



St. Mary's University

**The Effect of Human Capital proxed by Education
Expenditure on Economic Growth in Ethiopia**

**By:
Hanna Dereje**

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**SAINTMARY'SUNIVERSITY
SCHOOL OF GRADUATE STUDIES
INSTITUTE OF AGRICULTURE AND DEVELOPMENT STUDIES**

**THE Effect of Human Capital Proxied by Education
Expenditure on Economic Growth in Ethiopia**

**A THESIS SUBMITTED to St. MARY'S UNIVERSITY
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**BY: HANNA
DEREJE**

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DECLARATION

I, Hanna Dereje, hereby declare that this thesis work entitled “The effect of human capital proxed by education expenditure on economic growth in Ethiopia “submittedby me for the award of the degree of Masters of Art in development Economics from Saint Mary’s University at Addis Ababa, Ethiopia, is my original work and all sources and materials used for this thesis have been duly acknowledged. I have submitted this thesis to Saint Mary’s University as of January, 2020 and I agree to admit any responsibility for the scientific and ethical mischief pertaining to this research work as per terms and conditions of Saint Mary University.

Declared by: Hanna Dereje

Signature: -----

Date: -----

Place and date of submission-----

ENDORSEMENT

This thesis has been submitted to St. Mary's University, Institute of Agriculture and Development Studies for examination with my approval as a university advisor.

MaruShete (PhD and Assoc. Professor)
Signature

Advisor

St. Mary's University, Addis Ababa

BOARD OF EXAMINERS

As members of board of examining of the final MA thesis open defense, we certify that we have read and evaluated the thesis prepared by Hanna Dereje under the title “**The Effect of Human Capital proxed by Education Expenditure on Economic Growth in Ethiopia**”. We approved that this thesis meets the accepted standards with respect to originality and quality we recommend that to be accepted as fulfilling the thesis requirement for the Degree of Masters of Art in Development Economics

Dean, Graduate studies

Signature

Date

Advisor

Signature

Date

Internal Examiner

Signature

Date

External Examiner

Signature

Date

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LIST OF ACRONYMS

ARDL:	Autoregressive Distributive Lag
ECM	Error Correction Model
EEA	Ethiopian Economic Association
EPC	Ethiopian Planning Commission
EU	European Union
GDP	Gross Domestic Product
GNI	Gross National Income
HCR	Human Capital Resources
IQ	Intelligence Question
MOE	Ministry of Education
MOF	Ministry of Finance
NBE	National Bank of Ethiopia
PEE	Primary Education Enrollment
TGE	Transitional Government of Ethiopia
TFP	Total Factor Productivity
TVET	Technical and Vocation education and Training
UNDP	United Nation Development Program
WB	World Bank
WWII	World War Two

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ABSTRACT

The general objective of the study was to assess the effect of human capital proxed by education expenditure in Ethiopia. Although there are many previous related studies on the topic, the studies were focused on only by aggregating total public expenditure as proxy to human capital; as far as the researcher's knowledge there is no previous studies used different levels of education expenditures separately. It is a major research gap. The secondary data was collected from various organization data base and employed both descriptive analysis and time series econometric model. The descriptive was showed that the trend of explained and explanatory variables showed gradual increase year to year and the share of total public education expenditure from real GDP was very small. In empirical findings, relevant pre and post estimation tests which are unit root test, co-integration test, Granger causality test, autocorrelation test, normality test and stability test were done. The result of the study disclosed that entire explanatory variables jointly has significant and positive relationship with economic growth in long run and secondary education expenditure, tertiary education expenditure and total import are significant and positive effect on economic growth in short run. But, general inflation rate is significant and has negative effect on economic growth in the short run. Total education expenditure, primary education expenditure, and total export are insignificant and no effect on economic growth in short runs. According to Granger causality test, education human capital and economic growth as bi-lateral causality. Findings of the researcher concluded that, education human capital has vital role on economic growth in long run and short run and education human capital and economic growth are supplementary to each other. Finally, the researcher mentions recommendation that Government should increase public education expenditure, especially to the secondary and tertiary education from its GDP as well as by supporting higher education institutions in order to generate their revenue and also support private sector to invest on education.

Keywords: *Human capital, economic growth, effect, Vector Error Correction Model, Ethiopia*

CHAPTER ONE: INTRODUCTION

1. 1. Background of the study

Ethiopia is considered to be one of the oldest nations in the world but at present its socio-economic condition is not satisfactory. It is the second most populous country in Sub-Saharan Africa. It is rated the poorest and most heavily indebted countries of the world, ranked last out of 208 countries. About 26% of the populations of the country, mostly women and rural residents, are living with their income less than one dollar a day. In terms of health and welfare, it ranks among Africa's and the world's poorest nations and the infant mortality rate is among the highest in the world. Political instability is another major problem of Ethiopia for the socio-economic development (Mohajan, 2016).

There are different types of capital. Among various type of capital, human capital is the one and vital for economic growth. Schooling, computer training Course, expenditures on medical care, and lectures on the virtues of punctuality and honesty are examples of human capital. That is because they raise earnings, improve health, or add to a person's good habits over much of his lifetime. Therefore, economists regard expenditures on education, training, medical care, and so on as investments in human capital. They are called human capital because people cannot be separated from their knowledge, skills, health, or values in the way they can be separated from their financial and physical assets (Becker, 1975). Throughout the western countries, education has recently been re theorized under Human Capital theory as primarily an economic device. Human Capital Theory is the most influential economic theory of western education, setting the framework of government policies since the strategy in determining economic performance has been to employ a conception of individuals as human capital and various economic metaphors such as technological change, research, innovation, productivity, education, and competitiveness. Economic considerations peers in the past, however, have not determined education (Patrick, 2017).

In earlier time high emphasis is given to increase saving level which in turn increase level of investment in order to bring economic growth of a nation in the short run, but in the long run

according to neoclassical growth model, technology is assumed to be exogenous, so no more growth takes place in the economy. The reason behind for this , because of diminishing returns to physical capital as more and more physical capital is added to the production process, the output will decline in the long run unless efficiency is added in the process of production since technology is assumed to be similar to all nation as public good (Mankiw, 2009). International difference in per capita income is due to difference in factor of production, including physical and human capital.

In Ethiopia different types of education policy were employed. The modern education in Ethiopia is usually dated to the year's between 1941 and 1970. The education sector with his late majesty the Emperor as frontline minister was by far the best staffed and financed. With the Emperor at the helm of power, the Ethiopian government believed strongly in the centrality of education as a vehicle of progress. It is debatable what the Emperor meant by education and progress but his numerous statements on the subject indicate that modern education was to enrich Ethiopian civilization (Negash, 1990). The socialist system of governance and its education policy was started between 1974 to 1991. The Ethiopian political system that prevailed in the country between 1974 and 1991 was the complete antithesis of the Imperial one. Socialist education stressed the inculcation of ideology as a prime objective with Marxism and the value of production as the main pillars. The United States of America, one of the main partners in the development of the Ethiopian education sector, was replaced by educational experts from Eastern Germany (Negash, 1990). The federal system of governance is functional since 1991; a new era dawned on Ethiopia – that of the federal system of governance equipped with an appropriate educational policy that became operational in 1994. The educational policy of the new government is thus the third policy in the history of the country since 1945. The major feature of the new educational policy that became operational in 1994 is the introduction of ethnic languages as mediums of education for primary education (Negash, 1996).

1.2. Statement of the problem

Currently Ethiopia's educational system is in deep crisis. Most of the literature highlighted the implication of the deterioration of the quality of education on the development of the country associated with the problems of current education policy, organization, administration, provision, staff quality, system of enrollment, language policy, financing, learning cycle, system of educational evaluation, system of quality assurance, academic freedom, intellectual migration (brain drain) and political control of the education system.

