St. Mary's University

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The Impact of Higher Education on Economic Growth in Ethiopia

By

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DECLARATION

I, the undersigned hereby declare that this thesis titled “The Impact of Higher Education on Economic Growth in Ethiopian” is my original work and no part of this work has been presented for a degree in any other university, and that all sources of materials used and borrowed ideas for the thesis have been duly acknowledged in the list of references provided.

Name: Daganchew Adefris Gebrehiwot Signature: _____Date_____

ENDORSEMENT

This Thesis has been submitted to School of Graduate Studies, St. Mary's University, for examination with my approval as a university master's student advisor.

Dr.Maru Shete (Associate prof.) _____ _____

Advisor Signature Date

St. Mary's University, Addis Ababa

APPROVAL OF BOARD OF EXAMINERS

As a member of the Board of Examiners of the Master Thesis open defense examination, we testify that we have read and evaluated the thesis prepared by Dagnachew Adefris Gebrehiwot under the title “The Impact of Higher Education on Economic Growth in Ethiopia” and we recommend that this thesis has been accepted as fulfilling the thesis requirements for the degree of Master of Arts in Development Economics.

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ACRONYMS AND ABBREVIATIONS

ADF Augmented Dickey Fuller Test

ARDL Autoregressive Distributed Lag

EPRDF Ethiopian People Republic Democratic Front

FDRE Federal Democratic Republic of Ethiopia

ECM Error Correction Model

ETB Ethiopian Birr

FCPI Food Consumer Price Index

GDP Gross Domestic Product

GTP Growth and Transformation Plan

LCDs Least Developed Countries

MOE Ministry of Education

MOFEC Ministry of Finance and Economic Cooperation

MOFED Ministry of Finance and Economic Development

NBE National Bank of Ethiopia

OLS Ordinary Least Square

RGDP Real Gross Domestic Product

UNCTAD United Nations Conference on Trade and Development

VAR Vector Autoregressive

VECM Vector Error Correction Model

UNESCO United Nations Educational, Scientific and Cultural Organization

WB World Bank

ABSTRACT

The main objective of this research was to investigate the impact of higher education on economic growth in Ethiopia (1974-2019). Many studies attempt to explore the impact of higher education on economic growth. However, this particular area of the impact of higher education on economic growth remains unclear and there are limitations in investigating on the area particularly in Ethiopia. The study adopted a time series retrospective research design to examine the impact of independent variables (government expenditure to higher education, employments opportunity, student enrollment, stock of human capital, and rate of research and development) to the dependent variable (Real GDP).Data were collected from World Bank, United Nations Conference on Trade and Development and National Bank of Ethiopia. The study employed ARDL and ECM models to evaluate the long run and short run relationship between variables respectively. The study findings indicate that government expenditure, stock of human capital, and higher education enrolment ratio have positively correlated with GDP and have significant contribution to the economic growth of the country in the long run. However in the short run, government expenditure, higher education enrolment, stock of human capital and employment rate have been found showing insignificant contribution to economic growth of the country. Among the variables government expenditure to higher education is found playing most significant contribution to the GDP. However in the short run government expenditure is insignificantly contributing to the economic growth. Other things remain constant; a one percent increase in government's expenditure to higher education leads 1.567 Ethiopian Birr decrease in economic growth. Also in the long run employment opportunity is found insignificantly contributing to the growth of the economy. The gross employment rate is negatively influenced which is statically insignificant at 1 percent significant level Similarly research and development has little or no contribution to economic growth of the country in the short run and long run. Holding other things constant an increase in investment in higher education research and development, there is insignificant role that it plays for the GDP of the country.

Key words: higher education, impact, real GDP, economic growth,

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Higher education, according to Pallavi (2007:76-77), refers to education provided by universities, vocational universities (community colleges, liberal arts, colleges, and technical colleges) and other collegial institutions that award academic degrees. Colleges and universities are the main institutions that provide higher education. According to World Declaration on higher education adopted by the World Conference on higher education in 1998 and as has been reported by World Bank Report (2017:5), higher education is defined as: "all types of studies, training or training for research at the post-secondary level, provided by universities or other educational establishments that are approved as institutions of higher education by the competent state authorities." Higher education is also known as tertiary education in some countries like Ethiopia. Higher education also refers to all post-secondary education, including both public and private universities, colleges, technical training institutes, and vocational schools which offer diploma, undergraduate and postgraduate degree programs. Higher education is instrumental in fostering growth, reducing poverty and boosting shared prosperity. A highly-skilled workforce, with a solid graduate of higher education, is supposed to be a prerequisite for growth and innovation.

Higher education is an engine for economic growth and development of a country. The reality is that educated people are more productive, earn higher wages, and cope with economic shocks better, and innovative. Higher education has long been regarded as a public good in terms of producing enormous positive externalities, benefiting not only individual citizens of a country but also the entire society at large. According to Mulu (2017:591) the social benefits/externalities of higher education cover economic, political, social, cultural and technological aspects such as economic growth through innovation and technological changes. In addition to economic opportunities, higher education is significant institution to increase productivity, gain tax revenues, and bring political stability and social cohesion that are widely acknowledged as core reasons for why countries invest in higher education (World Bank, 2020). This paradigm shift has been influencing governments to expand higher education all most all countries across the globe. The expansion of higher education can enhance the growth of the economy which enhances the wellbeing of the society across a nation.

Graduates of higher education are also more environmentally conscious, have healthier habits, and have a higher level of civic participation that all contribute to economic growth and development (Molla, 2018; World Bank report, 2017). Most importantly, higher education produces graduates equipped with research and innovation that is an engine of economic growth of a country. Also, increased tax revenues from higher earnings, healthier children, and reduced family size all build stronger nations economically. In short, higher education institutions prepare individuals not only by providing them with adequate and relevant job skills, but also by preparing them to be active members of their communities and societies. The economic returns for higher education graduates are the highest in the entire educational system.

Growth and human capital development can be mutually reinforcing. Growth promotes human capital development, and human development promotes growth (Stevens and Weale, 2004). It is through this pursue that both developed and developing countries have been providing pristine attention to the expansion and growth of higher education. Stevens and Weale (2004) remark, that at this technological and global business oriented age of societies, countries seem to realize the role of higher education access in addressing national poverty, ensuring economic growth and prosperity utilizing their human capital. The experiences of many developed countries' massive expansion of higher education are equated with their economic growth and welfare of their society.

The concept of linking higher education access and economic growth has been diffused throughout the world in the 20th and more recently in the 21st century. Responding to the needs of industries during the earlier periods, higher education accessed approximately 200 times beyond the enrollment level in 1900 (Schofer & Meyer, 2005; Mattoon;2006). Empirical studies dealing with the individual benefit of higher education have rapidly flourished. Since then, higher education and economic growth have shown a substantive relationship that has changed over time in terms of characteristics and intensity. Intensively, higher education is more tightly coupled with the economy than it was in the Middle Ages. The vast increment and expansion of higher education in the last two centuries has increased higher education enrolment, expenditure, and stock of human capital, research, innovations and developments that also add value to economic growth of countries. As a result of this huge investments have been invested in the expansion and growth of higher education. Governments give also due attentions to the expansion and growth of higher education almost all countries in both developed and developing countries.

Moreover, in the past two centuries, the attention on education has seemed to shift from primary education to higher education in terms of access and connecting to the economy (Pallavi, 2007; Adepoju and Odunitan, 2018). Because of this, the 20th and the late 21st centuries have been marked as periods of economic growth and higher education development. Economic output grew roughly fivefold worldwide in these eras. Globally, the number of enrollment reaches 100 million in the universities with about $1trillion expenditures annually and an impressive capital growth and human capital formation. Across the world, there are also millions who graduated from higher education institutions and contribute to economic growth of their countries in different professions. Even in developing countries higher education institutions have been seven to ten fold compared to the 19th and early 20th centuries.

In most of these countries including Ethiopia about 30 % of their annual budget is allocated to access to education. From this amount about 70 percent is allotted to expansion and growth of higher education (World Bank, 2020). This is because the importance of higher education in bringing economic growth through direct and indirect impacts has become highly needed in the growing demands for human capital. Access to higher education, indeed, is one of the highest priorities of this century even as an international development agendas including the recent Sustainable Development Goals (SDGs).The idea is that this century is the century of knowledge based economy so that innovation, research and development ,soft science skills and partnerships are prioritized areas to achieve economic growth and development in the realization process of ending extreme poverty, bridging the extreme gap between the poor and the rich and welfare for the people of the world. Countries would achieve this by accessing higher education institutions which are incubators of innovative knowledge, applied and scientific research outputs, and research and development.

According to Philip & Kate (2015:22) it is estimated that Ethiopia's gross enrolment ratio (GER) has increased by 800 percent between 2000 and 2012 with the establishment of the so-called third generation universities. Ethiopia spends much of her annual budget to access higher education and growth and aims to be a middle-income country by 2025 and build a green economy mainly by its produced human capital from higher education. With regard to expansion of higher education, the number of public universities increased from 2 in 1991/92 to 36 in 2014/15 and 51 in 2018/19 at national level (Mulu, 2017).These universities offer different professional trainings under different programs. Similarly, the number of private higher education institutions have increased from 3 in 1996 to about 100 in 2014/15 and about 300 in 2018 (MoE,2016). The participation rate of these institutions has also increased from less than 14% of higher education enrollments in 1999 to about 15.4% for undergraduate in 2014/15 and 21% in 2017 (Mulu,2017).The expansion of higher education has continued to be grown momentum also wishing a number of other universities due to open soon. Since then today, approximately the total enrollment has reached 550 thousand in all 50 public universities only in regular, evening and distance programs. As higher education expansion is a reality for Ethiopia, and investigating the impact of this on economic growth of the country is a timely issue, it is imperative to make an inquiry into this area. Therefore this study attempts to examine the impact of higher education access on economic growth in Ethiopia using time series data that ranges from 1974-2019.

1.2 Statement of the Problem

Ethiopia has recently been aggressively expanding higher education institutions from time to time, both public and private. The number of higher public education institutions funded by Ethiopian government reaches 51 currently and there are also many private higher education institutions that offer diploma, undergraduate and postgraduate degrees with various programs. The impact of this recent rapid access and expansion of higher education on economic growth of the country is one of the rigorous areas to be explored. Also the impact of higher educational spending on economic growth has been one of the critical problems in economics literature (Adepoju and Odunitan, 2018). Many economic growth models and theories such as Romer (1990) and Lucas (1988) have been developed over time related to access to higher education and economic growth. Higher educational expenditure is part of public expenditure and after World War II this public expenditure has been increased in both developed and developing countries (World Bank, 2017). The governments of many developing nations also believe that higher education plays a vital role in promoting economic growth.

Theoretically, even literature provides support for such policies (Matundura, 2017). However, empirical studies that verify this fact on Ethiopian economic growth as a result of higher education expansion have insufficiently been researched. Related to this, studies have been conducted on the impact of stock of human capital, enrolment, research and development, and employment opportunities on economic growth of Ethiopia treating these variables individually as seen in (Befkadu ,2017), (MoE,2016), (Mulu ,2017) and (Woubet,2017) studies respectively. However, cumulative study treating all the variables at a time has not yet presented. The first rationale to examine the impact of higher education access on economic growth in Ethiopia in this study is to contribute to the efforts of this exploration.

The second reason related to the above is the presence of limited inquires in the area. Matundura (2017) has indicated that while some studies have been conducted on the impacts of education on economic growth, no consistent evidence exists for significant impacts of higher education access on economic growth, in a positive or a negative direction. Also results and evidences differ by countries, analytical method employed, and categorization of public and private education expenditures, stock of human capital, and enrolment rates and there is still little or no study in both private and public higher education access and impact on the economic growth in Ethiopian (Befkadu,2017; Molla,2018). There have also been time lags, policy changes, and implementation of policies and strategies in Ethiopia for the last six decades regarding higher education. Although there is a solid theoretical framework of the economic growth and its relationship with higher education (Psacharopoulos, 1982; Keller, 2006; Schofer and Meyer, 2005; Romer, 1990), the empirical evidences of this relationship are scarce (Mattoon, 2006; Adepoju and Odunitan, 2018).

Historically, many economists have also held that economic growth is primarily a matter of amassing more tangible capital. They have treated education as a consumer good. In recent years, however, growing recognition has been given to the fact that education is an investment industry for the development of people as important as the development of things and that growth may be fostered by the development of the human talents and skills (Schofer and Meyer, 2005). Schofer and Meyer argue that the main stream of modern economics has by-passed any systematic analysis of human wealth. The human wealth that has been built through higher education is supposed to be foundational for economic growth of a country. This paradigm shift to higher education as source of engine for economic growth implicates the fact that economic growth and access to higher education should influence and influenced each other so that identifying their nexuses and cross-fertilizations is significantly needed.

The next source of motivation came from the perceived difference that higher education access is growing day by day and gaining lots of importance in in the world in general and in Ethiopia as well. This rapid expansion may be partially explained by the need for a larger trained work force, but the location of the public universities also relates to the need for national unity. However the expansion of higher education in Ethiopia has hindered by ups and downs (Mulu, 2017; World Bank, 2019:2020).In some years there is lack of government expenditure that affects enrolment, graduation and other variables.

The historical educational policies, strategies, curriculum and implementations affect the Ethiopian higher education system (World Bank, 2019:2020). In Ethiopia universities are established within the regions may be to create a measure of autonomy and self-respect, a stake in the national identity as well as being a catalyst for local economic development through the increased demand for goods and services in the local community. However, higher education expansion raises certain issues in Ethiopia. Higher education may be one way of creating a larger middle class, but also raises social and private costs (Philip and Kate, 2015). The expansion of higher education in Ethiopia has been too fast for the government and the private sector to allocate the recurrent expenditure needed to maintain quality absorbing much capital of the country. Philip and Kate (2015) advise government to slow down the rapid expansion of higher education arguing that higher education should equally compete with quality and efficiency to economic growth. Therefore, this study attempts to fill the gaps indicated above in its focus on investigating the impact of higher education on economic growth in Ethiopia using time series data that ranges span of time 1974-2019.

1.3 Research Objectives

1.3.1 General Objective

The general objective of this study is to investigate the impact of higher education access on economic growth in Ethiopia

1.3.2 Specific Objectives

Specifically, the study intends to address the following specific objectives. These are to:

1) find out the relationship between higher education expenditure and economic growth;

2) investigate the role of higher education employment opportunity to economic growth;

3) examine the relationship between enrollment and economic growth.

4) investigate the relationship between stock of human capital and economic growth; and

5) examine the role of research and development to economic growth.

1.3.3 Research Questions

Given the specific objectives, the study addresses the following research questions:

1) How much does higher education expenditure affect economic growth?

2) What is the impact of employment opportunity on economic growth?

3) How does higher education enrolment affect economic growth?

4) To what extent the role of stock of human capital is linked to economic growth?

5) How does research and development influence economic growth?

1.4 Research Hypothesis

This study is intended to investigate the impact of higher education on economic growth in Ethiopia. The study uses Real GDP as dependent variable, government expenditure to higher education, employment opportunities, higher education enrollment, stock of human capital, and research and development as independent variables. Based on these general premises, the following core hypotheses were meant to be tested:

Ho: Higher education expenditure has no effect on increasing economic growth.

