaps. So the government and other concerning bodies should set a clear cut policy that will lead to the proper management of foreign aid received by allocating them to the intended purpose.
- 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 strategies, which is used to avoid misallocation and mismanagement of external debt problem.
- The finding reveals that the positive impact of labor on the Ethiopian economy growth. Therefore, in order to increase the contribution of labor to growth, the government should upgrade the knowledge and skills of labor force so as to increase their

efficiency. Moreover, since Ethiopia is labor abundant and capital scarce country. So in order to grow faster it should have used the abundant resources properly (uses labor intensive technology).

- The financial sector in Ethiopia does not properly play its role. Finance is very important to facilitate either investment or the day to day activities as a whole. So the government should have a proper expansionary monetary policy to increase broad money supply so as to facilitate business activities and enhance the economic growth by developing the financial sector.
- Population has significant positive impact on Ethiopian economic growth. Therefore, the Federal Government of Ethiopia should have to carefully plan population growth strategy coupled with efficient and effective institutional and economic policy changes could be beneficial. Additionally, the government should also put measures to sustain the existing economic growth which has been growing at a higher rate than the population growth. This will ensure that the increasing demand of goods and services arising from the population growth is met. Having a larger, healthier, and better-educated workforce will only bear economic fruit if the extra workers can find jobs. As a result, open economies, flexible labour forces, and modern institutions that can gain the confidence of the population and markets alike may help country gather the potential benefit created by its demographic transition. And the impact of the other dimensions of population such as population density, size, structure and population aging on economic growth requires in-depth investigations.
- In order to enhance the contribution of Government Expenditure, the government of Ethiopia has to make systematical expending of Government finance for adequate social service, economic service and human capital. Thus educated and healthy societies will bring technology and innovation, which is believed as an aspiring board of economic growth. But, regarding the negative impact of government spending, this paper suggests that the concerned body should have to manage and control government expenditure both in allocation and executions.

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**LIST OF APPENDECS**

A. Appendix A: Long run and Short run Regression test.

➤ ARDL Estimation

<b>Dependent Variable: LRGDP</b>				
Method: ARDL				
Date: 08/25/22 Time: 15:21				
Sample (adjusted): 3 47				
Included observations: 45 after adjustments				
Maximum dependent lags: 2 (Automatic selection)				
Model selection method: Akaike info criterion (AIC)				
Dynamic regressors (2 lags, automatic): LGCF LHC LEXT LFAID LEXD INF LLF LFD GEXP POPG LSWEXP				
Fixed regressors: POLICY_CHANGE_DUMMY_D_C				
Number of models evaluated: 354294				
Selected Model: ARDL(1, 1, 1, 1, 2, 2, 0, 1, 0, 2, 2, 0)				
Variable	Coefficients	Std. Error	t-Statistic	Prob.*
LRGDP(-1)	0.065139	0.137432	0.473974	0.6409
LGCF	0.137194	0.045296	3.028831	0.0069
LGCF(-1)	0.055454	0.053278	1.040840	0.3110
LHC	0.194984	0.078644	2.479304	0.0227
LHC(-1)	0.208550	0.075950	2.745864	0.0128
LEXT	-0.011131	0.045377	-0.245306	0.8088
LEXT(-1)	-0.159409	0.046807	-3.405641	0.0030
LFAID	-0.087621	0.031403	-2.790169	0.0117
LFAID(-1)	0.015823	0.037473	0.422253	0.6776
LFAID(-2)	-0.079827	0.030927	-2.581123	0.0183
LEXD	-0.019104	0.023198	-0.823488	0.4204
LEXD(-1)	-0.004997	0.029945	-0.166865	0.8692
LEXD(-2)	-0.040272	0.029775	-1.352545	0.1921
INF	0.000785	0.000630	1.246985	0.2276
LLF	-0.177121	0.216798	-0.816984	0.4241
LLF(-1)	0.638176	0.272184	2.344655	0.0301
LFD	-0.239421	0.058553	-4.088991	0.0006
GEXP	-0.014133	0.003158	-4.475914	0.0003
GEXP(-1)	0.001006	0.004689	0.214607	0.8324
GEXP(-2)	0.022573	0.006003	3.760136	0.0013
POPG	0.681756	0.260570	2.616396	0.0170
POPG(-1)	-0.982296	0.373059	-2.633085	0.0164
POPG(-2)	0.527335	0.207305	2.543757	0.0198
LSWEXP	-0.001724	0.006684	-0.257919	0.7992
POLICY_CHANGE_DUMMY_D_C	-0.012639	0.039827	-0.317342	0.7544
R-squared	0.999633	Mean dependent var		12.49342
Adjusted R-squared	0.999150	S.D. dependent var		0.924361
S.E. of regression	0.026947	Akaike info criterion		-4.096586
Sum squared resid	0.013796	Schwarz criterion		-3.052736
Log likelihood	118.1732	Hannan-Quinn criter.		-3.707449
F-statistic	2070.273	Durbin-Watson stat		2.247117
Prob(F-statistic)	0.000000			