Unregulated national education policy, quality of teachers, and irregular language implementation are additional factors that affected educational progress. For instance, besides implementing unregulated medium of instruction, The Irish Times, (2010) also reported on the use of Mandarin and Turkish languages in current Ethiopia's schools, which forced the paper to comment. Most of the literature highlighted the implication of the deterioration of the quality of education on the development of the country and the articles found a correlation between the deterioration of the quality of education with current education policy and the level of poverty (Teshom, 1999; Tekeste, 2006; Damtew, 2007).

Tekeste (2006) indicated as the 1994 education policy greatly contributed to the deterioration of the quality of education. The problem is on the medium of instruction. He indicated that students' lack of proficiency in English and there are not enough qualified teachers to teach in English at the high school level. He further highlighted that when the Ministry realized the shortage of qualified teachers to teach in English, since 2004 Ethiopia's high school students are using plasma screen for education. Teferra and Altbach (2004) also argued that in most African countries lack of academic freedom and intellectual migration (brain drain) are major factors that affected adversely educational progress. Without free expression of new ideas the development of the society cannot be achieved and academic freedom plays a major role on the development of the country. Besides academic freedom, education policy and intellectual migration, Tekeste (2006) also found that the center of the crisis for higher level of education is the medium of instruction. The study assessed different African countries educational system and their correlations with the impacts of the colonial power influences. The article argued that after the independence of most African countries, the education infrastructure created by the colonizers

had been left as it is, and this author further argued that Ethiopia has never been colonized, however the educational system that the government implemented was similar to those of the colonized African countries. They also argued that beside the problem in the medium of higher education instruction, in most African countries, academic freedom and intellectual migration (brain drain) are major obstacles. This is also consistent with most of the author's findings. Historically, except between (1941-1974), Ethiopia's educational system continues to suffer from time to time. First, the emerging Ethiopia's educational system was highly disrupted by the fascist Italy invasion and the invaders eliminated educated Ethiopians. Second, when the imperial regime is replaced by the military regime, those highly educated Ethiopians became the target of that regime. They were either killed or forced to leave the country. As a result, Ethiopia lost those highly qualified Ethiopian professionals. Unfortunately, in 2001, the current regime also summarily fired highly qualified university professors and instructors. Due to all these problems, the country faces high intellectual migration (brain drain) and Ethiopia's human capital is greatly affected. Currently, those highly qualified Ethiopian academicians and professionals are teaching in higher institutions in the western world. It appears however Ethiopia's educational system has not come out of the problems. Besides with the above stated problems there is high gap on tertiary education. From tertiary education, higher education is the one and major level of education.

Higher education can be seen as having positive influence on economic growth in three main ways such as, accumulation of productive skills and capabilities, the generation of new knowledge using innovation and enabling faster adoption of existing technology(Holmes,2013;Aghion et al.2009).

Before the 1990s, highest level of policy making in developing countries, influenced by international trend setting institutions like the World Bank, was informed by the thesis that the private returns of higher education were much higher than the social counterparts, and hence governments focused their resources rather on lower level education. Today, however, it is clear that higher education not only produces social benefits that are too significant to ignore, rather it is considered as an essential element of the development dynamics in the global competitive environment Bloom et al. (2014), Bell(2008) and Montenegro and (Patrinos, 2013). The

Government of Ethiopia places a very high priority for poverty reduction as part of its overall goal for socio-economic development. The Poverty Reduction Strategy has identified four priority sectors; such as road, education, agriculture and natural resource, and health sectors. To implement the Poverty Reduction Strategy successfully, the economy shall need substantial additional skilled and trained manpower at all levels-top, middle, and low. Expansion of the road infrastructure, education, agriculture and health services shall demand substantial number of trained manpower. Thus, responsibility for training the required additional skilled manpower shall substantially fall on the tertiary and TVET sub-sectors of education (MOE, 2001).

In Ethiopia emphasis given to higher education as instrument of development could be the remarkable growth of the subsector. Expansion has been one of the most successful areas in the development of Ethiopian higher education in the past two decades,

In Ethiopia, emphasis given to higher education as an instrument of development could be the remarkable growth of the subsector. Expansion has been one of the most successful areas in the development of Ethiopia higher education in the past two decades, both in terms of number of institutions as well as overall in take capacity. This massive movement which is, started at the end of the 1990s justified by the need for improved access and equity, (Woldegiyorgis, 2014). But the increase in number of higher education institutions were increased only number of graduated students from different university. Quality of education does not be considered. As a result, the increase in number of higher education institutions were increased in number of graduate students does not bring Ethiopian economy to grow rather than increasing the number of unemployed. So in order to give advice to policy maker's there is a need to see the relationship between education and economic growth, especially higher education.

Different studies were conducted to examine the relationship between human capital and economic growth using different proxies and came up with different results. Barro (1991), Mankew et al (1991), Wilson(2004) and Kanayo (2013), showed that increased education of the labor force appears to explain a substantial part of the growth of output in both developed and developing countries. In Ethiopia, some researcher such as Teshome (2006), Abdu (2014), Tewodros (2014 and 2015), Kidanemariam (2015), Dinkneh and Yushi(2015), Muhdin (2016)

and Tefera (2017) tried to study the relationship between human capital and economic growth using different types of human capital proxies like public expenditure on education and health and school enrollment. Their results indicated that, there is significant impact on output. But, study conducted by Woubet (2006), tried to investigate the impact of human capital on economic growth using schooling as variable of human capital and found that schooling has in-significant impact on the level of output. In this study the research will attempt to add value by using updated information and by classifying public expenditure of education in to different proxies, as public expenditure of primary and basic education, public expenditure of secondary education, and public expenditure of tertiary education in order to know which level of education more affect economic growth and help policy implication.

1.3 Research Questions

1. Does education human capital contributes to economic growth in Ethiopia?
2. What is the short run and long run relationship between education human capital and economic growth in Ethiopia?
3. What is the share of education from total GDP of Ethiopia?
4. Which level of education contributes more for Ethiopian economic growth and why?

1.4. OBJECTIVES OF THE STUDY

1.4.1 General objective of the Study

The general objective of the study is to assess the relationship between education human capital and economic growth in the period of 1978-2018 in Ethiopia

1.4.2. Specific objectives of the study

- To examine the share of primary, secondary, and tertiary education level from the total education level to economic or GDP.
- To analyze long and short run relationship between education and economic growth in Ethiopia.

1.5. Significance of the Study

This study deals with assessment of education human capital on economic growth in Ethiopia and expected to beneficial for different stakeholders, Such as for the researcher, government,

policymakers, and other economic agents. The study will be expected to improve the practical knowledge and skill of the researcher of this study by making familiar with factual evidence and general information of the relationship between education human capital and economic growth. It may also have some contribution to the formation of appropriate policy options regarding the subject area of education human capital and economic growth in Ethiopia and serve as a benchmark to conduct further research in this area.

1.6. Scope and limitation of the study

Undertaking research on the assessment of the effect of human capital proxied by education expenditure on economic growth at an international level is a complex task since it will require huge finance, time, and sufficient knowledge. These constraints may force the study to undertake a research at national level (in Ethiopia) and examine the relationship between education human capital and economic growth in Ethiopia. According to time frame, the study will be delimited with only 40 years of data from (1978 – 2018).

This research only concerns human capital proxies such as public expenditure on primary, secondary, and tertiary education, which is one limitation, because human capital includes other dimensions like health. Availability of data and accuracy will usually be a challenge for researchers in most developing countries like Ethiopia.