Hi: Higher education expenditure has effect on increasing economic growth.

Ho: Higher education employment opportunity has no effect to economic growth.

Hi: Higher education employment opportunity has effect to economic growth.

Ho: Higher Education enrolment has no effects to economic growth.

Hi: Higher education enrolment has effects to economic growth.

Ho: Stock of human capital has no effects to economic growth.

Hi: Stock of human capital has effects to economic growth.

Ho: Higher education research and development has no effects to economic growth.

Hi: Higher education research and has effects to economic growth.

1.5 Significance of the Study

This study is intended to bring considerable contributions. Firstly, it provides useful information to education policy makers, researchers, economists, student researchers, academic scientists and other concerned stakeholders about higher education in general and its impacts on economic growth, its current patterns, past and future trends, the relationships between higher education and economic growth, and the linkage effects etc., in Ethiopia. It also offers information on higher education directions, challenges and opportunities so that what specific both higher education and economic growth policy information targeted to economic growth to be taken into consideration through policy interventions.

Secondly, the study makes a methodological contribution in terms of applying advanced econometric models and other tools on economic growth and higher education related variables. Based on the extent of implementation of its recommendations by decision makers, this study is also expected to ultimately benefit institutions and agencies. Among these, Ethiopian Ministry Science and Higher Education, Ethiopian Higher Education Relevance and Quality Agency, Ethiopian Finance Minister and other stakeholders will be benefited from this study as it provides insightful directions regarding the current higher education investments and future implications towards the sustainable and continuous Ethiopian economic growth through expansion of higher education, quality dimensions and the formation of competitive and innovative human capital in the country.

1.6 Scope and Limitation of the Study

This study examines the impact of higher education on economic growth in Ethiopia drawing time series data from 1974-2019.The study includes both public and private higher learning institutions that offer diploma, undergraduate and postgraduate programs under various professional trainings. Regarding the limitation of the study, the problem of identifying the correct model specification and the adequacy and reliability of data on higher education variables could have impact on the reliability and validity of data. Besides, in Ethiopia, there have been some significant policy changes in both the economic and higher educational access sectors, particularly during the last three decades. These policy changes, as well as international economic trends may have impact on both economic growth and higher education over this period. Hence the present data could not make it possible to take these factors into account as it is beyond the researcher's capacity. Future studies, therefore, may try to account for these factors when investigating the impact of higher education access on economic growth in Ethiopia.

1.7 Organization of the Thesis

This thesis is organized into five chapters. Chapter one, an introductory in nature, deals with the background, articulating the gap the study intends to fill, describing the objectives, research questions, hypothesizes the problem stated, significance, and scope and limitation of the study. Chapter two is devoted to literature review. Under this chapter both theoretical and empirical reviews have been conducted. The theoretical review has been made and presented with related to theories that are relevant to the present study. The empirical review has also been used to refer to what has been made so far related to the problem raised in the present

study and to show the gaps this study aims to fill. In the third chapter, a brief description of research methodology has been presented. Under this chapter, research area descriptions, designs, data sources, data collection tools, sampling issues, variables of the study, methods of data analysis etc., have been presented. The fourth chapter deals with results and discussions of the data collected for this study. The last chapter (chapter five) presents summary, conclusions and recommendations of the study.

CHAPTER TWO: REVIEW OF RELATED LITERATURE

2.1 An Overview of Higher Education

Higher education institutions since their beginning in the fifth century have evolved with radical expansions both in quantities and specializations. Across the world, the number and expansion of higher education has been alarmingly increasing particularly in the last half century. In the 1950, after the Second World War, in Europe and America, huge investments were allotted to the expansion of higher education aimed at elevating basic knowledge and skills developments. Following the expansion and penetration of globalization in the 1980s, more emphasis was given to research and development as the global economy and business penetrates across countries. According to Matundura (2017:21), in America, Europe and Japan investing in human capital has been a core concern of respective countries in these times. In western countries, higher education was then considered as engine of innovation, research and development to compete in the global economic spheres. In the 1980s and 1990s, in countries, such as West and South East Asian, higher education has been used as tool for economic growth and development aspirations through innovation, research and development.

Similarly, in developing countries whose economic activity was mainly relied on traditional primary sector, education had no significant role (World Bank, 2020). However, after the Second World War, they start to realize that education in general and higher education in particular as a tool is used to alleviate poverty and illiteracy and further developmental aspirations (Mattoon, 2006). Many countries including the Sub-Saharan African have started to invest in higher education aimed at increasing economic growth and poverty reduction efforts. However, Mattoon remarks that efforts made to increase quality and quantity of higher education in these countries is still remained low.

In Ethiopia, like other parts of the world, higher education was started in the 1950s when the country's first university (Addis Ababa University) established (MoE, 2016).Within this realm, the Ethiopian higher education has passed several routes with the regimes of Hailesselassie, Derg and the present government. During the Hailesselassie regime the University College of Addis Ababa, the first institution of higher education in the country's history was opened 1951.But instructors were expatriates and the number of students was below 100.The curriculum was the British and later replaced by the Americans.

According to Regassa (2014:12) the American system to Ethiopian education system constituted a third foreign influence on the country's educational system. In 1957 a five-year plan was introduced. According to this new plan, the country's overall educational system was so designed as to focus on the production of skilled manpower and the improvement of the quality of education. However, before the plan showed any tangible effect, the second five-year plan had already started by 1962 (Philip, 2015). In a similar manner, before the outcome of this second-five year plan became visible, the third five-year plan had just begun in 1972 and the 1974 revolution suddenly appeared on the scene.

The 1974 revolution has brought fundamental change in the education system targeted at reducing illiteracy. This year is supposed to be the foundation for the beginning of Ethiopian real modern education (Woubet, 2006). During this Derge region there were two higher education institutions including the Addis Ababa University. Because the government's focus at the time was directed toward eradicating illiteracy and increasing the enrollment rate at the primary school level, the growth registered in higher education was insignificant, and the enrollment in tertiary education had not exceeded the 15,000 mark (MoE, 2016). In addition, the higher education process was interrupted by different programs and higher education expenditure was low. Not long after the outbreak of the revolution, it was proclaimed in 1975 that teachers and students of institutions of higher education were sent out for development activities under the "Development through-Cooperation- Campaign" program, as a result of which the educational process was interrupted for two years throughout the country (MoE, 2016). Higher education expenditure was also interrupted. The one time perhaps higher education showed any improvement during this period was in 1978, when, for the first time in the history of the country's educational system, programs in graduate study were launched. And this had its own reason. Because of political and other reasons that followed in the footsteps of the revolution, the country's intellectuals had left the country in numbers unprecedented until that time (MoE, 2016). Moreover, because expatriate teachers, particularly those affiliated with Addis Ababa University, left the country, the University was deprived of its academic manpower. Moreover, of those who were sent abroad for further education, only very few came back.

During the Derg regime there was no industrialization, private higher education was almost limited (MoE, 2016). Most importantly as Derg focus on socialistic ideology and eradicating illiteracy at primary levels, the higher education expenditure was low, enrolment, stock of human capital, and other variables were limited.

After the fall of Derg and the coming of the Ethiopian People's Revolutionary Democratic Front (EPRDF) in 1991, the number of higher education both public and private have increased dramatically (MoE, 2016). For example since 2000 Ethiopia's higher education sector has grown from two public universities to 51 today with a number of private higher education institutions that offer a number of programs (Woubet,2006). In 1995 the government designed a policy of Agricultural Development Lead Industrialization. In this time there was new educational curriculum based on educational evaluation and training. Not only educational system, but also it has opened new door for private higher education expansion. The present government system compared to the previous ones gives emphasis to expansion of higher education. That is it allocates much budget to education in general and higher education in particular. The government has also planned Growth and Transformation plans. In the first and second Growth and Transformation plans, education in general and higher education in particular is given high consideration (MoE, 2016). Among the objectives set in those plans but failed to achieve are building number of higher education institutions including the private, research and development, increasing higher education enrolments, and number of graduates in various programs.

However, compared to the previous regimes, efforts are undertaken to increase higher education expenditure and expand over all higher education landscape. According to World Bank Report (2017:55) from 2004, the number of students in each public university has doubled to 77,182 in 2009/10 (although the target was 110,000 enrolments), and reached more than 900,000 in 2019.The number of students enrolled in private higher education has also increased since 2000s. It is estimated that Ethiopia's gross enrolment ratio (GER) in both public and private higher education institutions has increased by 800 percent between 2000 and 2019. Also the government of Ethiopia has invested much amount of capital for higher education expansion (MoFED, 2017).With this capacity, Ethiopian higher education institutions have playing significant role in producing the stock of human capital in various professions at different times. The rapid expansion of both public and private higher education may be partially explained by the need for a larger trained work force and to materialize the vision Ethiopia to become middle income country in 2025 (MoE, 2016). Higher education is one way of building human capital, tax collection, boosting innovation and development and creating a larger middle class citizen.

The expansion of higher education in Ethiopia can also be viewed as an important means for changing the socio-economic condition of the people as higher education is seen as a panacea

for bringing cultural transformation in the society. With this perception, Ethiopia has increased the number of higher education than can increase student enrollment rate. The enrolment rate though was lower in the earlier years; it has shown rapid growth in the last three decades. Since 1974, the participation rate has shown an improvement to a certain degree. Now the rate of higher education enrollment has enabled to produce a total of 6,223,961 students at both primary and secondary levels and 52,305 students at higher institutions (Regassa, 2014). The pouring out a number of students to the labor in the form of human capital in the market is also showing encouraging performance. This enrolment growth as a result of high higher education expenditure and expansion has expanded dramatically during the last six years. This is increasing the skills of the labor force, which form an important part of the country's wealth.

There is a rapid expansion in the development of the higher education infrastructure (institutions and facilities), qualified human resource, the enrolment rate (10.2% in 2015/17) and the graduation rate in the higher education of the country for the last 15 years. However, there is huge gender gap in enrolment among male and female and most universities are confronted with insufficient supplies of text and reference books, laboratory and workshops equipment; and access to ICT facilities (Moedu, 2016). To reach a middle-income category in 2015, Ethiopia needs to achieve at least 22% gross enrollment, but the available resources and modalities of financing do not allow reaching 22% gross enrollment by 2025.

To bring the access to Higher Education Institutes of Ethiopia to the level of the lower middle income countries by 2025 and more in 2030, two important reforms have been proposed. These reforms are:

1) To assure 22% GER by 2025, it is recommended to strengthen universities established during GTP I and GTP II; opening new campuses and satellite campus on the existing universities; exploring other non-dormitory delivery mechanisms to expand higher education including opening Ethiopian Open University, expanding continuing and distance education and start providing online education. It is important to develop strong quality assurance and enactment mechanism to deal with quality of education for non-dormitory delivery of education like open, continuing, distance and online education. It is also important to encourage private provision of higher education with appropriate quality control in place. The contribution of the private higher education

in both Malaysia and Vietnam is immense. The private higher education has opened opportunity for those who want to pursue their study at higher education level. The private higher education institutions enrol about 20 % in Vietnam and about similar size in Malaysia. The experience of Malaysia could be good example how the private higher education are promoted, supported and regulated to provide quality higher education for at least 22% of the higher education students.

2) It is important to strengthen the teacher training and capacity building activities to achieve the qualification mix of the academic staff (Bachelor: masters: PhD Degrees) MoE aspired to reach (0:70:30) respectively by 2020. c. Though there is an increment in the female students' enrolment and the share of female academic staffs, there is still significant gender gap. To narrow the gender gap, it is important to further strengthen the affirmative action already in place.

With similar perspectives, research and development role to economic growth contributes little to economic growth is generally found to be at its beginning phase due to different reasons (Mulu, 2017).Small amount of research funding, poor linking institutional research priorities with the priority and lack awareness with undeveloped skills of doing research are some of the reasons. Besides, the low level of industrialization in Ethiopia currently; shortage of capable researchers at universities (PhD holders accounts only for 11.3% of the total academic staff until 2017), and the poor attitude universities had traditionally towards the university-industry link and to its significance are the main challenges for building strong partnerships with industries. Even though the role of research and development is vital for economic growth, in Ethiopian higher education there is weak linkage with economic growth. The role of the private sector in strengthening their partnership in terms research and development, innovation and technology transfer is yet to be developed (Mulu, 2017).The government invests small compared to other higher education investments like expenditure, enrolment, employment opportunity and so forth.

2.2 Theoretical Framework

A number of theoretical studies have been conducted on and between higher education and economic growth. The general theoretical underpinnings indicate that higher education and economic growth reinforce each other and therefore depends upon each other (Psacharopoulos, 1982). As the economy grows, it indicates that productive capacity has increased which comes with it an increase in employment and technological innovations. The

more countries invest in higher education, the more growth and productivity is expected (Lucas, 1988). More investment in the higher education brings an increasing stock of human capital and also creates employment. This increase in employment will result in higher incomes and to the total economic growth and thus a greater expenditure on education with more people getting access to higher education. As more people get enrolment and education, their productive capacity increases and thus contribute to economic growth of a country. This virtuous cycle will continue to repeat itself until the economy develops and as a result contributes to a significant reduction in poverty.

There are a number of theories dealing with the associations between higher education and economic growth. These theories have emphasized the role of human capital for economic growth. Among these theories that highlight the connection between human capital and economic growth, the Harrod-Domar Growth Model/theory, Robert Solow and Trevor Swan's (1957) neo-classical theory of economic growth, and endogenous theory of economic growth of Paul Romer (1986) and Robert Luca (1988) are the most important ones that this study has reviewed.

2.2.1 Harrod-Domar Growth Model

This model was developed by Domar and Roy Harrod. As economists, they individually crafted an economic growth model founded on a fixed-coefficient in the early 1940's. This function works on the premise that capital and labor are utilized in a constant ratio to each other to generate total output. The model can be expressed as follows in equation

$Y = K/v$ ……..…… (2)

Where v is a constant computed by dividing capital (K) by output (Y) and referred to as the capital-output ratio. It is essentially a degree of the yield of investment or capital.

2.2.2 The Neo-Classical View of Economic Growth

This model was first profoundly introduced by Robert Solow and Trevor Swan (1957) though its origin traces back in the 1900s.The model extensively view that the long-run rate of economic growth is exogenously determined by either savings rate (the Harrod-Domar model) or the rate of technical progress (Solow model).Labor, capital and technology are important determinant factors to bring economic growth according to this theory. The neoclassical growth theorists have not given due attention to education which can be endogenously rather than exogenously incorporated to boost innovation and research and

development for economic growth. In this model, the implication for developing countries is that since they have smaller endowments of physical and human capital, they will grow faster than rich countries for the same level of investment in physical and human capital assets. Eventually, poor economies will catch up with rich economies and per capita incomes will converge. In the basic neo-classical model, it is assumed that technological change is exogenous to the economic process (Solow, 1956). The evidence, however, does not appear to indicate that less developed countries are catching up to developed countries. Dissatisfaction with the neo-classical model led to a search for alternative explanations of divergent growth paths. In this theory, it is not clear why innovation would occur if it is a public good. The neo-classical theory is not able to account for the diverging development of nations, and exogenous technical change is questioned.