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



➤ ARDL Long Run form and Bounds Test

<b>Dependent Variable: D(LRGDP)</b>				
Selected Model: ARDL(1, 1, 1, 1, 2, 2, 0, 1, 0, 2, 2, 0)				
Case 3: Unrestricted Constant and No Trend				
Date: 08/25/22 Time: 15:27				
Sample: 1974 2020				
Included observations: 45				
<b>Conditional Error Correction Regression</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>T-Statistic</b>	<b>Prob.</b>
C	7.835442	1.265310	6.192509	0.0000
LRGDP(-1)*	-0.934861	0.137432	-6.802334	0.0000
LGCF(-1)	0.192648	0.073480	2.621757	0.0168
LHC(-1)	0.403533	0.083808	4.814973	0.0001
LEXT(-1)	-0.170540	0.061949	-2.752927	0.0127
LFAID(-1)	-0.151625	0.052916	-2.865364	0.0099
LEXD(-1)	-0.064372	0.028617	-2.249403	0.0365
INF**	0.000785	0.000630	1.246985	0.2276
LLF(-1)	0.461056	0.255392	1.805284	0.0869
LFD**	-0.239421	0.058553	-4.088991	0.0006
GEXP(-1)	0.009447	0.005011	1.885086	0.0748
POPG(-1)	0.226795	0.098747	2.296723	0.0332
LSWEXP**	-0.001724	0.006684	-0.257919	0.7992
D(LGCF)	0.137194	0.045296	3.028831	0.0069
D(LHC)	0.194984	0.078644	2.479304	0.0227
D(LEXT)	-0.011131	0.045377	-0.245306	0.8088
D(LFAID)	-0.087621	0.031403	-2.790169	0.0117
D(LFAID(-1))	0.079827	0.030927	2.581123	0.0183
D(LEXD)	-0.019104	0.023198	-0.823488	0.4204
D(LEXD(-1))	0.040272	0.029775	1.352545	0.1921
D(LLF)	-0.177121	0.216798	-0.816984	0.4241
D(GEXP)	-0.014133	0.003158	-4.475914	0.0003
D(GEXP(-1))	-0.022573	0.006003	-3.760136	0.0013
D(POPG)	0.681756	0.260570	2.616396	0.0170
D(POPG(-1))	-0.527335	0.207305	-2.543757	0.0198
POLICY_CHANGE_DUMMY_D_	-0.012639	0.039827	-0.317342	0.7544
* P-value incompatible with t-Bounds distribution.				
** Variable interpreted as Z = Z(-1) + D(Z).				
<b>Levels Equation</b>				
<b>Case 3: Unrestricted Constant and No Trend</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
LGCF	0.206071	0.072956	2.824586	0.0108
LHC	0.431651	0.068191	6.330012	0.0000
LEXT	-0.182423	0.060992	-2.990941	0.0075
LFAID	-0.162190	0.047640	-3.404475	0.0030
LEXD	-0.068857	0.028141	-2.446839	0.0243
INF	0.000840	0.000669	1.255271	0.2246
LLF	0.493181	0.255208	1.932467	0.0683
LFD	-0.256104	0.042067	-6.087977	0.0000
GEXP	0.010105	0.005007	2.018125	0.0579
POPG	0.242597	0.092646	2.618533	0.0169
LSWEXP	-0.001844	0.007134	-0.258463	0.7988
EC = LRGDP - (0.2061*LGCF + 0.4317*LHC -0.1824*LEXT -0.1622*LFAID -0.0689*LEXD + 0.0008*INF + 0.4932*LLF - 0.2561*LFD +0.0101*GEXP + 0.2426*POPG -0.0018*LSWEXP )				
<b>F-Bounds Test</b>		<b>Null Hypothesis: No levels relationship</b>		
<b>Test Statistic</b>	<b>Value</b>	<b>Signif.</b>	<b>I(0)</b>	<b>I(1)</b>
F-statistic	9.860365	10%	Asymptotic: n=1000 1.83	2.94