1.7. Organization of the Thesis

The paper would be organized into five chapters. Chapter one stands for introduction of the study. This chapter includes such essential parts of the study, background of the study, statement of the problem, research hypothesis, objective of the study, significance of the study and scope and limitation of the study. The literature review part of the study is presented in chapter two. This chapter discusses the views of other authors and previous researches on the field. It contains three sub parts. The first sub part discusses about the theoretical framework on better understanding aspects of human capital and economic growth. The second sub part presents a review of empirical studies on human capital, and the last sub part discusses about the conceptual framework of the study. Chapter three deals with research design and methodology used to carry out the study. It contains research design, model specification, data type, source and instruments of data collection and methods of data analysis. The next main

chapter is forth chapter. This chapter deals with the results and analysis of the findings. It contains data presentation, analysis of the result and interpretation. Finally, the last fifth chapter presents summary, conclusions and recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.1. Theoretical Literature Review

2.1.1. Definition and Concepts of Human Capital

Human capital is to mean the stock of skills, traits and knowledge that an individual possesses. It is important to be clear that there are multiple valuable skills, and that human capital does not just mean IQ. It is really only relatively recently that researchers have begun to map out the range of skills that can be considered part of human capital and we cannot yet determine precisely which types of human capital matter most in particular eras and contexts. Like other capital, human capital grows through being invested in, and that investment is called education. Not all education is done in schools; families are a very important part of the process. But education in schools is perhaps the primary lever for policies on human capital (Burgess, 2016)

2.1.2. Review of human Capital Theories

2.1.2.1 *The Early Theories on Human Capital*

The first estimate of a nation's stock of human capital was probably made around 1676 by Sir William Petty for his *Political Arithmetic* (published posthumously in 1690). Petty did not, however, use his estimate in support of any substantive hypotheses or in connection with any theoretical model for the derivation of causal connections. Exactly a hundred years later, in 1776, Adam Smith published his *Inquiry into the Nature and Causes of the Wealth of Nations*. Smith was quite clear about the role of human capital. In his discussion of the nation's "stock," he remarked on most people's preconception of the capital stock as always being something physical, such as factories, machines, or tools; and he warned the reader not to forget that one of the important parts of capital stock is the raised productivity of human beings. Smith considered education as one of the effective ways of increasing the productivity of human resources. That Smith was highly critical of the quality of teaching at Oxford University and of the counterproductive arrangements in the university education of his time should not be mistaken as an argument against capital formation through education. He emphasized the development of skill through specific kinds of training.

In 1883, a German statistician by the name of Ernst Engel published a book on the "Cost Value of Human Beings". So He treating the investment outlays made for man as productive factor; he

was chiefly concerned with the cost of food invested in the growing child. According to The English economist, Joseph Nicholson(1891), almost all systematic writers on Political Economy have discussed the question whether or not the skill of the artisan and other intangible elements of the social fabric should be included in the wealth of the individual or the nation. He looked to the cost of educating, not the cost of feeding the child, as the major investment in human productivity. Assessing the human capital accumulated in the people of the United Kingdom, he estimated that the total value of the country's living capita was more than five times the stock of dead that is, physical capital. Alfred Marshall also should be cited for his clear vision of these ideas. He distinguished "personal" capital from "material" capital; he considered personal capital as being chiefly formed through investment by parents paying and caring for the education of their children.

2.1.2.2 The New Theories on Human Capital

Coming to the twentieth century, John Raymond Walsh, published in 1935, entitled "Capital Concept Applied to Man". In 1945 other study was conducted by the pioneer Milton Friedman and Simon Kuznets on Income from Independent Professional Practice. This book undertook an elaborate empirical test of the thesis that investment in scarce skills was paying off. Gary Beker(1964), differentiated between general and specific human capital was training that would only benefit one company. General human capital would benefit the individual at any company; He found that companies would pay for specific human capital while individuals paid the general form. Firms would not invest in workers, who might then be poached by competitors. Beker's theory's explained how investing in education benefited people, companies and countries. That the theory is supported by research states with the highest education scores also have the highest incomes. The top stated spend 50% to 100 % more an education than the average, according to the national center for education statistics.

Becker (1962), in his Investment in Human Capital: A Theoretical Analysis, discussed schooling, information, and health as human capital investments, although he concentrated on in-house training, since he saw that it clearly illustrates the direct effect of human capital on earnings, employment, and other economic variables. In his earlier work, Underinvestment in College Education (1960), he had provided an important methodology for studying human capital investments, which was then put to the test and discussed in his monograph Human

Capital: A Theoretical and Empirical Analysis, with Special Reference to Education (1964). As well as pointing to the gap between physical inputs and observed growth in per capita income, by formulating a theory of human capital, Becker's goal was to formalize and incorporate the impact that the productive process itself has on worker productivity and to the theories of company behavior.

Meanwhile, Theodore Schultz (1962) highlighted the difficulties in distinguishing between expenses (consumption) and investment. He saw education exhibiting both characteristics. His work also encompassed many other types of human capital investment: (1) health facilities and services (in fact, anything that affects the life expectancy, strength, stamina, vigor, and vitality of people); (2) in-house training; (3) formal education; (4) study programs other than those organized by firms; and (5) the migration of individuals and families. Although Schultz maintained that the main reason for the sudden prominence of human capital theory was because it might well explain the gap between the inputs and observed growth, he also emphasized the failure of the post-war economists (having been one himself) to correctly ascertain the economic damage caused by the war. In his view, they had overestimated the importance of non-human capital and its destruction and underestimated or been blind to the role of entrepreneurs, the educated and skilled labor.

The economy in Europe bounced back much faster from the war than their traditional estimates had suggested. In addition, Schultz discussed the reasons why mainstream economists had followed Alfred Marshall and shied away from treating human beings and their attributes as capital. Even though there was the added convenience for marginal productivity analysis to treat labor as a bundle of innate abilities free of capital, the main reasons this kind of intangible capital had been ignored rested on moral and philosophical considerations – certain values and beliefs inhibit us from seeing other people as capital goods. Indeed, some of the problems thought to be inherent in the idea of human capital were exposed early on in the debate between (Shaffer, 1961; Schultz, 1962).

Contemporary human capital research has thus seemed to have been more interested in the intangible side (e.g., education, skills, and innovation), than in the tangible side (e.g., health,

longevity, vitality). Nevertheless, although sidelined, this tangible side is alive and well in health and population studies. Before the interest of the 1950s and '60s in human capital, statisticians and investment actuaries most commonly assessed human beings within an analytical framework of capital. These cost-of-production and capitalized earnings approaches were developed to estimate the money or capital value of a human being, or the population of a nation. Sometimes people were seen as capital goods, and there were no distinctions made between human beings and their skills, abilities, education and health. But since these views focused on measuring the value, production costs, and maintenance costs of human beings, they are treated here only as and when they appear in the relevant literature. Acquired skills as capital and the idea of investment in human beings as a means of increasing productivity are the relevant ideas here. Michael Spence's signal theory based on the idea of asymmetric information is usually discussed in connection with human capital in economics textbooks. Spence argued that investing in the labor market was like buying lottery tickets for employers, because although potential employees might have knowledge about their own genuine attributes, the employer was more or less in the dark. Educational credentials, it was argued, thus functioned as signals of inherent capabilities to prospective employees. The theory has many consequences for human capital theory, one of them being whether education systems might function merely as signaling mechanisms for employers above all else. Such idea comes close to the physical human capital theory that was growing popular towards the end of the 19th century especially among Léon Walras, Vilfredo Pareto, and Irving Fisher. They argued that the natural ingredient was inseparable from the value that education brought to human beings. One concept slightly different from the standard idea of human capital, developed through a combination of education and in-house training, is the concept of 'personal capital' used by Ottati (1994) and Becker (1996).

Tomer (1996) understood individual predispositions as determined by a person's basic behavior, and this depended on one's physical and psychological makeup (both inherited and acquired). Such predispositions related to one's internal biochemical balance, physical health, conditioning, and psychological tendencies. Whereas the knowledge one learned about accounting management, or other skills was ordinary job-related human capital, acquiring more self-understanding and self-esteem were about personal capital, because such capital would be likely to improve one's ability to obtain the optimal satisfaction from life's activities. This change in personal qualities would

also have job-related consequences, because improved interpersonal competence could lead to greater individual productivity and compensation. Tomer wrote that personal capital was therefore an antecedent to job-related human capital, because a person's capabilities were built on one's personal qualities and predispositions. Ottati understood personal capital to function as a kind of reputation generated by repeated cooperative behavior greater than that prescribed by local customs. Such a reputation of trustworthiness brought returns by allowing such a reputed person to conclude advantageous transactions.