2.2.3 The Endogenous Growth Models or New Growth Theory

Following with the dissatisfaction of neo-classical economic growth theories, in the mid-1980s, a group of theorists developed a new theory of growth that determines long-run economic growth. They favored a model that replaced the exogenous variable (unexplained technical progress) with a new model in which the key determinants of growth were explicit in the model. These theorists researched in detail and later Paul Romer (1986) and Robert Luca (1988) have documented the facts and details of endogenous model in their essays. Since then, a number of theoretical views on higher education and economic growth have been subject of theoretical discussions and debates. Significantly, endogenous growth model was developed by Romer based on investment in human capital then was propounded by Luca in assuming that investment in education leads to production of human capital which is crucial determinant in the economic growth process. This theory holds that economic growth is primarily the result of endogenous not external forces. It also holds that investment in human capital, innovation, and knowledge are significant contributors to economic growth. Endogenous growth theory focuses on positive externalities and spillover effects of a knowledge based economy which will lead to economic development.

Luca (1988) confirms that long-run growth rate of an economy depends on policy measures. For example, subsidies for research and development or education increase the growth rate in some endogenous growth models by increasing the incentive for innovation. In this model, the level of economic growth (output) is a function of the stock of human capital that is formed mainly through higher education. The theory also postulates that in the long run

sustained economic growth is only possible if human capital can grow without bound. Endogenous growth models based on the analysis of research and development, notably the landmark contribution of Romer (1990), yield the result that the economic growth rate partly depends on the level of human capital. The underlying assumption of the model is that human capital is a key input in the production of new ideas, technologies and innovations that is why countries invest in higher education.

The endogenous growth model also argues that total factor productivity is determined within the model, instead of being driven by exogenous technological progress as evidenced in the rapid South East Asian countries' economic growth. Unlike the neoclassical theories, endogenous growth models have explicitly included education by emphasizing its role in increasing the innovative capacity of the economy through developing new ideas and technologies. Romer (2000) maintained that models of growth driven by Research and Development are determined by the quantity of inputs and not simply the expenditure upon it. Incentives like tax credits to encourage research and development may be ineffective unless they encourage a greater number of scientists and engineers to work towards developing new ideas. In most endogenous growth models based on research and development, the stock of human capital is taken to be exogenously determined. Matundura (2017) has relaxed this assumption, and considered what happens when individuals can choose to make investments in education or training, while firms make investments in research and development. For some parameter values multiple equilibrium are possible, since the incentives of workers to invest in human capital, and those of firms to invest in research and development are interdependent. The role of knowledge and non-rival human capital is also emphasized in this model. In endogenous model, the spillovers remove the existence of a steady state by leading a production function to arise from the investment in physical capital. These investments create new knowledge which can be shared amongst firms who have not made the same physical capital investments.

In addition, with endogenous growth model, knowledge is explicitly linked to research and development activities and long-run economic growth rates depend on the output of this sector. These models also generate growth endogenously, as investment in education increases the stock of knowledge, which helps facilitate further advances in a way similar to the human capital accumulation relationship described in equation. Higher education obviously plays a key role in ensuring there are sufficient workers in the economy with the ability to carry out research and development. The expansion of higher education therefore

can enhance both graduate productions and innovation and technology that is the engine of economic growth of ta country. In the Lucas model, growth in human capital depends on the level of school enrolment, stock of human capital, labor force and school expenditures etc.

Notice that both the neoclassical model and the Lucas model feature growth driven by the accumulation of the factors of production increasing resources dedicated to the production of capital (such as an expansion of higher education) creates extra growth. The key differences non-rival human capital stocks and no steady state mean that there should be no convergence in the Lucas model, so accumulation affects the long-run growth rate and there should be no negative relationship with initial Growth Domestic Product, providing differences in initial capital and technology take-up are controlled for. Much of the research into higher education and economic growth since the 1990s has focused on popular endogenous-growth theories. These theories reveal that improving education in developing nations increases the rate at which populations are able to adopt better technologies and industrial processes for the efficient production of goods and services. Education and economic growth, therefore, clearly raise the standard of living of poorer nations towards one that parallels technologically-advanced societies. The most popular endogenous growth model which is also the simplest has been the linear or AK model expressed as; $Y\ C^{\alpha}\ H^{\beta} = AK$……..... (3) Where Y, K and L represents income, capital and labor respectively.

2.3 Review of Empirical Literature

The interrelation between higher education and economic growth has been discussed since ancient Greece. Adam Smith and the classical economists emphasized the importance of investment in human skills. Early attempts to measure the contribution of education to economic growth were based either on the growth accounting approach or on the rate of return to human capital or stock of human capital. However, it was not until late in the twentieth century that researcher undertook formal and scientific empirical analysis of this relationship. Since then, several studies have investigated the relationship between economic growth and higher education (Psaharoupolous, 1988; De Meulmester et al., 1995; Jorgenson and Fraumeni, 1998). Their starting point was always the root of the economic growth itself. The pioneer growth theorists hypothesized that economic growth depended on the increase of capital and the labor factor in the productive processes. A fundamental reason for economic growth was found to be the increase of productivity in these factors of production.

Researchers on the one hand affirmed that correlations exist across countries between economic growth rates and schooling enrollment rates including enrollment in higher education, stock of human capital another group of researchers such as De Meulmester et.al. (1995), on the other hand, using more sophisticated econometric techniques, found that this relationship is not always a direct one. The academic debates and inquiries among economists, researchers and statistians have gone for the last couple of decades.

Especially in the aftermath of Second World War, several economists, including Milton Friedman, Gary Becker, and Jacob Mincer, developed the "human capital" theory to examine the benefits of education for individuals and society. Friedman and his wife Rose originally suggested that there was no evidence that "higher education yields 'social benefits' over and above the benefits that accrue to the students themselves." (Matundura, 2017:17). On the contrary, they hypothesized that higher education may promote "social unrest and political instability" (Milton Friedman and Rose Friedman, 1980). In this empirical investigation they found out that higher education may also create greater tax revenue, create facilities for innovation and development and employments, increase savings and investment, and lead to a more entrepreneurial and civic society. All these aspects directly or indirectly contribute to the economic growth of a country.

Higher education can also improve a nation's health, contribute to reduced population growth, improve technology as it is supposed to be engine of innovation and human capital, and strengthen governance. With regard to the benefits of higher education for a country's economy, many observers attribute India's leap onto the world economic stage as stemming from its decades long successful efforts to provide high-quality, technically oriented tertiary education to a significant number of its citizens (World Bank, 2017). They also firm that the recent South East Asia's economic boom was connected to high investment in human capital, research and development through accessing and expanding higher education.

Indeed, it is understood that higher education can lead to economic growth through both private and public channels. According to Mulu (2017:7), the private benefits for individuals are well established and include better employment prospects, higher salaries, and a greater ability to save and invest. These benefits may result in better health and improved quality of life, thus setting off a virtuous spiral in which life expectancy. For Matundura (2017), there is a large amount of evidence that human capital which has been produced by higher education institutions has a significant impact on economic growth of a country through various

dimensions. Matundura's and other researchers' empirical studies focus on the impact of higher education on economic growth in terms of higher education expenditure, employment creations, enrolment, stock of human capital formation, research and development and other related attributable factors. Some of these studies which have been conducted globally have been examined as follows:

The empirical studies deal with the correlation and causal linkages between higher education and economic growth. They also imply that sustained growth relies on the potential for human capital to grow without bound. As such, policy on education should be prioritized when considering the determinants of economic growth (Keller, 2006).Keller argues that considerable empirical studies have been conducted in order to support this theoretical premise. The most common empirical approach in the literature to study the impact of higher education on economic growth has been through cross-country growth regressions. These studies relate a measure of the growth rate of productivity to the average level, or growth rate, of education within a country.

The first empirical study reviewed under this section is Keller's (2006) cross-country inclusive study on the relationship between economic growth and higher education. In this study Keller has tested for Granger causality between higher education enrolments and economic growth in six countries (Sweden, United Kingdom, Japan, France, Italy and Australia) 3 for different periods for each country ranging from 1885 to 1987.Finally he found out that bi-directional short run causality running from higher education enrolments to economic growth in Sweden, the United Kingdom, Japan, and France and bi-directional causality between higher education enrolments and economic growth in Australia and Italy. According to Keller (2006) a theoretical framework derived from a standard Cobb-Douglas production function indicates that GDP per unit of labor input should be related to the share of labor of a particular type (graduates or workers at different qualification levels) weighted by the average human capital of the type of worker (captured by the relative wages of different types of labor input. Keller's study shows that the share of employment with tertiary education has been increased from a certain amount. It also indicates that graduate skills accumulation contributed to roughly 20% of GDP growth in the UK from 1982-2005.His econometric analysis indicates that a 1% increase in the share of the workforce with a university degree raises the level of long run productivity by 0.2-0.5% to the UK economic growth.

Similarly, during the period before the Second World War, Jaoul (2004) analyzed causality between higher education human capital formation and economic growth in France and Germany and obtained results which confirm that higher education has an influence on gross domestic product for France while no relationship was found for Germany.

Stevens and Weal (2004) have developed an endogenous growth model of a dual economy where human capital accumulation is the source of economic growth. They argued that the duality between the rich individual exists in the mechanism of human capital accumulation. They also raise the issue of causality, suggesting that reverse causation running from higher economic growth to additional higher education may be at least as important as the causal effect of education on growth in the cross-country association. Stevens and Weal (2004) also examined the long run relationship and causality between government expenditure on higher education and economic growth in the Malaysian. Findings from this study showed that economic growth (GDP) positively co-integrated with fixed capital formation, labor force participation or employment creation and government expenditure on higher education.

With regard to the short-run relation, it is found that there is a short-run bidirectional relationship between economic growth and education expenditures. The study also indicates that education expenditure plays an important role in influencing the economic growth.

Another empirical study reviewed is DiNapoli's *The Economic Impact of Higher Education in New York State* (2011) which explores the economic impact of New York State's universities on wage and salary, employment creation, promotion of research and development, and economic development in the city in the year 2009. DiNapoli, in this study, has found out that all the above macro variables have positive correlation with economic growth of the state. Comparing with other states in the United States of America, DiNapoli has concluded that economic growth of New York state by in the mentioned year has exceed by five percent because of the state's universities perform all the above aspects well.

Pegkas's study (2014) examines the link between higher educational levels and economic growth and estimates the potential impact of the different educational levels on economic growth in Greece over the period 1960 – 2009. During that period a higher educational expansion took place in higher education. The paper applies the Mankiw, Romer, and Weil (1992) model and employs co-integration and error-correction models. The empirical analysis reveals that there is a long-run relationship between educational levels and gross domestic product.

Similar studies dealing with higher education and economic growth linkages and effects have been conducted in Asia. Most of these studies in the past quarter century, focus on higher education and long-run economic growth. The investigations of growth have evolved in both theoretical and empirical realms. The studies revealed out those differences in growth rates have a huge impact on the economic wellbeing of the nation. For example, Schofer and Meyer's study (2005) showed that because of the expansion of higher education annual economic growth between 1960 and 2000 in GDP per capita in East Asia was 4.5 per cent, while it was less than 2 per cent in Latin America. As a result, the average East Asian was seven times better off at the end of this period, while the average Latin American was less than twice better off. This is because East Asia countries have better expanded and access higher education than Latin American countries. The underlying view is clearly that accessing higher education and improving the skills of the country will improve the economic position of both individuals and the nation. Higher education is seen as the source of research and development which is factor for innovation that will drive productivity in most East Asian countries.

Human capital flows most commonly proxied by university enrolment rates have been widely used in empirical studies of the relationship between human capital and growth. This is largely due to the availability of long time series of data for a large cross-section of countries rather than because it is viewed as preferable to the stock measures. As improved stock measures continue to be developed, it is likely that this approach will gradually be phased out in preference for stock measures. Among the first studies to adopt enrolment rates as a proxy for human capital is the contribution of Barro (1991). This study analyses the relationship between growth and human capital for 98 countries from 1960 to 1985, using 1960 university enrolment rates as a determinant factor. In his findings Barro shows that enrolment rates are positively correlated with economic growth in real per capita GDP. The relationship between stock of human capital, employment opportunity and economic growth has provided consistent dataset on education stocks based on school enrolment for further studies.

Chaudhary's *The Nexus between Higher Education and Economic Growth: An Empirical Investigation for Pakistan* (2009) is another empirical study reviewed in-depth. In this study, Chaudhary investigated the role of higher education on economic growth for Pakistan between 1972 and 2005 using the application of Johansen Co-integration and Toda & Yamamoto (1995) Causality approach in Vector Autoregressive (VAR) framework. The Study examined whether higher education affect long run economic growth in Pakistan. The empirical analysis reveals that there is a long run relationship between economic growth and higher education. Finally Chaudhary found out that there positive correlation between higher education and economic growth.

Lee's *Higher Education Expansion and Economic Growth in Japan and South Korea* (2012) reveal that there is positive correlation between higher education expansion and economic growth both in South Korea and Japan. Lee's study shows that the economy of both countries grow fast as a result of expansion of higher education with quality human capital productions. Lee also says that Japanese science major group had a positive effect on the increase of their GDP value added by industry and service et al., but the South Korean science major group showed the least effect on their economic growth among four major groups. In South Korea, the social science major group contributed to the economic growth through affecting on the increase of their industrial and service GDP.

In Sub-Saharan African countries such as Ghana, Uganda, and South Africa, certain common trends have been observed that are considered universal. Higher education increases the standard of living overall, but the most significant impact on economies is only clear where large changes occur both at the higher and primary education levels. Higher education is often cited as an important determinant of economic growth and, as a result, it plays a significant role in achieving national development and contributes to a country's economic growth (Matundura, 2017). Higher education has been considered as instrumental tool for it is engine of economic growth in the age of today's knowledge economy. This is because higher education produces every talents and innovations through human capital which also builds health and other sectors which are significant to the economic growth.

Contrary to the above facts, in some African countries there are studies which proof there is inverse correlation between higher education expansion and economic growth. For example Hanushek's (2016) extensive empirical study which begins by asking "Does higher education expansion bring economic growth?" testifies this. In his study, Hanushek found out that higher education expansions do not support economic growth. There are differences in cognitive skills, knowledge and human capital of countries can explain most of the differences in growth rates across countries, but he says that just adding more years of schooling without increasing cognitive skills historically has had little systematic influence on economic growth.

Another empirical research work reviewed is Gyimahbrempong, Paddison, and Mitiku' (2005).This research work uses panel data over the 1960–2000 period, a modified neoclassical growth equation, and a dynamic panel estimator to investigate the effect of higher education stock of human capital on economic growth in African countries.

They found out that all levels of education human capital, including higher education human capital, have positive and statistically significant effect on the growth rate of per capita income in African counties. The research work has also disproved those of earlier research findings that presented no significant relationship between higher education stock of human capital and economic growth.

Gerickson's (2017) article which presents an evaluation of the effects of various levels of education on economic growth in Kenya is another in-depth reviewed empirical study.

Explicitly, the article investigates the effect of higher education enrollment on real Growth Domestic Product of Kenya (1972-2010). Adopting a correlational research design, Gerickson has found out that enrolments in higher education were found to have a negative and significant effect on real GDP per capita.