K	11	5%	2.06	3.24
		2.5%	2.28	3.5
		1%	2.54	3.86
Actual Sample Size	45		Finite Sample: n=45	
		10%	-1	-1
		5%	-1	-1
		1%	-1	-1
<b>t-Bounds Test</b>		<b>Null Hypothesis: No levels relationship</b>		
<b>Test Statistic</b>	<b>Value</b>	<b>Signif.</b>	<b>I(0)</b>	<b>I(1)</b>
t-statistic	-6.802334	10%	-2.57	-4.69
		5%	-2.86	-5.03
		2.5%	-3.13	-5.34
		1%	-3.43	-5.68

B. Appendix B: Diagnostic Test

<b>Breusch-Godfrey Serial Correlation LM Test:</b>				
F-statistic	2.448980	Prob. F(2,17)		0.1162
Obs*R-squared	10.06524	Prob. Chi-Square(2)		0.0065
Test Equation:				
Dependent Variable: RESID				
Method: ARDL				
Date: 08/25/22 Time: 15:49				
Sample: 3 47				
Included observations: 45				
Pre sample missing value lagged residuals set to zero.				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRGDP(-1)	0.079060	0.158733	0.498066	0.6248
LGCF	-0.006752	0.046420	-0.145463	0.8861
LGCF(-1)	0.013546	0.057356	0.236165	0.8161
LHC	0.003459	0.074700	0.046311	0.9636
LHC(-1)	-0.018895	0.074698	-0.252947	0.8033
LEXT	-0.002721	0.042414	-0.064149	0.9496
LEXT(-1)	0.003503	0.045452	0.077059	0.9395
LFAID	0.010925	0.030849	0.354154	0.7276
LFAID(-1)	2.24E-05	0.037421	0.000599	0.9995
LFAID(-2)	0.002537	0.028836	0.087963	0.9309
LEXD	-0.000877	0.025635	-0.034229	0.9731
LEXD(-1)	-0.022275	0.031699	-0.702727	0.4917
LEXD(-2)	0.019440	0.029093	0.668197	0.5130
INF	-0.000280	0.000600	-0.466792	0.6466
LLF	-0.140003	0.211714	-0.661282	0.5173
LLF(-1)	-0.026307	0.257094	-0.102324	0.9197
LFD	0.029709	0.060991	0.487113	0.6324
GEXP	-0.000241	0.002958	-0.081583	0.9359
GEXP(-1)	0.002666	0.004928	0.540920	0.5956
GEXP(-2)	-0.003322	0.006226	-0.533556	0.6006
POPG	-0.042412	0.244722	-0.173306	0.8645
POPG(-1)	0.052056	0.350950	0.148328	0.8838
POPG(-2)	-0.023247	0.194582	-0.119472	0.9063
LSWEXP	0.000657	0.006242	0.105257	0.9174
POLICY_CHANGE_DUMMY_D_	-0.002646	0.037545	-0.070465	0.9446
C	-0.451587	1.418371	-0.318384	0.7541
RESID(-1)	-0.328139	0.328076	-1.000194	0.3312
RESID(-2)	-0.605656	0.307817	-1.967587	0.0657
R-squared	0.223672	Mean dependent var		-2.53E-15
Adjusted R-squared	-1.009320	S.D. dependent var		0.017707