2.1.3. Growth Theories

There are different types of theories of economic growth such as Harrod-Domar which is classical economic theory, Solow-Swan it is neoclassical economic theories, and the new economic theory or endogenous growth theories, can be influenced by economic factor. It starts from the observation that technological progress Endogenous growth theory explains long-run growth as emanating from economic activities that create new technological knowledge. It is long-run economic growth at a rate determined by forces that are internal to the economic system, particularly those forces governing the opportunities and incentives to create technological knowledge. In the long run the rate of economic growth, as measured by the growth rate of output per person, depends on the growth rate of total factor productivity (TFP), which is determined in turn by the rate of technological progress. The neoclassical growth theory of Solow (1956) and Swan (1956) assumes the rate of technological progress to be determined by a scientific process that is separate from, and independent of, economic forces.

Neoclassical theory thus, implies that economists can take the long -run growth rate as given exogenously from outside the economic system.

Endogenous growth theory challenges this neoclassical view by proposing channels through which the rate of technological progress, and the long- run rate of economic growth takes place through innovation, in the form of new product, processes and markets, many of which are the result of economic activities. For example, because firms learn from experience how to produce more efficiently, a higher pace of economic activity can raise the pace of progress innovation by giving firms more production experience. Also, because many innovations result from Research and Development expenditures undertaken by profit-seeking firms, economic policies with respect to trade, competition, education, taxes and intellectual property can influence the rate of

innovation by affecting the private costs and benefits of doing Research and development (Howitt and Aghion, 1998).

2.2. EMPIRICAL LITERATURE REVIEW

2.2.1. Empirical Studies on Human Capital

When studies examining human capital and economic growth are taken into consideration, it is determined that the studies mostly utilized the Cobb-Douglas production function, used by Lucas (1988), which includes the human capital variable. Also, it has been seen that the indicators related to education representing human capital have been used in the great majority of studies. As a result of the studies, it has been stated that education generally has positive effects on economic growth. Romer (1989) assesses the effect of human capital level on economic growth for 112 countries using annual data for the period of 1960-1985. The literacy rate representing the human capital was used in the study, since it can be obtained for a large country set and allows for an easier comparison between countries. As a result of regression analysis for the models he has established, he has found that the literacy rate positively affects economic growth.

Barro (1991) conducted a study on 98 countries for the years 1960-1985, and observed that there is a positive relationship between per capita real GDP and the level of human capital represented by primary and secondary school enrollment rates. He has found that birth rates are lower and investment rates are higher in countries with higher level of human capital. Mankiw et al. (1992) also examined the effect of human capital on economic growth. Ratio of high school graduate working population representing human capital. As a result, they found that the higher saving rate is, the higher education level and the greater population have significant effects on per capita income. So, both Barro and Mankiw et al. (1991) concluded that schooling has a significantly positive impact on economic growth.

Wilson (2004) provides an in-depth appraisal of a wide body of international research that examines the links between education and training in a country and its macroeconomic growth. An initial analysis of broad statistics for all EU Member States suggests a loose correlation between investment in human resources and growth in gross national product (GNP), but clear

causal relationships are difficult to establish. Increased investment in education is shown to lead to higher productivity and earnings for the individual and similarly, such investment results in significant social rates of return. The returns on investment in vocational training are more difficult to demonstrate. This study reviews a large number of growth models that attempt to specify and quantify the GNP and human resource relationship. Wide differences are found in the model specifications, the quality of the data inputs and the results obtained. Other links between investment in human capital and economic performance are reviewed using diverse literature sources on human resource management, corporate market value, company size, and industry structure. The indirect impact of education on non-economic benefits is also examined in the context of the technological, spatial and environmental gains to society. It is concluded that, overall, the impact of investment in education and training on national economic growth is positive and significant.

Kanayo, (2013) used the Error Correction Model as an analytical tool, and examines empirically the relationship between economic growth and human capital development. The study made use of secondary data and examined the time series characteristics of the variables selected, to avoid the problems of spurious correlation often associated with non-stationary time series to concurrently generate long-run equilibrium relationships. In order to achieve linearity, logarithmic calculations were used to examine the variables. Generally, the estimation of the model showed that the variables included in the model provided basic information on the nature of impact on economic growth. Findings also showed that investment in human capital in the form of education and capacity building at the primary and secondary levels impact significantly on economic growth, while capital expenditure on education was insignificant to the growth process.

According to Shi Mei-Ling (2014) human capital formation plays a striking role in economic development. Based on the data of human capital investment, material capital investment of Henan Rural areas from 1995 to 2012, the article analyses the relationship between human investment and economic growth using classical production function. The conclusion is the human investment plays more importance role to gross economic growth than the material capital investment, and also the

contribution because of lower level of investment of human capital investment and the economic growth steered by material increasing .So, on the basis of results, it puts forward the advice on policy

Oreffice (2015), investigate relationship between Human Capital Development and Economic, Growth in Nigeria. It employed a variety of analytical techniques including: unit roots, co-integration, and growth error correction model (ECM) and granger causality tests. The human capital model of endogenous developed by Mankiw et al. (1992) was used for the study. The study also utilized annual time Series data from 1970-2012. This study used government expenditure on education and health as well as schools' enrolment to proxy human capital development while economic growth was proxies by real GDP. The findings include the existence of a short-run and long run relationship between human capitals development and economic growth in Nigeria. On the direction and significance of the relationship, the result is mixed. Human capital development proxies by government expenditure on education and health are insignificant in determining economic growth while, a human Capital development proxy by school's enrolment (except PEE) has a positive and significant effect on economic growth. Furthermore, in the short-run the investment in human capital is insignificant in determining economic growth. In conclusion, this study discovered a positive relationship between human capital development and economic growth in Nigeria although the relationship is weak.

Muhdin (2016) conducted deep literature review on 12 papers conducted in Ethiopia between year 2011 and 2015. The review result shows that economic growth, as measured by GDP, is highly and positively influenced by human capital investment and export in both short and long run. In the same token, public expenditure (for productive sector), private investment, real exchange rate and household consumption are also important in determining economic growth, especially in the long run.

Wang and Liu (2016) a panel data model to investigate the effect of education human capital on economic growth, using the latest education data of 55 countries and regions from 1960 to 2009. Meantime, by subdividing education human capital into higher education, secondary education and primary education, it also examines the effect of different education level on economic growth. Furthermore, while introducing health human capital into the model, we explored the

influence of different economic development level and some important historical events. The result shows that in general, education human capital has a significant positive impact on economic growth. The positive impact of higher education on economic growth is especially significant, however, the primary education and secondary education does not have a significant impact on economic growth; as for human capital, life expectancy and per capita GDP growth also showed a significant positive correlation. Muhammed et al. (2017), examined Using data for 132 countries over 15 years, the empirical results reveal that human capital plays a positive role in per capita GDP growth only in the presence of better economic opportunities and high-quality legal institutions. In fact, economic opportunities reinforce the effect of human capital on growth: the easier it is to do business and trade domestically or internationally, the stronger the effect of human capital on growth.

In Ethiopia some researcher tried to study the relationship between human capital and economic growth. For example the analysis done by Teshome (2006) investigated, the impact of various components of government spending (consumption, investment, and human capital) on the growth of real GDP for the period 1960/61-2003/4, it is found that only on human capital have long run significant positive impact. And also all components of government expenditure do not have significant meaning in explaining economic growth. Woubet (2006), investigated the impact of human capital on economic growth in Ethiopia using an error correction method and found that human capital variable in the form of schooling has an insignificant impact on the level of output. On the other hand, Abdu (2014) examined the relationship that can be revealed between real gross domestic product and various composition of government expenditure like: education, health, transport and communication, urban development and housing, total capital expenditure and total recurrent expenditure in Ethiopia.