Likewise, Hong-Sang and Adepoju and Odunitan's (2018) study assesses the impact of education expenditure on human capital, labor skills and economic growth in Tanzania and Zambia using the multi-sectorial Computable General Equilibrium model. The simulation results suggested that education can raise economic growth of those countries. They also investigated the relationship between economic growth, education expenditure, employment and stock of human capital formation over the period 1962-2002 using Vector Error Correction Model. The study revealed out that there are both positive long run and short-run relationship between education expenditures, employment and human capital formation and economic growth in Uganda and Tanzania but negative correlation in Zambia.

With the exception of a few, much of the studies conducted in the 1980s and 1990s show that there is positive relationship between higher education expansion and economic growth. These studies consider economic growth as per growth rate as dependent variable and stock of human capital, school expenditure, quality, employment opportunities, wage and salary's' contribution to economic growth, development and innovation, student enrolment etc., as independent variables. Majority of these empirical studies reviewed that economic growth has been influenced and influenced by these variables. One exception here is Wolff (2001), who, amongst a wide range of estimations, finds relationship between university enrolment rates and economic growth between 1950 and 1990, and between the change in enrolment rates and economic growth between 1960 and 1990. However, Wolff also argues that any effect on enrolment rates are probably biased upwards due to reverse causality of rising incomes encourage more people to go to university.

Moreover, he found that there is little effect of the higher education attainment of the current workforce (rather than the enrolment rate of the future workforce) on economic growth. Similarly in Ethiopia a few studies have been conducted on the impact of higher education on economic growth. For example Mulu (2017) has examined the role and linkage of research and development to Ethiopian economic growth. In this study he found out that there is poor university-industry linkage. Ethiopian higher educations have poor contribution to economic growth and development with research and development efforts.

Befekadu (2018) also investigate the impact of human capital on economic growth in Ethiopia. And he found out that human capital as product of higher education has positive contribution to economic growth. Similarly, Ministry of Education in collaboration with World Bank conducted a study on enrolment ratio and economic growth of Ethiopia. In this vast study, they have concluded that enrolment plays important role to economic growth of Ethiopia.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Description of the Study Area

This study has been carried out using time series data collected from World Bank, United Nations Conference on Trade and Development, and National Bank of Ethiopia. In addition information was collected from Ministry of Science and Higher Education, Higher Education Quality and Relevance Agency, and Ethiopian Ministry of Finance and Development and used for data analysis and interpretation. The study is conducted on the impact of higher education access on economic growth in Ethiopia in the span of time starting from 1974 to 2019.The data for this study were collected from both public and private higher education institutions offering diploma, undergraduate and postgraduate degree programs.

3.2 Research Design and Approach

This research is designed with time series retrospective study for it investigates the impact of higher education access on economic growth in Ethiopia from the period 1974-2019.The study is also approached through quantitatively as it took secondary statistical data. The data were analyzed in align with the theory and the model selected for the current study and was tested in order to avoid errors. Sampling for this quantitative data set a stationary problem was proven. In order to make easy for stationary of variables and to reduce growing seasonal variables as well as hetroschedastcity problem in time series data, models were tested before used for analysis.

3.3 Types and Sources of Data

The major sources of data for this research were time series recorded from 1974-2019 on government expenditure to higher education, employment opportunity, and enrollment of students, stock of human capital, and research and development of Ethiopian higher learning institutions, both public and private. Ethiopia has devoted itself to entice the expansion of higher education, both public and private. In addition to this the data used for this study was collected from real GDP of the country from 1974 to 2019.

3.4 Methods of Data Collection

The quantitative data largely depends on information to be obtained through secondary sources that are recorded on certain phenomenon and was utilized to quantify that variable or data. This quantitative data was generated through conducting time series data and gathering information from World Bank, United Nations Conference on Trade and Development, and National Bank of Ethiopia.

3.4.1 Quantitative Data Collection

In this study ARDL (Autoregressive Distributed Lag) and ECM (Error Correction Model) models are employed to evaluate the long run and short run relationship between variables respectively. Quantitative data were collected from the above mentioned sources on account of government expenditure to higher education, employment opportunities, higher education students' enrollment , stock of human capital and research and development contributions to economic growth in Ethiopia from 1974 up to 2019.The impact of higher education access on economic growth, government expenditure to higher education, employment opportunities, enrollments ,stock of human capital and research and development as objectives of this study were the focus areas to be analyzed and interpreted. The data were collected to examine the impact of higher education access on economic growth of Ethiopia. Moreover, this time series data was used to investigate the impact of higher education access on economic growth in Ethiopia during the time period covered in this study.

3.5 Methods of Data Analysis

In this study, the package of Eviews version 9 encompassing statistical tools was employed. This software package has been found to examine long run and short run relation between the study variables better than other software packages. Various quantitative data analysis statistical tools can be employed for the different data set in different researches based on the objectives set. For this study, which is pure quantitative in nature, the data analysis technique was determined by the nature of this study. In doing so, the quantitative data analysis tools incorporate determine the state of the specific objectives. In addition the data analysis techniques incorporate both descriptive statistics and econometric models. Descriptive methods were employed to reveal the impacts of higher education access on economic growth in Ethiopia using time series data for the years that ranges from 1974 to 2019.

The descriptive analysis technique was used to incorporate descriptive and inferential statistics to describe the impacts between higher education accesses on economic growth along with the independent variables of this study. The Specific data analysis techniques are presented as follows:

3.5.1 Specific Data Analysis Techniques

A) Finding out the relationship between government higher education expenditure and economic growth

Theoretical modeling of higher education and its impact on economic growth

The impact of higher education expenditure on economic growth can be discussed by considering the classical theory of production function. The model is adopted from Pegkas, 2014).Let us see the following production function where output is a function of labor and capital

O=F (L, K), where L is the amount of labor and K is the amount of capital to produce 'O' level of output in the economy. For the impact of higher education on economic growth, let us include the expenditure on higher education as indispensible variable in the production function.

GDP=F (EXE), where GDP represents the total economic growth and EXE represents the education expenditure on higher education.

Now, we can estimate the Eq. 2 to observe the impact of expenditure on higher education on economic growth in the following econometric model:

GDPt=α1+β2 EXEt+Ɛt where, GDPt=Growth Domestic Product in time, EXEt=public expenditure on higher education, Ɛt, error term.

B) Examining the role of higher education in employment opportunities

The analysis of this specification is derived from Barro (1991) and presented as follows:

(1) $Y=AK\alpha H1-\alpha$ where Y is output or GDP per growth, A is total factor productivity generated through employment opportunity to the economic growth or the GDP, K is the stock of physical capital, and H is the stock of human capital. H can also be disaggregated into the average level of human capital per worker (h) and the amount of labor input (L), so that we can express equation (1) as:

(2) $Y=AK\alpha (hl)^{1-\alpha}$

C) Investigating relationship between enrollment ratio and economic growth. The analysis is based on the following specification: GHERt =Et /Pt *100 where GHER =Gross Enrolment Ratio in school year t for each educational level, t E = Enrolment for each level of education in university year t, Pt = Population in age-group which officially corresponds to each level of education in school year t. Detailed model specifications of the analytical tools and the econometric models are explained as follows.

D) Examining the role of stock of human capital to economic growth

The mode specification is adopted from Chaudhary (2009) and can be analyzed in the following way:

Log(PIB/LOC)= αlog H+ βlog X+ θi + γt + ε ,where: GDP/capita is the real level of GDP per capita and is a direct function of human capital (H) and other factors (X) and a stochastic element ε, and α, β are parameters to be estimated γt şi θi are dummy variables capturing the time and country fixed effects

E) Investigating the role of research and development to economic growth

The model specification is adapted from Khan (2014) and analyzed in the following way:

Y=f (K, L,He, RD) …(1) where Edu=education He=Health and RD =Research and Development

The model can be written in empirical form as follows:

$\ln Y=a_o+a_1 \ln K +a_2 \ln L+a_3 \ln Health+a_4 \ln RD+Ui$ ……(2)

$\ln RD=Yo+Y_1 \ln RGDPPC+Y_2 \ln ENR+Y_3 \ln Edins+Y_4 \ln PTR+Ui$…(3) where, RGDPPC=Real GDP,ENR=educational enrolment, dins=no of educational institution and PTR=pupil-teacher ratio.

CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.1 Introduction

In this chapter descriptive statics and econometrics analysis have been made. Under the descriptive statistics, the trends and overall presentations of Ethiopian higher educational predicted variable concentration are presented. The analytical tools, such as tables and graphs are used to describe the variables used in the model. Under the econometrics analysis, necessary tests for this study as stationary tests, diagnostic tests and bound test have been conducted. Then the necessary tests of both the long run and short run models are estimated using ARDL and Error Correction respectively. After the estimation has been made the interpretations and discussions are presented based on the model results.

4.2 Description of the Ethiopian Economic Growth Experience

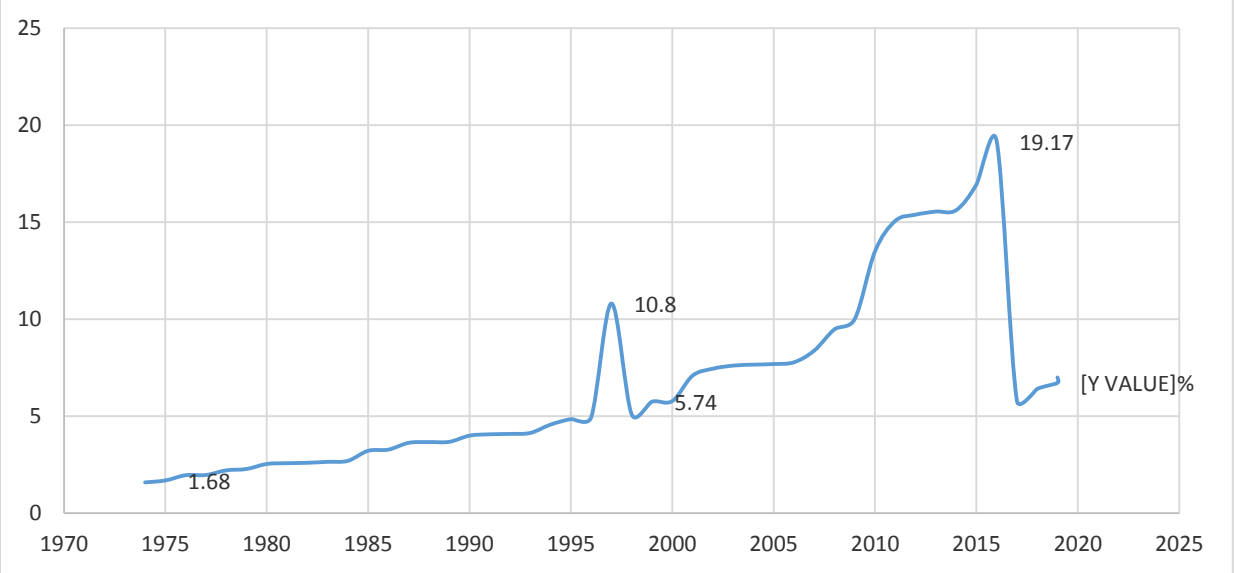

Figure 4.1: Trends in Growth of RGDP in Ethiopia (1974-2019)
Source: Computed based on CBE /World Data, 2020

As seen from the above figure one, at the beginning year (1974) the real GDP was very low. During this period 1974-1978 the GDP growth rate was 1.68.This is because, in these times, the country was under civil war and there was instability in most parts of the country (World Bank, 2020). Then after the GDP growth became positive starting from 1975 to 1977 showing relatively lower rates of growth indeed.

In the 1977, the country also experienced a negative economic growth. The major cause for this is that there was catastrophic drought that impoverishes many people and it also puts its

hand on the history of Ethiopian economy. 1991-97 growth rate rose to 10.02% .This period, relatively from the earlier periods, was characterized by stable and there were good weather conditions (Woubete, 2006). That makes the growth rate to be risen. Similarly, the Real GDP growth rate was plummeted to lower rate in 1983 and 1884 respectively. These were also periods of severe drought and poverty in most parts of the country. That has brought changes not only poverty but also price instabilities and macroeconomic imbalances. This growth rate of Real GDP again has become picked up to 9.9% and 14.4% in 1985 and 1986.This is because there was good rains season, according to (World Bank, 2017). There was also a decline trend in1988/89-1990. This was because of intensive internal war that takes place in Ethiopia in order to overthrow the government and to retain power by the ruling government.

The economy starts to show relatively higher and positive starting from 1995 onwards. Ethiopia began to see accelerated economic progress in 2000s and it shifted to an even higher gear in 2003/04.The Real GDP growth was averaged 15% per annum during the year 2010. This happens because of the EPRDF (the existing government) has adopted the typical structural adjustment policies of market liberalization, which issued a new economic policy in November 2015.According to (Alemayehu,2012:12;Befekadu, 2018:7) this open market oriented economic policy and other development initiative programs have brought about 19% economic growth rate in the history of the country.

However even the existing government has experienced up and down trends of real GDP growth because the majority of the Ethiopian economy depends on subsistence agriculture. Most importantly the agricultural activities of the country depend on rain fall and climate variations and other socio-environmental dimensions. For example, the decline in real GDP in Ethiopia in 2018/19 (i.e. 6.71%) contrary to double digit growth from the previous year is due to inflations and broad money supply (World Bank, 2020).The variation on the Real GDP of the country has its own impacts on the allocation of budget for the expansion of higher education as the focus of this study. Most importantly the variation in economic growth rate is that the country is depending on traditional agriculture. In addition political instability and in lack of appropriate policy are other factors contribute to low economic growth in the country.

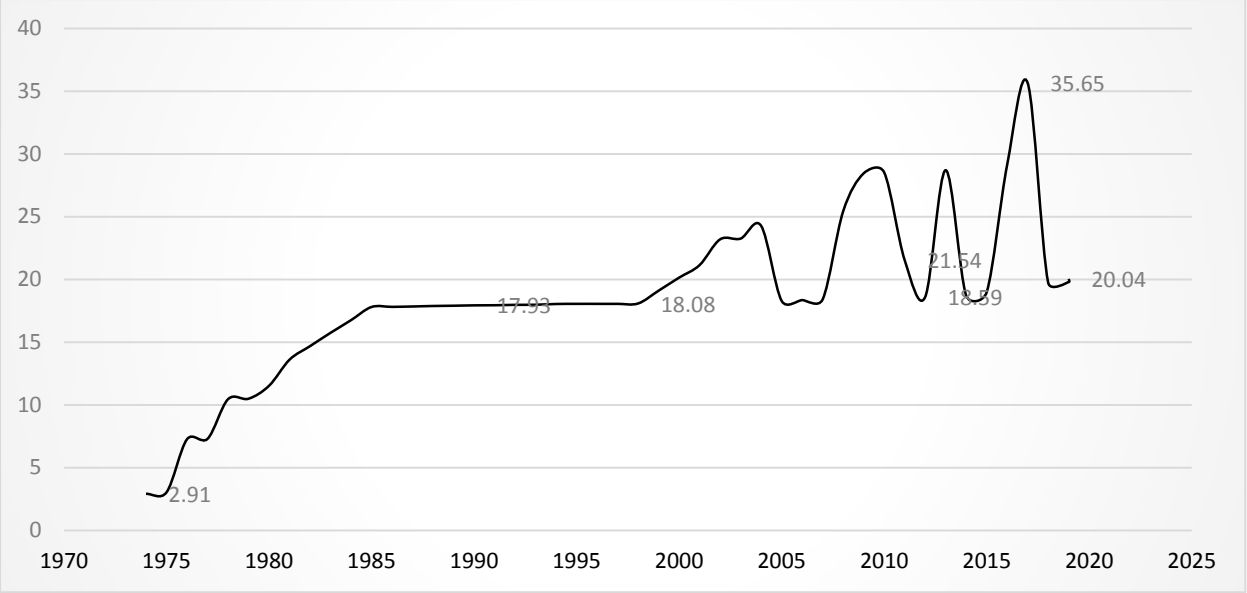

Figure 4.2: Gross Elasticity of Government Expenditure to Higher Education (1974-2019)
Source: Computed based on WB and UNCTAD data, 2020

Ethiopian government has invested a lot to the expansion of higher education. Government expenditure in higher educational institutions as % of GDP (%) in Ethiopia was reported at 18.59 % in 2013, according to the World Bank collection of development indicators. This report is a compiled report from officially recognized sources such as National Bank of Ethiopia, Ethiopian Ministry of Education and Ministry of Finance and Development. Ethiopian government expenditure in higher learning institutions as % of GDP, actual values, historical data, forecasts and projections were sourced from the World Bank on June of 2020 as the above graph demonstrates.