S.E. of regression	0.025100	Akaike info criterion	-4.260877
Sum squared resid	0.010710	Schwarz criterion	-3.136731
Log likelihood	123.8697	Hannan-Quinn criter.	-3.841807
F-statistic	0.181406	Durbin-Watson stat	2.173034
Prob(F-statistic)	0.999954		

**Breusch-Godfrey Serial Correlation LM Test:**

F-statistic	2.448983	Prob. F(2,17)	0.1162
Obs*R-squared	10.06525	Prob. Chi-Square(2)	0.0065

Test Equation:

Dependent Variable: RESID

Method: ARDL

Date: 07/26/22 Time: 17:00

Sample: 1976 2020

Included observations: 45

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRGDP(-1)	0.079060	0.158733	0.498067	0.6248
LGCF	-0.006752	0.046420	-0.145463	0.8861
LGCF(-1)	0.013546	0.057356	0.236164	0.8161
LHC	0.003459	0.074700	0.046312	0.9636
LHC(-1)	-0.018895	0.074698	-0.252948	0.8033
LEXT	-0.002721	0.042414	-0.064149	0.9496
LEXT(-1)	0.003503	0.045452	0.077059	0.9395
LFAID	0.010925	0.030849	0.354154	0.7276
LFAID(-1)	2.25E-05	0.037421	0.000600	0.9995
LFAID(-2)	0.002536	0.028836	0.087962	0.9309
LEXD	-0.000877	0.025635	-0.034230	0.9731
LEXD(-1)	-0.022275	0.031699	-0.702727	0.4917
LEXD(-2)	0.019440	0.029093	0.668197	0.5130
INF	-0.000280	0.000600	-0.466792	0.6466
LLF	-0.140003	0.211714	-0.661282	0.5173
LLF(-1)	-0.026307	0.257093	-0.102324	0.9197
LFD	0.029710	0.060991	0.487114	0.6324
GEXP	-0.000241	0.002958	-0.081583	0.9359
GEXP(-1)	0.002666	0.004928	0.540920	0.5956
GEXP(-2)	-0.003322	0.006226	-0.533557	0.6006
POPG	-0.042412	0.244721	-0.173307	0.8645
POPG(-1)	0.052056	0.350950	0.148328	0.8838
POPG(-2)	-0.023247	0.194582	-0.119472	0.9063
LSWEXP	0.000657	0.006242	0.105256	0.9174
POLICY_CHANGE_DUMMY_D_	-0.002646	0.037545	-0.070465	0.9446
C	-0.451588	1.418370	-0.318385	0.7541
RESID(-1)	-0.328140	0.328076	-1.000196	0.3312
RESID(-2)	-0.605656	0.307817	-1.967588	0.0657
R-squared	0.223672	Mean dependent var	4.46E-15	
Adjusted R-squared	-1.009319	S.D. dependent var	0.017707	
S.E. of regression	0.025100	Akaike info criterion	-4.260878	
Sum squared resid	0.010710	Schwarz criterion	-3.136733	
Log likelihood	123.8698	Hannan-Quinn criter.	-3.841808	
F-statistic	0.181406	Durbin-Watson stat	2.173034	
Prob(F-statistic)	0.999954			

**Heteroskedasticity Test: Breusch-Pagan-Godfrey**

F-statistic	1.252958	Prob. F(25,19)	0.3103
Obs*R-squared	28.01008	Prob. Chi-Square(25)	0.3074
Scaled explained SS	6.743554	Prob. Chi-Square(25)	0.9999