The output of this research showed that expenditure on health and total capital expenditure is both positive and statistically significant in explain the growth of Ethiopian economy. However, expenditure on education, health, transport and communication, urban development and housing, and total recurrent expenditure are statically insignificant.

Tewodros (2014) investigated the relationship between education and health that are accepted as an indicator of human capital and economic growth is tested empirically. The study aimed at decomposing the relationship between human capital (using health index and education index as a proxy) and economic growth using time series data from 1971- 2011 in Ethiopia using modern econometrics technique. The finding indicates that in the long run investment on education and health would affect further economic growth. Hence policy makers and / or the government should strive to create institutional capacity that increase school enrolment and improved basic health service by strengthening the infrastructure of educational and health institutions that produce quality manpower. In addition to its effort, the government should continue its leadership role in creating enabling environment that encourage better investment in human capital (education and health) by the private sector. So any countries policy designed to promote economic growth should have to consider priority in health and education.

According to Dinkneh and Yushi (2015) human capital stock proxies by primary, secondary and tertiary school enrolment and human capital investment proxies by expenditure on Education and health have shown public expenditure on health and education, primary and secondary school enrolment have positive statistically significant effect on economic growth both in long run and short run. However, tertiary school enrolment has insignificant effect on economic growth both in long run and short run. Kidanemariam (2015) analyzed the impact of human capital on economic growth in Ethiopia. The finding of this research shows that there is a stable long run relationship between real GDP per capita, education human capital and health human capital.

The estimated long run model indicates that human capital in the form of health have big positive impact on real GDP per capita rise followed by education human capital. The findings of this paper imply that an economic performance can be improved significantly when the ratio of public expenditure on health to GDP increases and when secondary school enrolments get better. But the study did not include primary and tertiary school enrollment. Tewodros (2015) investigated that there is a steady long run relationship between real GDP, Physical capital, and human capital. The empirical results reveal that both physical capital and human capital are found to have positive impact on economic growth. So, the findings of this study imply that

economic growth can be enhanced significantly when the physical capital and human capital increases.

Tefera (2017) examined the impact of human capital on economic growth in Ethiopia. The finding shows that there is a stable long run relationship between real GDP, education expenditure, health expenditure, and school enrolment. The result of this research showed that expenditure on health and expenditure on education are positive and statistically significant long run and short run effect on economic growth of Ethiopia. However, school enrolment is statically significant and negative long run and short run impact on economic growth. Work and Urgaia (2018) studied the role of human capital resources in economic growth. In economic growth, human capital is an important stock component that can affect the gross national income GNI more than gross domestic product GDP since GNI comprises the GDP itself and other income resources obtained from abroad. The empirical results of transmission mechanism channels in vector autoregressive model indicate that the observed human capital has long-run effects on the national income in a panel of nine East African countries from the year 1980 to 2015. The short-term transmission mechanism channels show that there is an important contribution of human capital resources HCR to the development of physical capital stock through GNI. The GNI has also a positive impact on the accumulation of physical capital stock via HCR. In addition, this study also applies the time scaling decomposition of a panel wavelet analysis in Granger causality tests. The tests show that HCR and the GNI have a bi-directional causal relationship in the short-run, medium-and long-run. The recent trend shows that East Africa has the lowest level of human capital development which raises the issues of employment challenges faced by women more than men although it has achieved a rapid growth in expanding education.

2.3. Conceptual Framework

The conceptual framework shown in Figure 1 indicates that, economic growth is dependent on the physical capital, human capital, and labor force. From the theoretical and empirical literature reviews, the following conceptual framework of the study was developed by the researcher.

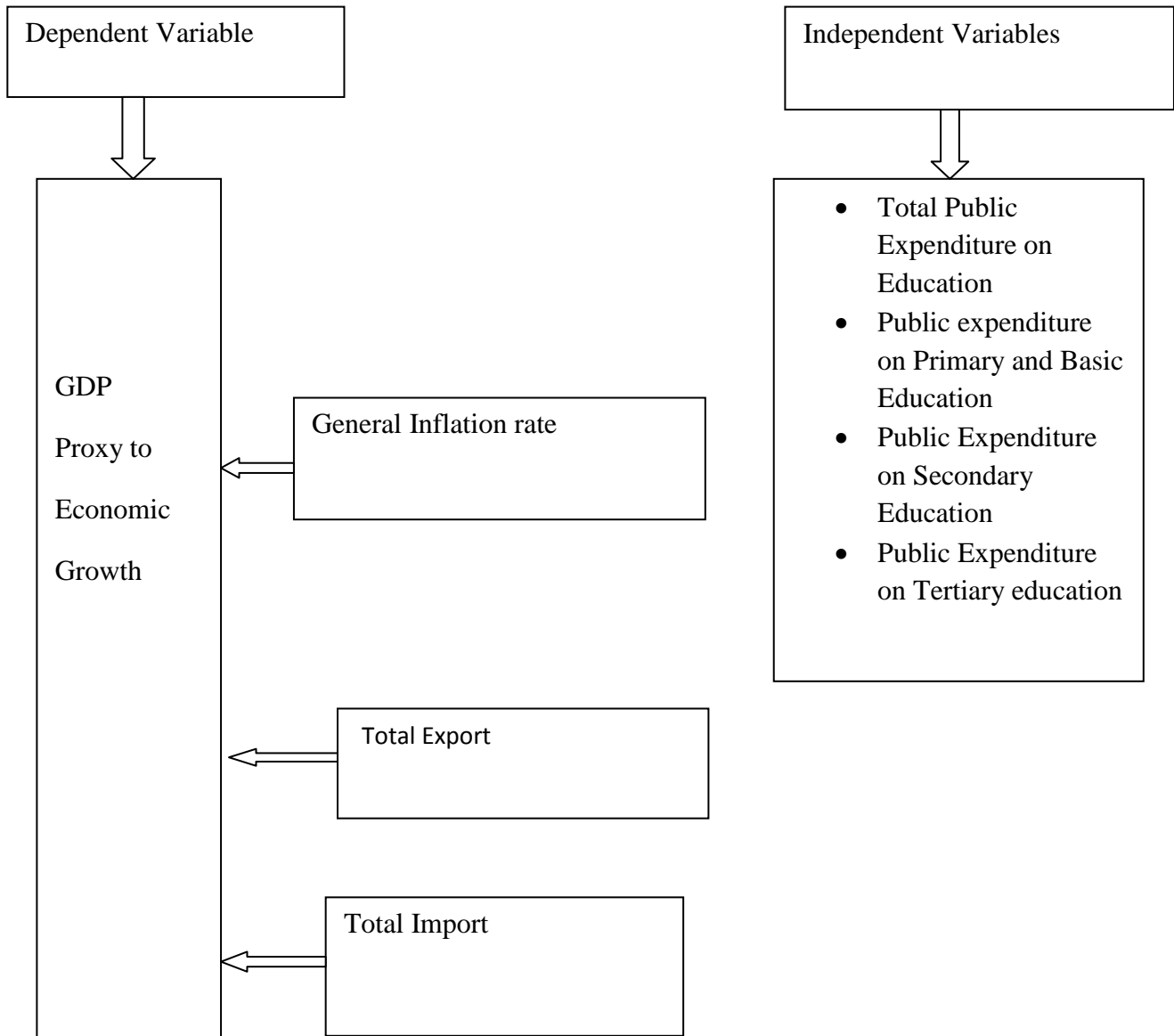


Figure 2.1. The conceptual framework of the study

Source: Compiled by the researcher (2019)

CHAPTER THREE: RESEARCH METHODOLOGY

This chapter deals with research methodology used to carry out the research. The chapter was organized in five subsections. Research design, data source, type, and methods of collection, method of data analysis, definition of variables and hypothesis development would be discussed in this chapter.