The general government expenditure to higher education institutions (current and capital) is expressed as a percentage of GDP. It excludes transfers to private entities such as subsidies to households and students, but includes expenditure funded by transfers from international sources to government. Then divide total expenditure in public institutions by the GDP, and multiply by 100. [1]

As seen in the above figure, the general government expenditure to higher education has declined in the year 2018.This is because the outcome of a decade of tighter fiscal policy and new reforms were undertaken in budget allocation to education in general and higher

[1] For more information, consult the UNESCO Institute of Statistics website: http://www.uis.unesco.org/Education/

education in particular by the existing government. Total spending has declined from 24.7 percent of GDP in 15/16/19 to 20.8 percent in 2017/18 and leveled around 21.25 percent in 2012/13 and 2013/14. In nominal terms, total general government expenditure has increased more than nine-fold between 2003/04 and 2013/14. In real terms, there has been an increase of less than two-fold during the same period. A relative increase in spending in higher education has been observed in recent years due to rising spending on pro-poor sectors following the economic reforms by the government. Moreover, public investment has been increasing as a share of total spending. This demonstrates that the government is commitment to expand higher education that produces human capital for the overall growth and development of the country.

Indeed there are significant disparities in higher educational institutions expenditure in absolute and per capita terms at subnational level. At subnational level, the huge variations in regional allocations to university and colleges are because regions allocate the block grant independently. The disparities are reflected in both proportion of regional budget to higher Educations sector and per capita higher education spending. Capital expenditure has larger variation than recurrent expenditure per capita. Spending on higher educations at private level ranges between ETB7 and ETB108; and between ETB42 and ETB153 for recurrent budget (MoE, 2016).

Ethiopia's government also considers education as a fiscal priority, but struggles to keep up with the expansion of the system and the surging number of students. Spending per tertiary student as percentage of GDP per capita, for instance, has been dropped by more than 18 percent between 1997 and 2012.This shows there is variation in expenditure of higher education due to economic, political and policy changes.

Nominal education spending has increased strongly in recent years with public higher education expenditures tripling from 21.6 billion Ethiopian Birr in 2009/10 (USD$780 million at current conversion rates) to 67.9 billion Birr (USD$2.45 billion) in 2015/16. However, when adjusted for Ethiopia's high inflation rate, which is averaged 16 percent between 2006 and 2018; real value gains were only modest and spending remains relatively low by African standards. Higher education expenditure as a share of GDP has fluctuated over the past 15 years. It has increased from 4 percent in 2000 to a peak of 5.6 percent in 2012, before dropping back down to 4.2 percent in 2014, (Molla,2018).The variation is influenced by political, economic and global changes.

According to World Bank (2020) figures, Ethiopian government has spent about 24.2 percent of its overall expenditures on education in 2015/16, making education the largest item in the federal budget. A high percentage of education spending of 48 percent in 2014/15 is devoted to higher education, which is largely consumed by the construction of new universities and related facilities. Beyond that, a sizable share of expenditures goes to recurring expenses like teacher salaries, limiting the availability of funds for structural improvements in critical areas like the school system. That is when measured as a percentage of GDP per capita. Corruption represents another challenge while less widespread than in other countries in the region, there's a risk of "leakage" in the downstream distribution of funds in some parts of the system, according to the World Bank (2020).

In the education sector, the budget for higher education and for the training of secondary and higher education teachers gets a formulated first. This is because these functions fall entirely within the domain of the federal government. Finally, budget implementation results in 'actual expenditure'. The process of federal budget formulation is replicated at both the public and private subside grant levels (World Bank, 2020).The following figure demonstrates this fact as:

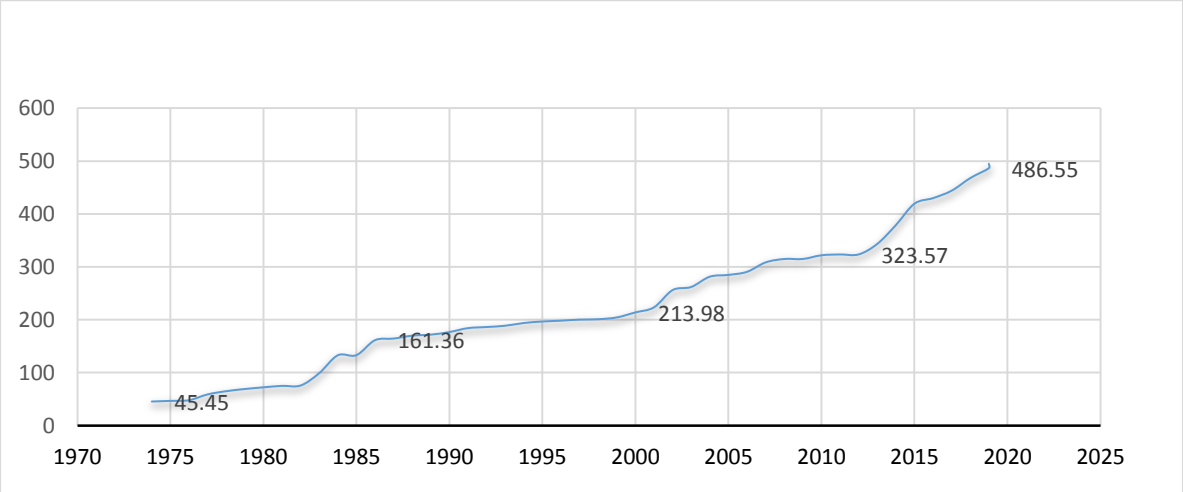

Figure 4.3 Marginal Gross Enrolments in Higher Education (1974-2019)
Source: Computed based on WB and UNCTAD data, 2020

Since Ethiopia has embarked the modern higher education, massive effort was made to bolster the overall education landscape. Since then great opportunities and significant challenges have shaped the course of policy and planning for the future Ethiopian higher education tends and facilities (Almayehu, 2012). Higher education enrolment has boomed to 45.5 thousand to 161.36 thousand from 1974 to 1991 till EFDER government came to power.

It also got higher from 2000 to 2015 and more higher roused by 23% which is large. It steadily increases from 2016 to 2019 by 27.8% being 485.5 students per year from different universities in the country.

The Derg education system was somewhat inhibited by problems such as budget shortfalls, which in turn affected the supply of basic educational materials including textbooks and a shortage of qualified teachers both at primary and secondary schools (Molla,2018). To resolve the problem of the shortage of qualified higher educational teachers, the government took an aggressive measure of recruiting 5, 500 untrained teachers, recruited immediately after the completion of 12 grade to university. It is not difficult to imagine how the huge recruitment of untrained teachers affected the quality of education (Almayehu, 2012).Within these efforts, higher education expenditure, access, number of graduates, and enrolment ratio were insignificant.

But, now a day's the newly upcoming educational road map has to be seen from its contribution to the expansion of higher education enrollment quality to upload GDP to the employment opportunities of the country. To resolve the problem of higher institutions, university qualification evolutions of graduates, the government designed a summer program, lasting over three years, to certify teachers from degree to master's and doctoral programs.

This strategy has continued employed as one of the mechanisms to train teachers at higher educational levels as reported in 2019.Aaccording to the World Bank collection of development indicators, compiled from officially recognized sources, Ethiopia higher institutions enrolment reaches to 37% . The Ethiopian higher education sector has come a long way since its humble beginnings. There were just three public universities, 16 colleges, and six research institutions in 1986 enrolling fewer than 18,000 students (Molla, 2018). Today, there are 51 public universities, as well as a large growing in private sector. Ethiopia did not have a single privately owned higher education institution before the early 1990s, but there are now many private higher learning institutions. The overall number of tertiary students in both public and private higher education learning institutions exploded by more than 2,000 percent, from 34,000 in 1991 to 357,000 in 2017/18, per UIS data (Molla,2018).

Despite this higher education expansion, Ethiopia still trails other LDCs in these key higher education indicators. In fact, the rapid expansion of higher education over the past decades has overburdened the system and created a slew of new problems, such as funding shortages, deterioration of quality and unemployment. Enormous progress in increasing access to

education notwithstanding, some observers now consider the Ethiopian education system to be in a state of crisis, and that quantitative achievements in areas like elementary enrollments mask stagnation in terms of quality and learning outcomes (MOE report, 2014/15).The higher education enrolment is also pushed by the demand that comes from high investment in primary and secondary enrolments.

In the higher education sector, educational quality has been strained by scarce funding, poor facilities and infrastructure, overcrowded classrooms, insufficient levels of academic preparedness among students, and a shortage of qualified teaching staff. According to World Bank report (2017:55) only 15 percent of university instructors had doctoral degrees in 2015 which is lower compared to even some countries in the Sub-Saharan Africa. Many students were taught by young, inexperienced instructors holding just a bachelor's degree. It consequently shows that Ethiopia ranks below other African countries like Rwanda, Senegal, Tanzania, or Uganda in comparative studies that measure research and innovation, such as the Global Innovation Index (WB, 2020).Higher education expenditure and expansion need to be considered to incorporate a reformed educational policies and curriculum.

Also, the World Bank's finger demonstrate that Ethiopia needs to reform its curriculum, policies and implementations in addition to increasing enrolments at all levels especially at higher education level. Let us see the figure below:

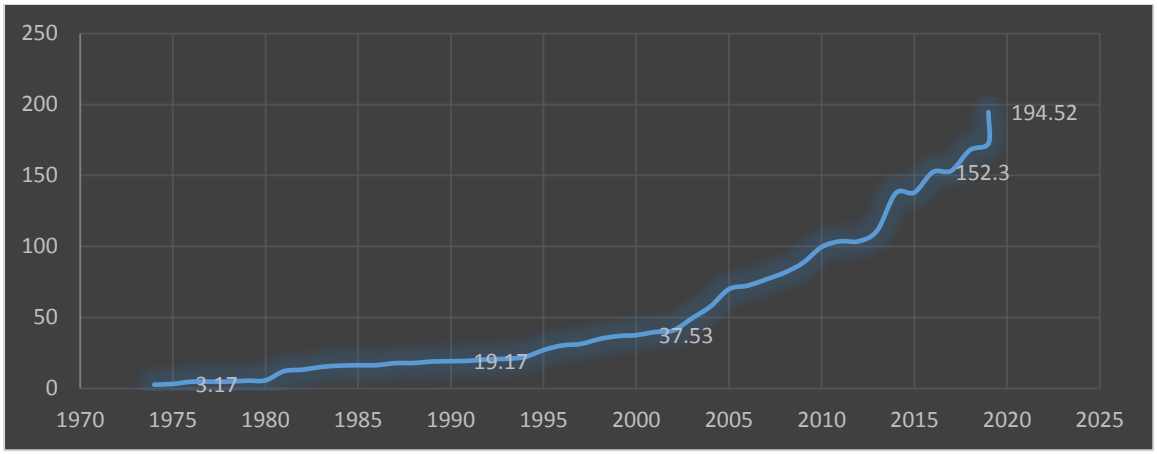

Figure 4.4: Trends of Gross Human Capital Stock in Ethiopia (1974-2019)
Source: Computed based on WB and UNCTAD data, 2020

The above figure shows the trends of gross human capital stock in Ethiopia from 1974-2019. In 1974/75 Ethiopian gross human capital stock was about 3.17%. And from Derg regime to EFDRE it reached to 19.17% which goes in linear way of growth of stock of human capital.

Somehow, from 1995 to 2019 it reached more than 67% growth as steady level which is 194.2% duplexing itself. This is deteriorating quality of education in the wake of significant expansion in the sector is another element that puts into question the basic framework that education provides students with growth enhancing skills. This is also reinforced by the observation that the curriculum has been too academic, politically motivated and alien to the largest segment of the population. The policy direction of the education sector has also been top down usually following the donor's perspective and is politically motivated.

Human capital is just one aspect of the economy that enters into the determination of growth (Molla, 2018). Simply providing more schooling may yield little or nothing in the way of economic growth in the absence of other elements such as the appropriate market, legal and governmental institutions and suitable policy environment in other sectors of the economy to support a functioning modern economy. Higher education learning institution is not by itself inefficient engine of growth but also a direction the study also questions the economic policy directions, which could have been perverting the contribution to economic growth that would have been made from an expansion in educational investment. Let us see the following figure.