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 08/25/22 Time: 16:08				
Sample: 3 47				
Included observations: 45				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.003327	0.022373	-0.148700	0.8834
LRGDP(-1)	-0.000796	0.002430	-0.327510	0.7469
LGCF	0.000680	0.000801	0.849583	0.4061
LGCF(-1)	0.001059	0.000942	1.124500	0.2748
LHC	-0.000896	0.001391	-0.644599	0.5269
LHC(-1)	0.000165	0.001343	0.123115	0.9033
LEXT	-0.000109	0.000802	-0.135687	0.8935
LEXT(-1)	-0.001062	0.000828	-1.283547	0.2147
LFAID	-0.001371	0.000555	-2.468358	0.0232
LFAID(-1)	0.000724	0.000663	1.092028	0.2885
LFAID(-2)	0.000713	0.000547	1.304382	0.2077
LEXD	0.001152	0.000410	2.808939	0.0112
LEXD(-1)	-0.000424	0.000529	-0.800871	0.4331
LEXD(-2)	0.000392	0.000526	0.745222	0.4653
INF	2.64E-05	1.11E-05	2.375197	0.0282
LLF	0.000200	0.003833	0.052231	0.9589
LLF(-1)	0.003377	0.004813	0.701649	0.4914
LFD	0.001633	0.001035	1.577641	0.1312
GEXP	-7.55E-05	5.58E-05	-1.352733	0.1920
GEXP(-1)	1.64E-05	8.29E-05	0.197859	0.8453
GEXP(-2)	-0.000159	0.000106	-1.497924	0.1506
POPG	-0.010781	0.004607	-2.340054	0.0303
POPG(-1)	0.016058	0.006596	2.434408	0.0249
POPG(-2)	-0.009111	0.003666	-2.485545	0.0224
LSWEXP	0.000132	0.000118	1.117719	0.2776
POLICY_CHANGE_DUMMY_D_	-0.000597	0.000704	-0.848275	0.4068
R-squared	0.622446	Mean dependent var		0.000307
Adjusted R-squared	0.125665	S.D. dependent var		0.000510
S.E. of regression	0.000476	Akaike info criterion		-12.16703
Sum squared resid	4.31E-06	Schwarz criterion		-11.12318
Log likelihood	299.7582	Hannan-Quinn criter.		-11.77789
F-statistic	1.252958	Durbin-Watson stat		3.003272
Prob(F-statistic)	0.310260			

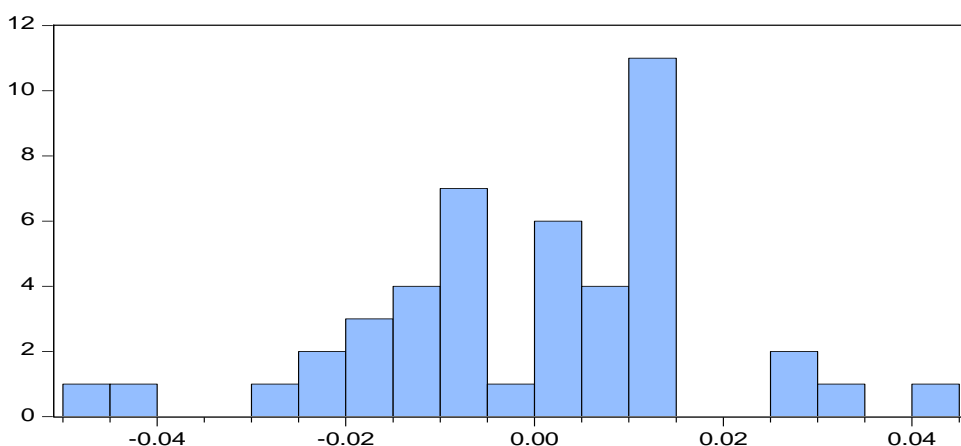


Fig 17 Normality

Series: Residuals	
Sample 3 47	
Observations 45	
Mean	-2.53e-15
Median	0.002791
Maximum	0.040012
Minimum	-0.049720
Std. Dev.	0.017707
Skewness	-0.368867
Kurtosis	3.700986
Jarque-Bera	1.941814
Probability	0.378739