3.1. Research Design and Research Approach

According to Bhat (2019), Research design is defined as a framework of methods and techniques chosen by a researcher to combine various components of research in a reasonably logical manner so that the research problem was efficiently handled. It provides insights about “how” to conduct research using a particular methodology. Every researcher has a list of research questions which need to be assessed. This can be done with research design. Research approaches are plans and the procedures for research that span the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation Cherryholmes (2012). There are different types of research approach. Quantitative research approach is one type of research approach, for testing objective theories by examining the relationship among variables. These variables, in turn, were measured, typically on instruments, so that numbered data was analyzed using statistical procedures. The final written report has a set structure consisting of introduction, literature and theory, methods, results, and discussion Cherryholmes (2012).

This study was designed to examine the relationship between education human capital and economic growth in Ethiopia from 1978 to 2018. In order to accomplish this study the researcher was used longitude in a research design with quantitative research approach to determine the relationship between dependent variable and independent variables. Longitude in all researched sign in values repeated observations of the same variables. The study will explain the results by comparing with empirical evidences. Hypotheses will formulated and tested on the basis of empirical reviews on similar subject matter.

3.2. Data Source, Type and Methods of Collection

The main objective the study was to examine the relationship between Education human capital and economic growth both in the short and long run in Ethiopia. The data for study would obtained from MOE, (Ministry of Education), World Bank, Ethiopian CSA (Central Statistics Agency), NBE (National bank Ethiopia), Ethiopian Economic Association (EEA), and Ministry of Finance

(MOF). The study was based on the multivariate time series data. The data would be taken yearly base; from the period 1978-2018. The period was specified based on the availability of data. The study was employed by the STATA version 14 statistical software.

3.3. Methods of Data Analysis

This study was developed based on descriptive analysis and empirical vector error correction model result analysis. It provides the descriptive analysis of the multivariate time series data and variables for the study of collaboration analysis between dependent and independent variables, deals the results of the data analysis that constitutes the findings of the study.

3.3.1. Descriptive statistics

Descriptive data analysis is vital in determining the statistical properties of the model in order to select the proper functional form of the estimated model Christina(2013). The descriptive statistics explores and presents an overview of all variables used in the analysis. In this section the minimum, maximum, mean, standard deviation of the variables were produced for the variables under study. Also a graphical and tabular analysis of the variables would be conducted to capture their movement over time.

3.3.2. Econometrics model specification

Human capital plays a special role in a number of models of endogenous economic growth (Barro, 1991). Endogenous growth theory as developed by Lucas (1988) basically represents an extension of the Solow (1956) neoclassical growth model in corporation positive externalities related to the accumulation of human capital through knowledge. Different scholars have designed different conceptual frameworks that incorporate human capital as one of the determinant factor of economic growth. These researchers have employed the human capital augmented Solow growth model (Cobb- Douglas production function as their framework, specifying output/ output per worker as dependent variable while labor, physical Capital and human capital are dependent variables. According to Lucas, (1988) human capital is an important source of long term growth because of its positive policies that enhance investment in human capital, therefore promote long run growth.

Cobb-Douglas production function in the study, taking output growth has a dependent variable while growth in labor, growth in physical capital and growth in human capital were taken as explanatory variable. In this study the impact of human capital on economic growth in Ethiopia

is analyze based on the standard growth accounting model. The augmented Solow production function specifies that output is a function of labor, human capital, capital stock and productivity Mankiw et al.(1992), explain the relationship as follow in a Cobb-Douglas production function with constant returns to scale.

The general form of human capital augmented Cobb-Douglas production is shown below:

$$Y_t = AK_t^\alpha H_t^\beta L_t^{1-\alpha-\beta} \quad \alpha + \beta < 1$$

Where Y_t represents output at time t , A is the level of technology which is not accounted by the growth in factors of production. K_t , H_t and L_t are physical capital, human capital and labor at time respectively. α , β and U are, elasticity of physical capital with respect to output, elasticity of human capital with respect to output and an error term respectively.

$$\ln Y_t = A + \alpha \ln K_t + \beta \ln H_t + \Theta \ln L_t \quad , \text{ where } \Theta = 1 - \alpha - \beta$$

Based on theoretical framework developed by Mankiw, Romer and Weil (1992) the following model is specified.

$$\ln \text{RGDP}_t = (\ln \text{PEDU}_{EXt}, \ln \text{SCEDUEX}_t, \ln \text{TEDUEX}_t, \ln \text{TEXP}_t, \ln \text{TIMP}_t, \ln \text{IR}) \text{ Then,}$$

$\ln \text{RGDP}_t =$ Where:

$\ln \text{RGDP}_t =$ Natural logarithm of real GDP at time t .

$\ln \text{TEDUEX}_t =$ Natural logarithm of Total public Education Expenditure at time t

$\ln \text{PEDUEX}_t =$ Natural logarithm of Primary and Basic Education Expenditure at time t

$\ln \text{SCEDUEX}_t =$ Natural logarithm of Secondary Education Expenditure at time t

$\ln \text{TEDUEX}_t =$ Natural logarithm of Tertiary Education Expenditure at time t .

$\ln \text{TEXP}_t =$ Natural logarithm of Total Export at time t

$\ln \text{TIMP}_t =$ Natural logarithm of Total Import at time t

$\ln \text{GIR}_t =$ Natural logarithm of gross Inflation rate at time t

U_t = Error Term

In this study, the real GDP used as a proxy for economic growth. The Total government expenditure on education, Government expenditure on Primary and basic education, Government expenditure on Secondary education, and Government expenditure on Tertiary education were proxy to Human capital, inflation rate, Total export and Total import were control variables, based on theoretical and empirical literature.

3.3.3. Estimation techniques

To comply with the objective of this study, unit root test, co-integration test and Granger causality test were conducted before VECM estimation and conduct, normality test and stability test after estimation. The significance of each explanatory variable would be determined by F-test at 95% confidence level. The adjusted R² would be used to measure the strength of explanatory variables to explain the variations in the explained variables.

3.3.1 Unit Root Tests

A test of stationary or non-stationary that has been become popular over the past several years is the unit root test. The Dickey and Fuller (AD) and the Augmented Dickey-Fuller (ADF) tests are the most usually used tests for unit root. Most of the economic -stationary and the use of non-stationary time series lead to spurious regression which cannot be used for precise decision. Variable is said to be stationary if it's mean, variance and auto-covariance remains the same no matter at what point we measure them. The null hypothesis of non-stationary is tested against alternative hypothesis of stationary. In this study the stationary was tested by using unit root test. Unit root test is investigation of the characteristics of the individual time series variables involved (Gujarati, 2004)

Therefore using such critical values can lead to over-rejection of the null hypotheses when it is true (Ibid). Hence, Dickey and Fuller have developed a test known as the Augmented Dickey-Fuller (ADF) test to solve this kind of difficulty Green (2004).

In the AD F test, the lag of the first difference dependent variable was added in the regression equation until the auto correlation problem would be resolved. The parameter of interest in the ADF model was Φ and the null and alternative hypothesis that will be tested are as follows: Ho:

$\Phi = 0$, $H_a: \Phi < 0$ The ADF test procedure for unit roots is similar to statistical tests for hypothesis. But, the critical values of the tau test to test the hypothesis Gujarati (2004).

3.3.3.2. Co-integration tests

Co-integration is a statistical property that describes long run relationship of economic time series. To analyze the relationship between GDP and human capital, the study was used autoregressive distributed lag (ARDL) approach which appears in recent empirical investigation. The econometrics advantage of ARDL approach is applicable irrespective of the degree of integration of the variable (i.e. whether the variable $I(0)$, $I(1)$ or mixture of the both), performs better for small sample size, long run and short run parameters of the model are estimated simultaneously. If the all variables are $I(1)$ this study used error correction mechanism (ECM) model.