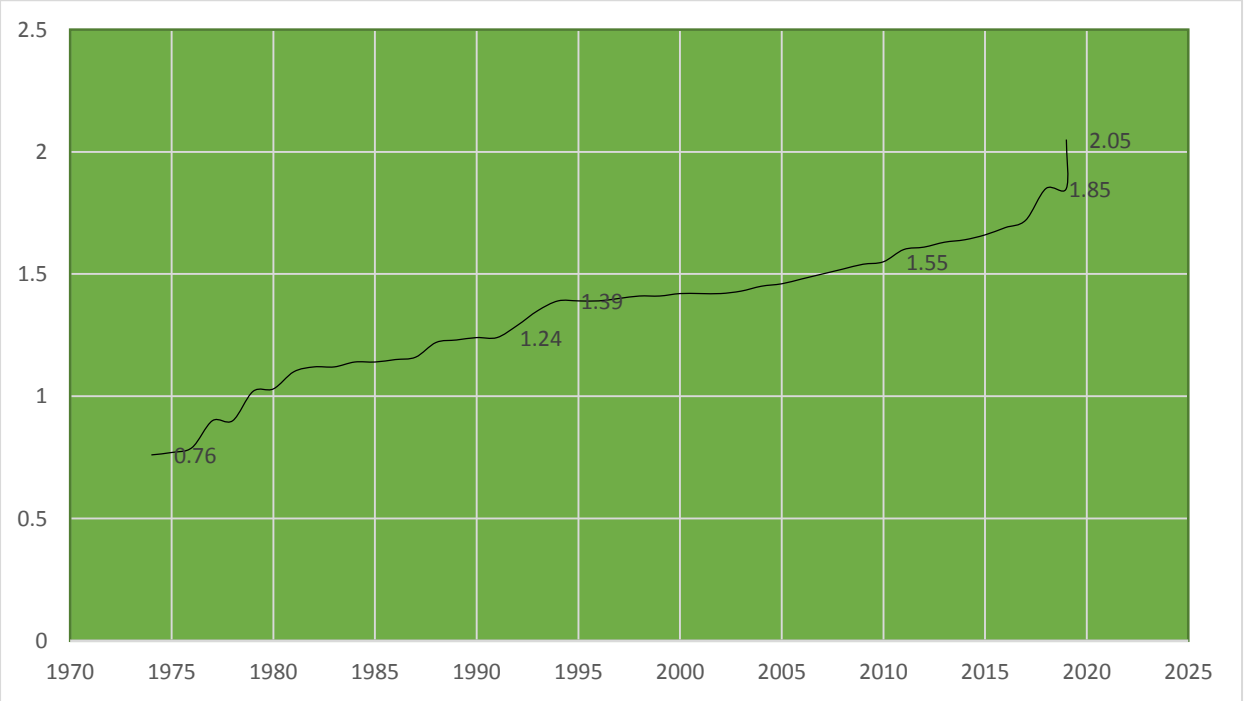

Figure 4.5.Trends of Higher Education Offerings to Research and Development (1974-2019)
Source: Computed based on WB and UNCTAD data, 2020

As seen in the above figure the trend of higher education offerings of Research and Development from 1974 to 2019 has been presented. From 1974/75 to 1991/92 it has risen from 0.76 % to 1.24 and from 1995/96 to 2019 it reached by only 2% as currency generations. However, higher educations have long been recognized as one of the important institutions to generate essential knowledge and skilled labor need for economic growth and development of a country. Many developed countries used research and development as engine for innovation and economic transformation (Mulu, 2017; World Bank, 2020).In higher education institutions, the increasing recognition of research and development as drivers of economic change has to be reshaped and transformed in Ethiopia as it is as one of their missions.

Higher education institutions are expected to play fundamental role in accelerating the scientific and relevant technological innovations and thereby enhancing the economic vitality and competitiveness of the country through their basic missions of generating and disseminating knowledge in addition to teaching and community services (Molla, 2018; World Bank, 2020). In this regard, a collaborative link between higher education institutions and the industry is necessary for technology transfer and the commercialization of academic research. Notably, any technological innovation process implies close linkages among different players such as the university, industry and government. The nature and intensity of the interactions among these actors critically influence the innovative performance of institution within a given innovation which is 2% per annual.

The role of higher education institutions as a strategic research resource is prominent feature to bring it to the inner circles of any national development agenda found increasing. From 1974 to 2019 the research and development allotment is enormously by 1.1% per Annam. On the contrary countries at different or at extremely dissimilar stages of socio-economic and political environments as well as industrial and technological development have tried to use their higher education institutions for research and development, innovation and sustainable development. According to World Bank"2020:127-128), America allots 19%, Germany allots 18% and Israel allots 16% from their annual budget to research and development. Even developing countries budgeted 5-10% of their annual budget to research and development (Mulu, 2017). Ethiopia is found relatively an exception in this regard by allocating only 2% to research and development in 2019.

Table 4.1: Summary of Descriptive Statistics of Growth Variables

	REALGDP	GOVT_EEXPT	EMPOPPO	ENROLL	STOKHCAP	RE_DVLNT
Mean	6.599787	18.39213	0.175106	227.7536	54.99957	1.352128
Median	5.080000	18.05000	0.160000	200.3500	31.30000	1.400000
Maximum	19.17000	35.65000	0.390000	494.9200	194.5200	2.050000
Minimum	1.580000	2.910000	0.040000	45.45000	2.640000	0.760000
Std. Dev.	4.586571	6.301838	0.081157	125.9054	53.68297	0.288895
Observations	47	47	47	47	47	47

Source: From NBE, MOFED, WB and UNECTAD data bases, accessed, 2020

The following result from above table one depicts the trends of all variables which are used in the model together. From the figure real GDP represents for, GOVT_EEXPT for Government Expenditure, EMPOPPO for employments opportunity, ENROLL for Enrolment to university, STOKHCAP for stock of Human capital, RE_DVLNT for rate of research and development. The impact of higher education on GDP is measured in percent. Government expenditure is expressed in millions of ETB and stock of human capital is measured in gross margin rate. Research and development is expressed in percentage and the rest of student enrollment is measured in number/000. The Y-axis represents all variables used in this study and the X-axis represents time ranging.

From 1974-2019, 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 seen from table 4.1 above 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 food inflation rate (FCPI), population growth and gross employment opportunities which are not expressed in millions of number unlike real GDP and other

remaining variables, the researcher depicts these variables in this summary statistics since they are considered as higher education importance to GDP marginal ration in Ethiopia.

4.2. Econometrics Analysis

The econometrics analysis, using statistical methods, is used to test or develop the economic theory. These methods rely on statistical inferences to quantify and analyze economic theories by leveraging tools such as frequency distributions, probability and probability distributions, statistical inference, correlation analysis, simple and multiple regression analysis, simultaneous equation models, and time series methods. This study has applied common econometrics analysis. These are series statistics (i.e. Stationery test), Group statistics (i.e. Correlation among variables), Residual diagnostic (i.e. Normality), and Stability diagnostic (i.e. Model stability test).

4.2.1 Test and Results

4.2.1.1 Unit Root Stationery Test Results

The unit root test has provided that the order of integration at which the variables can be stationary. Time series data are rarely stationary means; a type of stochastic process that has received a great deal of attention and scrutiny by time series analysts is the so-called stationary stochastic process. Broadly speaking, a stochastic process is said to be stationary if its mean and variance are constant over time and the value of the covariance between the two time periods depends only on the distance or gap or lag between the two time periods and not the actual time at which the covariance is computed.

Regression involving non stationary variables that have no clear tendency to return to a constant value or linear trend time series often lead to the problem of spurious regression. Spurious regression is a regression result of unrelated variables but strongly related as per the result (Gujarari 2004).This study tests were performed on all series, such as real GDP vs. government expenditure to higher education, gross employments opportunity, enrolment to university, stock of human capital and rate of research and development by using the Augmented Dickey-Fuller (1978) and Phillips-Peron (1988) tests.

The results of Augmented Dickey fuller and Phillips-Peron tests were applied to the variables mentioned in the model of this study. The ADF test is first level at difference level the Ho accept or not reject the Ho and Phillips-Peron tests is first level Ho accept Ho accept or not reject the Ho. So based on these both tests first guide line of the unit root test method ,this study, all variables are stationery at first level by this implication all critical value at 1%,5%

and 10% are proved the critical value and the second guide line of the unit root test his the total absolute value t- test value greater than each critical absolute value and final the third guild line of the unit root test all variables p value less than 5% and significant at all level.

Table 4.2 Augmented Dickey-Fuller (ADF) Test Result

Null Hypothesis: REALGDP has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic - based on SIC, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-2.014063	0.0200
Test critical values:	1% level		-3.581152	
	5% level		-2.926622	
	10% level		-2.601424	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(REALGDP)				
Method: Least Squares				
Date: 06/14/20 Time: 10:08				
Sample (adjusted): 2 47				
Included observations: 46 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
REALGDP(-1)	-0.154356	0.076639	-2.014063	0.0501
C	1.135018	0.615402	1.844352	0.0719

Significance level at 1%,5% & 10%

Table 4.3: Phillips-Perron (PP) Test Result

Null Hypothesis: REALGDP has a unit root				
Exogenous: Constant				
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel				
			Adj. t-Stat	Prob.*
Phillips-Perron test statistic			-2.014063	0.0200
Test critical values:	1% level		-3.581152	
	5% level		-2.926622	
	10% level		-2.601424	
*MacKinnon (1996) one-sided p-values.				
Residual variance (no correction)				5.435779
HAC corrected variance (Bartlett kernel)				5.435779
Phillips-Perron Test Equation				
Dependent Variable: D(REALGDP)				
Method: Least Squares				
Date: 06/14/20 Time: 10:15				
Sample (adjusted): 2 47				
Included observations: 46 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
REALGDP(-1)	-0.154356	0.076639	-2.014063	0.0501
C	1.135018	0.615402	1.844352	0.0719

Significance level at 1%,5% & 10%

Source: Own the study from EVIEWS 9, 2020

Result from the above table 3 and 4-unit root test analysis show that the ADF test statistic and Phillips-Peron (PP) in absolute term is greater than the set of critical values provided by Davidson and MacKinnon (1993) (cited in Gujarari 2004) at1%, 5% and 10%.

The dependent, constant and independent variable, thus the t statistics value obtained is compared with the critical value given at 1%, 5% and 10% and those indicated that the t - statistics values are greater than the critical values at 1%, 5% and 10%. The P-values are also

less than the 5% that means it is significant, so the null hypothesis of no co-integration is rejected for the entire model.

The evidence of co-integration by both methods indicates the existence of long run relationship among the variables. Hence there are significance at first level both ADF and PP analysis; hence the data of the study are stationarity.

4.3.1.2. Autocorrelation Test Result

Autocorrelation is one of the basic assumptions in linear regression model (LRM).It says that the random error components or disturbances are identically and independently distributed. The Durbin-Watson (DW) statistic tests have been done for first-order autocorrelation only. Also, it does not work properly if a dependent variable from a preceding time period is used as an independent variable in the model. This is because a most econometric software program calculates the Durbin-Watson statistic automatically.

Therefore, the relevant Durbin-Watson test statistic values in Figure 5 the test are dL= 0.748, dU = 2.362, i.e., for 47 observations and six variables excluding the constant term. Hence, 4 - dU = 41.814=2.36; 4 - dL = 4-0.748=3.252. The Durbin- Watson test statistic of 2.382 is clearly between the upper limit (dU) which is 2.36 and the critical value of upper limit which is 2.382 and thus the null hypothesis of no autocorrelation is within the non- rejection region of the number line all the variables. Therefore, this study is proved by Table 4 in the Durbin-Watson test. And more ever the R –squared in the Table 4, equals 0.930; the study can be made that 93% of variation in the dependent variable is explained by its regression on the independent variables. Which means the explanatory variables are highly explained in the dependent variables; because in the regression model, most of the econometrics researchers' proved that, a good regression models the R-squared is greater than 60 %. That is, it will increase as long as explanatory variables, regardless of their true significance.

Table 4.4: Regression result of Durbin-Watson Test

Dependent Variable: REALGDP			
Method: ARDL			
Date: 06/14/20 Time: 10:21			
Sample (adjusted): 5 47			
Included observations: 43 after adjustments			
Maximum dependent lags: 4 (Automatic selection)			
Model selection method: Akaike info criterion (AIC)			
R-squared	0.930262	Mean dependent var	7.046977
Adjusted R-squared	0.866863	S.D. dependent var	4.542223
S.E. of regression	1.657364	Akaike info criterion	4.154920
Sum squared resid	60.43079	Schwarz criterion	5.015041
Log likelihood	-68.33078	Hannan-Quinn criter.	4.472106
F-statistic	14.67323	Durbin-Watson stat	2.382174
Prob(F-statistic)	0.000000		

Source: Own the study from EVIEWS 9, 2020

4.3.1.3 Model Stability

Stability test the most common measurement was Ramsey RESET (Regression Equation Specification Error Test) test among the many "diagnostic tests" that econometricians routinely use, some variant or other of the RESET test is widely employed to test for a non-zero mean of the error term; that is, it tests implicitly whether a regression model is correctly specified in terms of the repressors that have been included. Among the reasons for the popularity of this test are the fact that it is easily implemented, and the fact that it is an exact test, whose statistic follows an F-distribution under the null.

The construction of the test does, however, require a choice to be made over the nature the null. The construction of the test does, however, require a choice to be made over the nature of certain "augmenting repressor" that are employed to model the misspecification, the RESET test statistic has a non-null distribution which may be doubly non-central F, or may be totally non-standard. Although this has no bearing on the size of the test, it has obvious implications for its power.

The Ramsey RESET test was performed to find out the stability of the model. Ramsey RESET test was aimed at testing for specification errors or non-normality which violate the assumption that the disturbances are distributed N (0, I). It tests for the omitted variables (that is; the vector of the repressors does not include all relevant variables), incorrect functional form and the correlation between the dependent and independent variables.

Under such specification errors, Ordinary Least Squares estimators would be biased and inconsistent, and conventional inference procedures would be invalidated (Ramsey, 1969). The null hypothesis that the model is stable (H0: Model is stable) was tested against the alternative hypothesis of no stability in the model (H1: No stability in the model). The null hypothesis is rejected in favors of the alternative hypothesis if the probability F-statistic of the Ramsey RESET test statistic is significant at five percent.

Table 4.5: Ramsey RESET Test

Equation: UNTITLED				
Specification: REALGDP REALGDP(-1) GOVT_EEXPT LNEMPOPPO LNEMPOPPO(-1) LNEMPOPPO(-2) LNEMPOPPO(-3) LNENROLL LNENROLL(-1) LNENROLL(-2) LNENROLL(-3) LNENROLL(-4) LNSTOKHCAP LNSTOKHCAP(-1) LNSTOKHCAP(-2) LNSTOKHCAP(-3) LNSTOKHCAP(-4) RE_DVLNT RE_DVLNT(-1) RE_DVLNT(-2)				
	Value	Df	Probability	
t-statistic	3.095353	21	0.0055	
F-statistic	9.581209	(1, 21)	0.0055	
F-test summary:				
	Sum of Sq.	Df	Mean Squares	
Test SSR	18.93320	1	18.93320	
Restricted SSR	60.43079	22	2.746854	
Unrestricted SSR	41.49759	21	1.976076	

Source: Own the study from EVIEWS 9, 2020

The results from Ramsey RESET test are presented in appendix F and X2 versions of the test show that the functions are linear and are stable since the p- value of the dependent variable Table 6, is significant at 5%. So using number of fitted term two models were the probability F-statistic of the test (0.0055) is significant at five percent level. Therefore, based on this result we fail to reject the null hypothesis that the models are linear and stable.

4.3.1.4. Hetroscedasticity Test Result

Heteroscedasity test is the popular one which includes Bruserch –Pagan-Godfrey (BPG) test and White test that this study has employed. The general definition of this test that it involves testing the null hypothesis that the variance of the errors is constant (homoscedacticity) or no heteroscedasticity versus the alternative that the errors do not have a constant variance while auto-correlation is an assumption that the errors are linearly independent on the another (uncorrelated with one another).

If the errors are correlated with one another, it would be stated that they are auto correlated. This test is conducted in order to ascertain that the disturbance or the errors have the same variance such that OLS estimators are best leaner unbiased error (BLUE), which is the coefficient estimates are efficient, and consistent and unbiased. In order to detect *heteroskedasticity,* there are different techniques that can be used. In this study I have used use the white test too, to assess the stability of the variance for both models. The null hypothesis of no *heteroskedasticity* is stated as follows for both models:

H0 = no heteroskedasticity and The null hypothesis is tested against the alternative hypothesis for both models:

H1 = there is heteroskedasticity

The null hypothesis, which in this case is a hypothesis for value of export model and volume of export model, will not be rejected in favor of the alternative hypothesis if the probability F-statistics of the white *heteroskedasticity* test is significant at five percent. For the economy growth model, as we can see under next chapter, both the common *heteroskedasticity* model this study focus on *heteroskedasticity* Breusch – Pagan –Godfrey and White *heteroskedasticity;* and the F-and X2 (LM) version of the test statistics offer the same conclusion that there is no evidence for the presence of *heteroskedasticity* since the p-values are considerably greater than 5 % or 0.05.