The ARDL procedure provides unbiased and valid estimates of the long run model. A mentioned advantage, the researcher has used the ARDL method of co-integration to investigate the impact of human capital development on economic growth. The ARDL approach involves two steps for estimating the long-run relationship Pesaran et al.(2001).The first step is to examine the existence of long-run relationship among all variables in an equation and the second step is to estimate the long-run and short- run coefficients of the model. We run the second step only if we find a co-integration relationship in the first step. Therefore following the ARDL approach proposed by Pesaran (1997) and Shin (1999) and Pesaran et al. (2001), the following model is specified in order to determine or test the long-run co-integration relationships between variables.

The advantage of ARDL First, the ARDL model is them or statistically significant approach to determine the co integration relation in small samples as the case in this study Pesaranetal.2001and Narayan (2004).

As second advantage of the ARDL approach is that while other co integration 3 techniques require all of the repressors to be integrated of the same order; the ARDL approach can be applied whether the repressors are purely order zero [$I(0)$],purely order one [$I(1)$],or mixture of

both. This means that the ARDL approach avoids the pre-testing problems associated with standard co-integration, which requires that the variables be already classified in to I (1) or I (0) or mixture of both Pessaranetal. (2001).

Third, with the ARDL approach, it is possible that different variables have different optimal numbers of lags. Forth, the other advantages of bound test in approach in the long run and short run parameters of the model in questions are determined simultaneously.

3.3.3.3. Granger causality test

The concept of granger causality relates to improve whether one variable forecast of another. A variables X is said to be caused by a variable Y, if X can be predicted better from past values of both X and Y than from past values of X alone. Granger causality tests are forecast capacity tests. To know what extent does one series enclose information about the other series? It is better indicator of precedence than a real causal identification.

Before using the multivariate Granger causality test, it should be ensure all the variables are in stationary level. If there is no co-integrating, multivariate Granger causality tests are executed through first differencing the variables of the vector auto regression (VAR) model. This is supported by Engle and Granger, (1987) who argue that if two time series are co-integrated then they are necessarily causally related. It is therefore important to test for stationary properties of variables before operating the Granger causality tests. Later, Sims, (1972) contended that Granger causality in a bi-directional causality or bi-directional causality between endogenous and exogenous variables. In this study the researcher was tested the causality between dependent and independent variables.

3.3.3.4. Normality test

The model assumes that the random variable “U” has a normal distribution. This means that small values of U’s have a higher probability to be observed than large values. This assumption is necessary for conducting statistical tests of significance of the parameter estimates and for constructing confidence intervals. If the assumption of normality is violated, the estimates of parameters are still unbiased. However, the statistical reliability by the classical tests (t-statistic

& F-statistic) of significance of the parameter estimates cannot be assessed, because these tests are based on the assumption of normal distribution of the u 's (Gujarati, 1995).

3.3.3.5. Stability Test

The stability test is used to check the variables are stable or not. The researcher was done this test to check the variables are stable or not.

3.4. Definition and Hypothesis of Variables

3.4.1. Definition of variables

A variable is any condition that can vary or change in quantity or quality.

According to the research objective and research questions, this study will set the variables and their measurements that are largely adopted from existing literature. The dependent variable of this study is real GDP and independent variables are public expenditure on primary education, public expenditure on secondary education expenditure, public re on tertiary education, foreign aid, gross inflation rate, gross capital formation and labor force.

The dependent variable is proxy and indicators of economic growth and the independent variables are proxy and indicators of, human capital, physical capital and labor force respectively.

A. Dependent Variable

It is the behavior that is potentially affected by the treatment and that we measure. The dependent variables are always a measure of behavior that we record after manipulating the independent variables. It is referred to as dependent because, changes in it depend on the effects on independent variable.

The other names of dependent variable are explained variable, predicted variable, target variable, endogenous variable and regressed variable Gujarati (2004) and Brook (2008).

Real GDP

Real GDP is an inflation adjusted measure that reflects the value of all goods and services produced by an economy in a given year, expressed in base year prices, and is often referred to as constant price. Real GDP is expressed by percentage of Nominal GDP divided by Price index Mankiw (1992).

Real GDP is the better indicator of economic growth. Therefore, the study will customize

economic growth as dependent variable and the proxy variable of economic growth is real GDP.

B. Independent variables

An independent variable is defined as the variable that is changed or controlled in a scientific research. It represents the cause or reason of an outcome. They are the experimenter changes to test the dependent variable. A change in independent variable directly causes to change the dependent variable. The other names of independent variable are explanatory variable, predictor variable, repressor variable and exogenous variable Gujarati (2004) and Brook (2008).

Expenditure on Primary and Basic Education

It is money spent on formal primary school, on-the job-training and off-the-job training. Giving more emphasis to education is raising the productivity of workers by providing useful knowledge and skills.

Expenditure on Secondary Education

It is money spent on the formal secondary school, on-the job-training and off-the-job training. Giving more emphasis to education is raising the productivity of workers by providing useful knowledge and skills.

Expenditure on Tertiary Education

It is money spent on the formal tertiary school, on-the job-training and off-the-job training. Giving more emphasis to education is raising the productivity of workers by providing useful knowledge and skills.

General Inflation

Inflation is defined as an increase in the overall price level in a country and measured in percent. In Ethiopian history inflation was not a problem of economic growth. However, starting 2008 it is a serious problem. Therefore to analyze its effect on economic growth, it is the other interest of the researcher's, which is included in this study as independent variable. The coefficient of this variable would be expected a negative sign. As we discussed earlier, this study will used annual secondary data from 1978 to 2018.

Total Import

It is a goods and services brought in to a jurisdiction, especially across a national border, from external source.

All of the variables discussed above are given in logarithm form. The log-linear form of specification enables the researcher to interpret the coefficient of the dependent variables directly as elasticity with respect to the independent variables.

Among numerous potential indicators of economic growth identified in previous related studies and the researchers practical assessment in public expenditure on primary education, public expenditure on secondary education, public expenditure on tertiary education, foreign aid, gross inflation rate, gross capital formation, and labor force rate are independent variables for measuring the effects of human capital, physical capital development and labor force respectively.

C. Hypothesis of variables

Table 3.1 Description of variables and their expected relationship

	Variables	Proxy	Notation	Expected Result
Dependent Variable	Real GDP	Economic Growth	RGDP	
Independent Variables	Total public Expenditure on Education	Human capital	TEDUEXP	Significant and Positive
	Public Expenditure on Primary and Basic Education	Human capital	PEDUEX	Significant and Positive
	Public Expenditure on Secondary Education	Human capital	SECEDUEX	Significant and Positive
	Public Expenditure on Tertiary Education	Human capital	TEDUEX	Significant and Positive
	Gross Inflation Rate	Gross Inflation Rate	GIR	Significant and Negative
	Total Export	Total Export	TEXP	Significant and Positive
	Total Import	Total Import	TIMP	Significant and Negative

Source: Compiled by the researcher (2019)

CHAPTER FOUR: RESULT AND DISCUSSIONS

This chapter analyses the effect human capital proxed by education expenditure on economic growth in Ethiopia using annual data from 1978-2018. It contains both descriptive and econometric analysis. Under descriptive part discussed the trend and growth status of the variables and share of independent variables within itself and with the dependent variables. Before employing direct estimation of the model, it was tested the unit root test to check whether the time-series is stationary or not. After identifying the optimal lag length, the presence of the co-integrating test using the Johansen procedure and done Granger causality test to identify its causality. Following estimation of long run and short run relationship employed autocorrelation, normality and stability tests.

4.1. Description of Variables

4.1.1. Trends of real GDP and its growth in Ethiopia from 1978-2018

Economic growth of Ethiopia shows only little improvement until 2003. After 2002, it showed significant improvement and then after upraised consistently. Within these periods, there was governmental change in 1991. However, this event did not create improvement on economic growth of the country in 1993 there was economic reform, so there was moderate improvement in real GDP, it reached birr 1,907.48 in 2002.

As we can see in figure 2 below, According to the data, the variance of the growth from 1978 to 2003 was not surprised, which rise from birr 99,233.13 million to birr 197,604.40 million which was only a change of birr 98,371.27 million within 25 years, it increased only 50.3%.