Heteroscedasticity is an important assumption assumed by the classical linear regression model. It says that that the error term should be homogeneous in nature. Whenever that assumption is violated, then one can assume that heteroscedasticity has occurred in the data.

Table 4.6: Heteroskedasticity Test: Breusch-Pagan-Godfrey

Heteroscedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.374578	Prob. F(20,22)	0.9845
Obs*R-squared	10.92302	Prob. Chi-Square(20)	0.9482
Scaled explained SS	4.766356	Prob. Chi-Square(20)	0.9998

Table 4.7: Heteroskedasticity Test: White

F-statistic	0.375699	Prob. F(20,22)	0.9842
Obs*R-squared	10.94740	Prob. Chi-Square(20)	0.9476
Scaled explained SS	4.776995	Prob. Chi-Square(20)	0.9998

Source: Own the study from EVIEWS 9, 2020

As seen in the above table (6 and 7), both the F-statistic and Chi-Square versions of the test statistic generate the same conclusion that there is no evidence for the presence of heteroscedasticity, since the p-values were in excess of 0.05.

The third version of the test statistic, scaled explained SS, which as the name suggests is based on a normalized version of the explained sum of squares from the auxiliary regression, also gave the same conclusion that there is no evidence for the presence of heteroscedasticity problem, since the p-value was considerably in excess of 0.05 the common heterosedasticity test are Breusch-Pagan-Godfrey and White tests approved this study.

4.2.1.5 Normality Test Result

Normality test in statistics is needed to assess the normality of a given set of data. For many statistical processes, it is used to determine if a data set is well-modeled by a normal distribution. It is also used to compute how likely a data is for a random variable underlying the data set to be normally distributed. It is a prerequisite to make the assessment of the normality of the data, as it is an important assumption in parametric testing.

There are various normality tests available for the determination of normality of a data. In statistics, the normality tests are used to determine whether a given set of data is well-defined by a normal distribution. They are also used to measure how likely a set of data to be normally distributed for a random variable. In probability theory and statistics, the probability distributions are the set of probabilities assigned to all the possible outcomes for an event or a set of events. There are several different types of probability distributions.

Normality tests among the many "diagnostic tests" that econometricians routinely use. There are many tests of normality discussed in the literature. Here let us consider two common normality tests. These are histogram of residuals and the Jarque–Bera test. A). Histogram of Residuals can be used to check whether the variance is normally distributed or the variance is a constant. A symmetric bell shaped histogram of residual which is distributed around zero indicates that the normality assumption is likely to be true.

In this study, as seen in figure 1 above; in the right side it looks like a bell shaped normal distribution curve on the histogram. We can get some ideas as to whether normal approximation may be appropriate or not. It is always a good practice to plot the histogram of the residuals as a rough and ready method of testing for the normality assumption.

The Jarque–Bera (JB) Test of Normality has created by two econometrics scientists from the second named; Carlos Jarque and Anil K.Bera. The Jarque–Bera (JB) test is goodness of fit of whether sample data have the skewness and kurtosis matching a normal distribution. Become our study 47 sample size observation and 6 variables including one dependent and constant variable we will show the left side Figure 1 and Jarque–Bera (JB) Test normality is an asymptotic, or large-sample, test. It is also based on the OLS residuals. This test first computes the skewness and kurtosis measures of the OLS residuals and uses the following test-statistic:

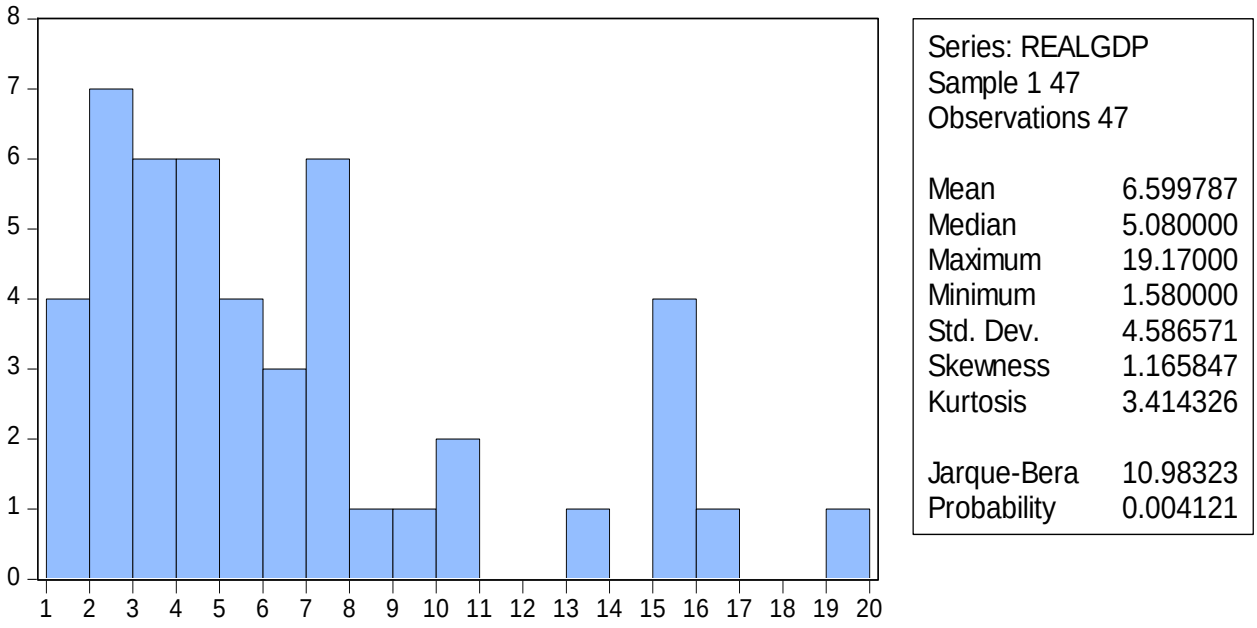

Figure 4.6 Normality Test Real GDP 2020
Source: Own the study from EVIEWS 9, 2020

Therefore, the JB test of normality is a test of the joint hypothesis that S and K are 0 and 3, respectively. In that case the value of the JB statistic is expected to be 0. Under the null hypothesis that the residuals are normally distributed; Jarque and Bera showed that asymptotically (i.e., in large samples) the JB statistic given in the chi-square distribution with 2 df.

If the computed p value of the JB statistic in an application is sufficiently low, which will happen if the value of the statistic is very different from 0, one can reject the hypothesis that the residuals are normally distributed. But if the p value is reasonably high, which will happen if the value of the statistic is close to zero, we do not reject the normality assumption; the sample size is rather small.

Hence, strictly speaking one should not use the JB statistic. If we mechanically apply the JB formula to our assumption, the JB statistic turns out to be the value; the p value of obtaining such a value from the chi-square distribution with 2 df is about some value, which is quite high. In other words, we may not reject the normality assumption. The normality tests to applied only the mechanically formula for this study shown in char 4 above in the right side where the coefficient of kurtosis is around 3, which is this study 3.41 ≈ 3 and the Bera-Jarque statistic had a P-value of 0.1016 implying that the probability is greater than 5% therefore the data were consistent with a normal distribution assumption.

4.4. Regression result Cause of Food Price Inflations

4.4.1. Long Run ARDL Bounds test for co-integration

After checking the stationarity of the variables, the next step is checking the bound test for co-integration. The first task in the bounds test approach of co-integration is estimating the ARDL model specified in equation (p+1) k using the appropriate lag length selection criteria. A maximum lag of order 1 was automatically chosen for the conditional ARDL model.

Because according to Pesaran and Shine (1999) for the annual data are recommended to choose a maximum of one or two lag lengths. In addition, the stationarity of the results confirmed that all variables were in order 0 and 1 and according to Wooldridge, (2000) the more lags we include, the more initial values we lose.

The F-test through the Wald test (Bound test) was performed to check the joint significance of the coefficients specified. The test is conducted by imposing restrictions on the estimated long run coefficients of Real-GDP, GOVT_EEXPT: Government Expenditure, EMPOPPO for employments opportunity, ENROLL; Enrolment to university, STOKHCAP; Human capital, RE_DVLNT; Rate of Research & Development. The computed F-statistics value is compared with the lower bound and upper bound critical values.

Table 4.8: ARDL Bound Test Result

	Value	K	Critical value bound		
F-statistic	3.701536	6	10%	1.86	3.09
			5%	2.33	3.28
			2.5%	2.39	3.8
			1%	2.49	3.9

Source: Model result

Note: Null Hypothesis is: No long run relationship exists

As portrayed in table nine above, the calculated F-stastics i.e. 3.701536 which is higher than the upper bounds of the critical values at all significance levels. This implies that we reject the null hypothesis of β1=β2=β3=β4=β5=β6 #0 (there is no long run relationships between

the dependent and explanatory variables) and we should accept the alternative hypothesis of 0 (there is long run relationships).

4.4.2. 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 indicate that the existence of a long run relationship between Real-GDP and GOVT_EEXPT: Government Expenditure, (EMPOPPO): employments opportunity, ENROLL: Enrolment to university, STOKHCAP: Human capital, RE_DVLNT: Rate of Research and Development. The estimated long run ARDL model is presented in table 9 below.

Table 9: ARDL Long Run Model Estimation

Dependent Variable: REALGDP				
Method: ARDL				
Date: 06/14/20 Time: 10:47				
Sample (adjusted): 5 47				
Included observations: 43 after adjustments				
Maximum dependent lags: 4 (Automatic selection)				
Model selection method: Akaike info criterion (AIC)				
Dynamic repressors (4 lags, automatic): GOVT_EEXPT LNENROLL LNEMPOPPO LNSTOKHCAP RE_DVLNT				
Fixed repressors: C				
Number of models evaluated: 12500				
Selected Model: ARDL(1, 0, 4, 3, 4, 3)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
REALGDP(-1)	0.584481	0.148111	3.946226	0.0007
GOVT_EEXPT	0.015052	0.137422	0.109527	0.0138
LNENROLL	0.033644	0.035054	0.959795	0.0476
LNENROLL(-1)	-0.044376	0.044993	-0.986267	0.3347
LNENROLL(-2)	0.012815	0.054571	0.234839	0.8165
LNENROLL(-3)	-0.100283	0.051010	-1.965963	0.0620
LNENROLL(-4)	0.130620	0.034740	3.759897	0.0011

LNEMPOPPO	-64.71724	54.49334	-1.187617	0.2476
LNEMPOPPO(-1)	77.79248	58.79246	1.323171	0.1994
LNEMPOPPO(-2)	-189.3375	67.70660	-2.796440	0.0105
LNEMPOPPO(-3)	92.91740	59.65970	1.557457	0.1336
LNSTOKHCAP	0.187127	0.083334	2.245506	0.0001
LNSTOKHCAP(-1)	-0.163255	0.123517	-1.321714	0.0980
LNSTOKHCAP(-2)	0.306121	0.117809	2.598449	0.0164
LNSTOKHCAP(-3)	-0.591684	0.124768	-4.742283	0.0001
LNSTOKHCAP(-4)	0.373105	0.098070	3.804458	0.0010
RE_DVLNT	-19.71926	13.97702	-1.410835	0.0023
RE_DVLNT(-1)	10.89191	13.87338	0.785095	0.4408
RE_DVLNT(-2)	-19.03092	17.12189	-1.111497	0.2784
RE_DVLNT(-3)	23.23464	13.64117	1.703274	0.1026
C	13.44923	7.158322	1.878824	0.0736
R-squared	0.930262	Mean dependent var		7.046977
Adjusted R-squared	0.866863	S.D. dependent var		4.542223
S.E. of regression	1.657364	Akaike info criterion		4.154920
Sum squared resid	60.43079	Schwarz criterion		5.015041
Log likelihood	-68.33078	Hannan-Quinn criter.		4.472106
F-statistic	14.67323	Durbin-Watson stat		2.382174
Prob(F-statistic)	0.000000			

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

Source: Model result, 2020 using Eveiws 9.

As seen from table 9 above, the estimated coefficients of government expenditure (Real-GDP with ENROLL: Student Enrolment to University, GOVT_EEXPT: Government Expenditure, (EMPOPPO): employments opportunity, STOKHCAP: Human capital, RE_DVLNT: Rate of Research & Development is statistically insignificance irrespective of sign changes in some variables.

Since the researcher has specified the growth model in a log-linear form, the coefficients of the dependent variable are interpreted as elasticity with respect real-GDP. The long run model result indicates that Research & Development and gross employments rate are negatively influenced which is statistically significant at 1% significance level.

Thus, holding other things constant, government expenditure to higher education has brought a 3.3% percent increase annual enrollment rate to higher education. Therefore, in this study government expenditure has been found as the most significant variable that positively affects GDP which is 1.5% to the contributions of GDP.

Average employments rate has a significant long run impact on the Ethiopian economic growth. Other things remain constant, aggregate in average employments rate increase in the Ethiopian economic growth has resulted 64 % percent decrease and affecting lowering human value mean level of unemployment affecting.

The findings of this research is concerning the long run negatively distressing of employment rate of higher education institutions' graduates that lag there is GDP input which is consistent with the endogenous growth of unemployment theories (mainly, advocated and/or developed by (WFP, 2019), which argue that the increase government expenditure leads to less productivity of employment improvement that enhances long run financial discrptincy output. On the other hand, growth of human capital stock is a positive significantly affecting by 18.7% of increasing the economic development in the long run. This is due to a steady increase in graduate's population's growth in Ethiopia starting around 2004 to 2019 by 35%. For instance, the Ethiopian universities, graduating growth reach 486 thousand in 2019 replicating to 130 per cent higher than the 2004- 2019 average (World Bank, 2020).

The growth of graduate rate of Ethiopian higher education can be the fact that several educational training and evaluation policy measures have been initiated by the Ethiopian government starting around 2006 in response to rising human capital stock growth. Some of the policy measures include higher educational enrolment and after graduate's quality control in economic measures such as adjustments.

Analysis of documentary evidences show that the government expenditure on higher education to scale up research and development has been increasing over the past years, but still negative 1.9% contributions of GDP in long run since 1974 to 2019 as data shows. However, funding for research and innovation from the government treasury is often

insignificant or totally unavailable until 2012 because of soaring student enrolment that favored allocations to teaching instead of research, and to undergraduate instead of postgraduate training. In 2011/12, the research budget of all universities accounted for only 1% of their total budget (see figure 5). Recently, 1.9% of the annual GDP is allocated for research, which is low compared to other countries, such as 3% EU, 2.59% in US and other African countries such as South Africa (World Bank, 2019).

The inadequacy of research funds has been hindering the research and innovation capacity of higher education institutions in Ethiopia in terms of research infrastructure, facilities and equipment as reported by (Mulu, 2017). His study testify that analysis of documentary evidences and data from annual data with university leaders and academic staff indicate that there are no intermediary funding agencies at national level that focus in stimulating university research and linkages with industries, business sectors and the community. The contribution of industry/business sector in funding university research is almost non-existent in the Ethiopian context. Also results of analysis of documentary evidences annual data indicate that the university-industry link was generally found to be at its beginning phase due to different reasons and this has negative effect on the GDP in long run if measures are not taken.

The low level of industrialization in Ethiopia currently; shortage of capable researchers at universities dewing grade 19.7% of the total income which Ethiopia economic growth gain from Research and Development. The poor attitude universities had traditionally towards the university-industry link and to its significance are the main challenges for building strong partnerships with industries according to World Bank report (2020). The fact that universities are just starting working in consultation with industries and thus their experience of so doing is quite immature was explained by two factors. The first one was the fact that Ethiopia is just launching the scheme of industrialization very recently and they have never been many industries as such to work with. And the second one is the low level of awareness and experience by higher education institutions that industries play an important place in the training of graduates and later in their deployment for work.

As found out from ARDL analysis there is poor linkage between higher education institution and research and development. This is hindered by many factors. Many of the enabling conditions are lacking. Particularly, the contribution of higher education institutions to research and innovation has to be strengthened with to promote the economic growth of the

country. Economic growth can be enhanced through proper utilization of innovative human minds. However the utilization of this human capital to research and development and enhancing the economic growth of the country through research and innovation is minimal. Higher education institutions should play significant role in building economic growth of the country through new innovative ideas and innovations. The role of the economic growth in strengthening the economy is maintained through direct labor force and development, innovation and technology transfer which is yet to be developed in Ethiopia.

Much empirical and theoretical work emphasizes that research and development (Rand D) is an important contributor to economic growth. Research and development spending is likely to lead to economic growth through its positive effect on innovation and total factor productivity (Romer,1990; Lucas,1988).However Ethiopia's' higher education research and development efforts has little or no contribution as this study found out.

In long run, this study stresses that the research and development in higher education institutions and linkages between higher education and research and development in Ethiopia is at low stage. It is possible to say that there is an inverse relationship. Several factors can be given for this as (Molla, 2018) argues. Molla says that low level of industrial expansion, inability to sort out needs and limited capacity to project markets on behalf of the industry and low level of awareness of universities to tie up their programs with industry, the link between universities' institutional research agenda and needs of industry and society is at a lower stage currently are major factors for low linkage between higher education and research and development promotions. Mulu (2017) also argues that the government has neglected this sector as there is very little research funds to Ethiopian higher education institutions.

4.4.3. Short Run Error Correction Model (ECM)

After testing the bound test for co-integration, the next step is short run model estimation. The results of the bound test indicate that the existence of a short relationship between Real-GDP and GOVT_EEXPT: Government Expenditure, (EMPOPPO): employments opportunity, ENROLL: Enrolment to university, STOKHCAP: Human capital, RE_DVLNT: Rate of Research and Development. Then the estimated short run ECM model is presented in the following model after the acceptance of long run coefficients. The short run Error Correction Model (ECM) was estimated as seen in the following table. 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).Let us see the detail statistics as follows:

Table 4.10 Error correction representation for the selected ECM Model

Vector Error Correction Estimates			
Date: 06/14/20 Time: 22:42			
Sample (adjusted): 4 47			
Included observations: 44 after adjustments			
Standard errors in ( ) & t-statistics in [ ]			
Cointegrating Eq:	CointEq1	Prob *	
REALGDP(-1)	1.000000	0.001***	
GOVT_EEXPT(-1)	-1.567863	0.000***	
	(0.39138)	0.000***	
	[-4.00603]	0.000***	
LNENROLL(-1)	0.067318	0.000***	
	(0.03801)	0.000***	
	[1.77115]	0.000***	
Error Correction:	D(REALGDP)	D(GOVT_EEXPT)	D(LNENROLL)
CointEq1	-0.107268	0.576816	0.087198
	(0.09820)	(0.13206)	(0.49122)
	[-1.09231]	[4.36772]	[0.17751]
D(REALGDP(-1))	-0.305276	-0.007905	-0.317606
	(0.18115)	(0.24361)	(0.90613)
	[-1.68522]	[-0.03245]	[-0.35051]
D(REALGDP(-2))	0.078190	-0.216358	-0.445266
	(0.16429)	(0.22094)	(0.82180)
	[0.47592]	[-0.97927]	[-0.54182]
D(GOVT_EEXPT(-1))	-0.331663	0.276939	0.348400
	(0.11999)	(0.16136)	(0.60019)
	[-2.76417]	[1.71630]	[0.58048]
D(GOVT_EEXPT(-2))	-0.214293	-0.011403	0.677088
	(0.10076)	(0.13550)	(0.50402)
	[-2.12675]	[-0.08415]	[1.34338]
D(LNENROLL(-1))	0.037613	0.000798	0.168802
	(0.03368)	(0.04529)	(0.16847)
	[1.11677]	[0.01763]	[1.00194]
D(LNENROLL(-2))	-0.053537	0.108989	0.046924
	(0.03392)	(0.04562)	(0.16968)
	[-1.57822]	[2.38912]	[0.27654]
LNSTOKHCAP	0.079508	-0.103800	-0.151556
	(0.03860)	(0.05190)	(0.19306)

	[2.06002]	[-1.99986]	[-0.78502]
LNEMPOPPO	-76.70277	-0.687405	176.4486
	(38.4619)	(51.7236)	(192.391)
	[-1.99426]	[-0.01329]	[0.91713]
C	6.509080	6.992952	-10.92314
	(3.89987)	(5.24456)	(19.5077)
	[1.66905]	[1.33337]	[-0.55994]

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

Source: Model result, 2020 using Eveiws 9

The error correction coefficient is estimated at (C= 6.509080) which is highly significant and has the correct positive sign. This shows that there is a very high speed of adjustment to equilibrium. The highly significant error correction term further confirms the existence of a stable long run relationship (Regassa, 2014). The coefficient of the error term implies that the deviation from long run equilibrium level of Real GDP with higher education provision in the current period is reached by 1% in annual in the next period to bring back equilibrium when there is a shock of real GDP to a steady state relationship. In other sense approximately negative 0.305 unit of the disequilibrium from the previous year's shock converges back to the long run equilibrium in the current year.

As observed from the above table above ,the result is similar to the long run government expenditure to higher educations as in the short run is statistically significant even at 1% significance level. Other things remain constant a one percent increase in government expenditure leads 1.567 million ETB decrease in economic growth in the short run. This result is consistent with the classical and neo-classical foundations of theory of economic growth (Regassa, 2014). On the other hand, government expenditure to higher education institutions in short run is also very significant negative factor in Ethiopian economic growth which is leading 1.5 percent increase in real GDP per capital human labor income. This is because students in Ethiopian higher education stay in the institutions from three to seven years depending of stream of departments. In those times the government only spends. There is no employment, or graduation.

The gross enrolment rate of student to higher education has been found playing a significant role to economic growth. It is about 6.7%, which highly integrated to the international student market outflow. However, a positive link between gross enrolment rate of student to higher education and economic growth is subject to the influence of many factors that are internal

and external to the university (Molla, 2018). Higher education institutions with government expenditure found in short run intake lower share of creating real GDP linkages which is necessary to enhance the economic growth of the country. This is because in higher education institutions there is high public expenditure, enrolment and there is no employment or job creation. Students stay higher education learning institutions.

Similarly in the short run research and development play insignificant role as the table above shows. Not only in the short run but also in the long run research and development has played little role to economic growth of the country. As the seen in the table the role of research and development to economic growth is negative which indicates that the higher education research and development has little or no contribution to economic growth of the country. This is against the theories of endogenous theory of growth as Romer (1990) and Lucas (1988) suggests. In addition Mulu (2017) argue that research and development in Ethiopian higher education contributes insignificant to the economic growth and national developments mentioning several factors for this. Mulu suggests that this requires a robust national framework to enforce strong linkage among the three predictor's i.e. expenditure, enrolment and economics using pre capital income.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

Based on the analysis and discussion of this study, in this section, the major findings are briefly summarized. As a general objective, this study investigates the impact of higher education access on economic growth in Ethiopia. And significant variables have been examined using short run and long run models of estimation. Other things remain constant; government expenditure to higher education has brought about a 3.3 percent increase annual enrolment rate to higher education. So in this study government expenditure to higher education has a significant contribution to economic growth of the country. This is because as there is more investment in accessing and expanding higher institutions, there is more likely increment of enrollment, stock of human capital and long run employment opportunities. In the long run, government expenditure has positive and significant influence to the GDP of Ethiopia. Hence the government expenditure is the most significant variable. The government expenditure variable is one of the most significant that has strong positive correlation with the GDP of Ethiopia. However in the short run, government expenditure has no contribution to economic growth. Other things remain constant; a one percent increase in government's expenditure leads 1.567 Ethiopian Birr decrease in economic growth.

Regarding the gross enrolment ration, it has been found that an increment in student enrolment adds positive effect to the GDP, while expenditure to higher education increases. Ethiopian higher education enrolment is contributing positive influence to the GDP of the country. The stock of human capital is also positively significant and affected by an increasing rate of economic growth in the long run. This is due to Ethiopia has continuously graduate students for years.

Average employments rate has significant relation with economic growth or GDP in the long run but insignificant relation with GDP in the short run as students stay in higher learning institutions with considerable expenses only. The employment opportunity has been found having insignificant impact to GDP in the long run. The gross employment rate is negatively influenced which is statically insignificant at 1 percent significant level. Employment

opportunity is also hindered by factors as employment climate, policy and curriculum of Ethiopian higher learning institutions.

As the long run model results indicate research and development has poor influence on the economic growth of Ethiopia. Holding other things constant an increase in investment in higher education research and development, there is insignificant role that it plays for the GDP of the country. Not only in the long run but also in short run, the rate of research and development offered by higher learning institutions has little or no significant to economic growth. The 2020 Ethiopia's research and development rate is about 2% which is one of the lowest in the world.

5.2 Conclusion

Higher education plays a vital role in economic growth of a country. It promotes economic growth and development both at individual and societal levels. It is widely accepted as a leading instrument for promoting economic growth in the late 20th and the 21st centuries as engine for human development, innovation and technological breakthroughs. Higher education plays a vital role in building human capabilities and accelerates economic growth through knowledge, skills and creativity and strength of a society. Higher education is a means through which economic growth and developmental activities are achieved. Various efforts have been made to expand higher education in Ethiopia in the last few years as did in many countries, developed and developing. The shared belief is that higher education expansions builds the stock of human capital, promotes high rate of enrolments, research and development, creates job opportunities etc. that all have role to the growth of the economy and development of the country by producing human capital needed for economic growth through various means. The classical and neoclassical as well as the endogenous growth theories prove this. Empirical researches also show this fact.

In this study Ethiopian economic growth is found impacted by its higher education expansions especially in terms of higher education variables as public expenditure, enrolment, stock of human capital, employment opportunity and research and development. Therefore in this study, the government expenditure to higher education has positive significance not only to the GDP directly but also indirectly in the form of increasing enrollment, stock of human capital, and research and development in the long run. The government expenditure to higher education has contributed a 3.3 percent of economic

growth of the country. However in the short run government expenditure has no contribution which is also aligned with empirical findings. It is true that the more investment in the expansion of higher education, there is high enrolment in various programs, and high stock of human capital. This positive correlation and GDP contribution is aligned with many empirical findings and the neoclassical growth theories. Hence the two (higher education and economic growth) have shared relationship in Ethiopia though there were ups and downs during the last five decades.

In this study the governments' expenditure to higher education also contributes stock of human capital and student enrolments which is substantiated by empirical and theoretical findings. There is an increasing stock of human capital formation following the expansion of higher education and rigorous government expenditure to higher education in Ethiopian. The increasing stock of human capital is because of the expansion of higher education, facilities and infrastructural developments in the last three decades particularly.

Unlike government expenditure, enrolment and stock of human capital, in this study, research and development has little or no contribution to economic growth of Ethiopia. This is against the expectation that research and development are significant ingredients of economic growth and development of a country. This is deviated from the endogenous growth model which stresses the role of higher education research and development to boost economic growth of a country. Local empirical studies also show that investment in research and development is low in Ethiopia as one of the rejected sector.

5.3 Recommendations

Based on the findings of this study, the researcher suggests the following recommendations.

There is a rapid expansion in the development of the higher education (both public and private) in the last couple of decades in Ethiopia. However, compared to the population and the upcoming of high demand from lower grades, it is important to access more higher education institutions with considerable quality assurances. To become lower middle income country by 2025 and more in 2030, Ethiopia needs to expand and address the high needs of higher education demands. To expand higher education and to assure at least a 22% growth enrolment ratio by 2025 especially in public higher education institutions, it is recommended to strengthen the expansion of higher education by establishing new universities or opening new campuses and satellite campus on the existing universities; exploring other non-dormitory delivery mechanisms to expand higher education including opening Ethiopian

open university, expanding continuing and distance education and start providing online education. Besides, it is important to develop strong quality assurance and enactment mechanism to deal with quality of education for non-dormitory delivery of education like open, continuing, distance and online education. It is also important to encourage private provision of higher education with appropriate quality control in place to expand their programs and professional trainings as they have demanded contribution to economic growth of the country.

As government expenditure has positive contribution to higher education access and expansion, graduation (stock of human capital), enrollment, and research and development which all contribute to economic growth, government need to continue to expand more higher education institutions substantiated by demanding policies. The higher education expenditure contributes the growth of the economy indirectly by allowing the production of human capital, promotion of research and development, and employment creation. The expenditure should also consider quality, research and innovation and promoting private sector issues.

Though higher education institutions have produced large stock of human capital because of high access and expansion in the last couple of years, unemployment has been a major challenge in Ethiopia. Many students remain jobless after graduation. In order to minimize this challenge, the government needs to take measures to revise the existed curriculum, programs and policy implementations. More practical education policies which invite creativity and innovation need to be nurtured.

As research and development has significant contribution to the economic growth of the country, the government needs to invest in this sector. In this age of knowledge economy, research, innovation, and development are significant endogenous variables to the growth of an economy and wellbeing of the society. Policies and strategies, partnerships, higher education-industry linkage systems have to be revised and reformed. Credits and incentives have to be offered to entrepreneurs and research scientists who contribute the growth of the economy. To bring the desired effect, firstly, measure must be taken to improve research infrastructure (laboratory, publishing, transport etc.). Secondly, promoting local journals that meets international standards so as researchers can gain experience of publishing their research finding in peer review national and international journals should be encouraged. Thirdly the government needs to increase the budget for research, development, technology

transfer and community service activities to at least 5% of the total budget so as to engage more academic staff in research and community service activities. Fourthly, measures have to be taken to improve the university support system to increase the efficiency of finance, purchasing and other services provided to research and development which requires more attention than those of other sections. Fifthly, a new improved system of procurement must be developed that suits for purchase research and laboratory inputs. Sixth, allow academic staff to allocate more time for research and community services. Seventh, promote universities to have more university-industry linkages by encouraging their industry leaders to teach part of the course so that students can get real work experience from the guest lectures.

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