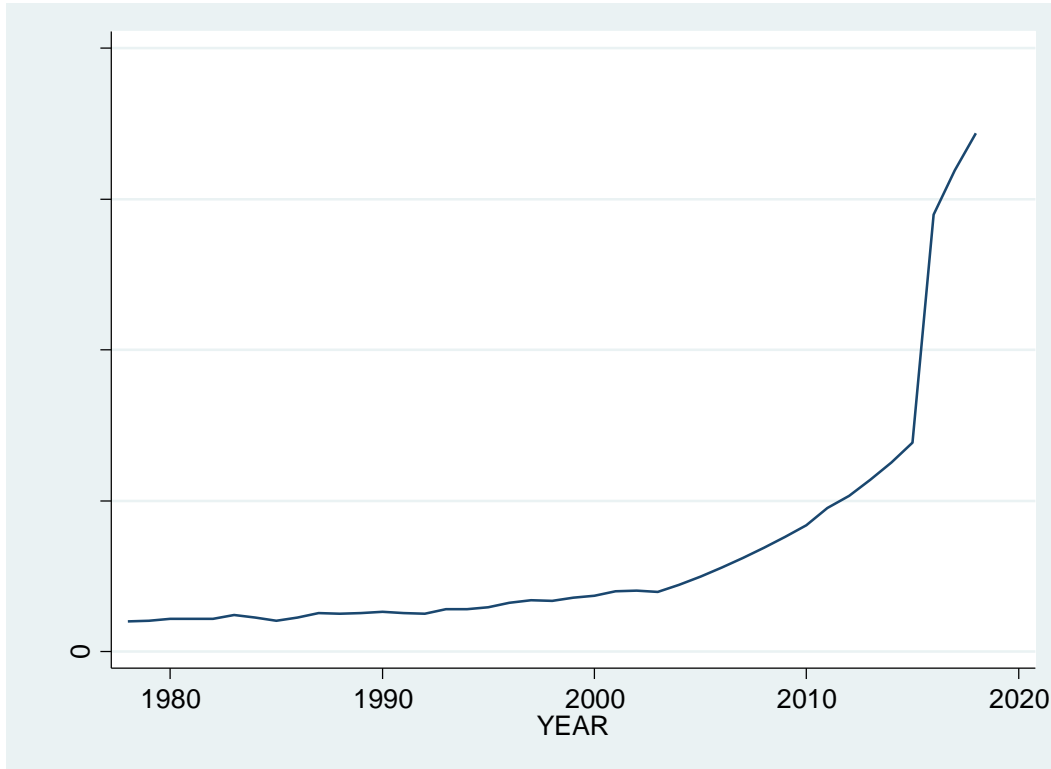


Figure 4.1 Trend of real GDP in Ethiopia from 1978-2018

Source: Model result (2019)

After 2002 the improvement came from the implementation of developmental state in the country in 2003. As a result, economic growth started to grow up. After 2003, it shows modest improvement constantly until 2015, it raised from birr 197,604.40 million to birr 692,222.86 increased by birr 494,618.46 million. It increased by 71.45 % within 12 years. However, from 2015, it shows dramatic growth. It rises to birr 1, 717,795 million within three year.

4.1.2. Trends and the share of public expenditure from Real GDP in Ethiopia from 1978-2018

This part of descriptive analysis was showed the trend and growth of public expenditure on education of total, primary and basic education, secondary, and tertiary education. Also, described the share of total education expenditure from GDP. To add more concerned about the share of primary and basic education, secondary and tertiary education from total public expenditure on education.

4.1.2.1. Trends of total expenditure on education and growth in Ethiopia from 1978-2018

As shown below in figure 3, the trends of total public expenditure on education in Ethiopia had very small change which was stagnant until 2003. Within these periods there was government change in 1991, number of schools decline due to departure of Eritrean schools from Ethiopian schools in 1991/1992. After 2002, government tried to increase spending on education, because government adopted developmental state during 2002 by giving big concern to education because without improving knowledge it is not easy to bring economic growth in Ethiopia so, government raised its expenditure on education from birr 2,395.43 million to birr 8,008.50 million in 2003 and 2009 respectively. After 2009 government dramatically increased spending for education from birr 9,654.20 million in 2010 to birr 38,169.60 million in 2015, which was increase by birr 28,515.40 million because government was plan to implement GTPII from 2010-2015. After 2015 government increased expenditure on education to birr 65,313.67 million in 2018.

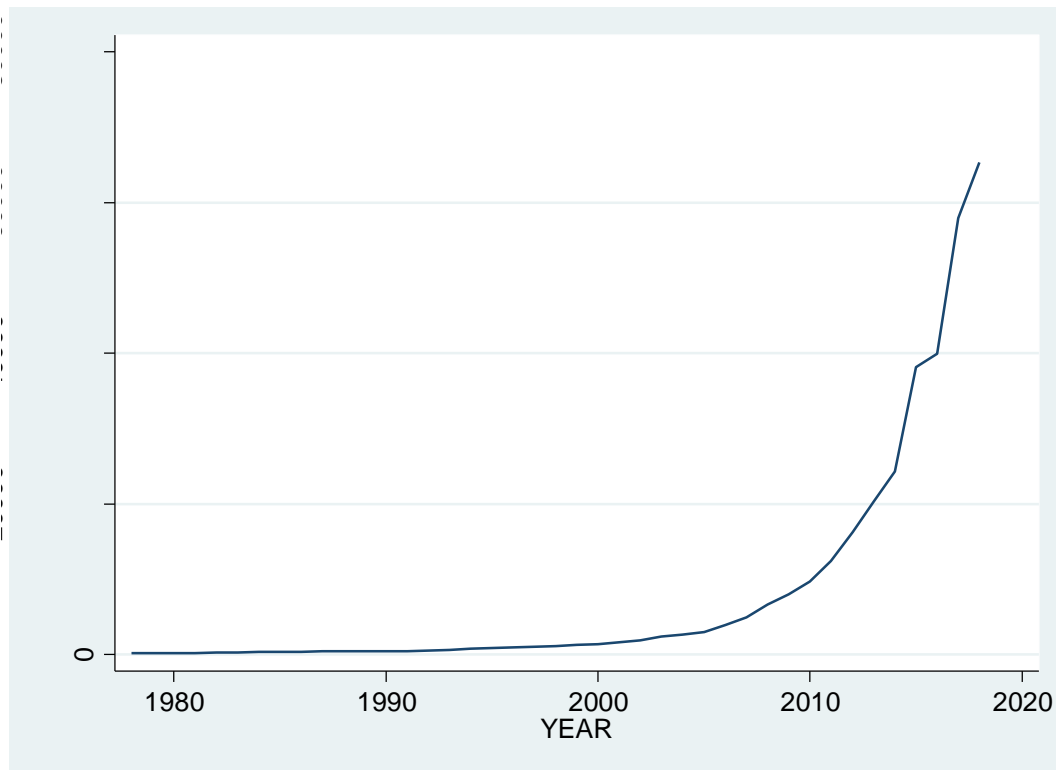


Figure 4.2: Trend of total public expenditure on education in Ethiopia from 1978-2018

Source: Model result

4.1.2.2. The share of total public expenditure on education and growth in Ethiopia from 1978-2018

The share of total public spending on education from GDP was 0.34% in 1991 which was less than 1%. It was a very small amount of money spent on education. At that time there was a governmental change, that was the overthrow of the Derg regime. In 1993, there was economic reform in Ethiopia as a result, the share of total spending from GDP to education increased to 0.43, still it was less than 1%. In 2002, the government adopted a developmental state, GDP share to total public education expenditure was increased to 1.2%. This change was due to the government's big concern for education in order to bring economic growth. Up to 2015, its share from GDP was increased and reached 5.51%. But, as shown below from the figure after 2015, the share of total public education expenditure from real GDP was decreased and reached around 3.8% in 2018, which is still a very small amount of money spent on education in Ethiopia.

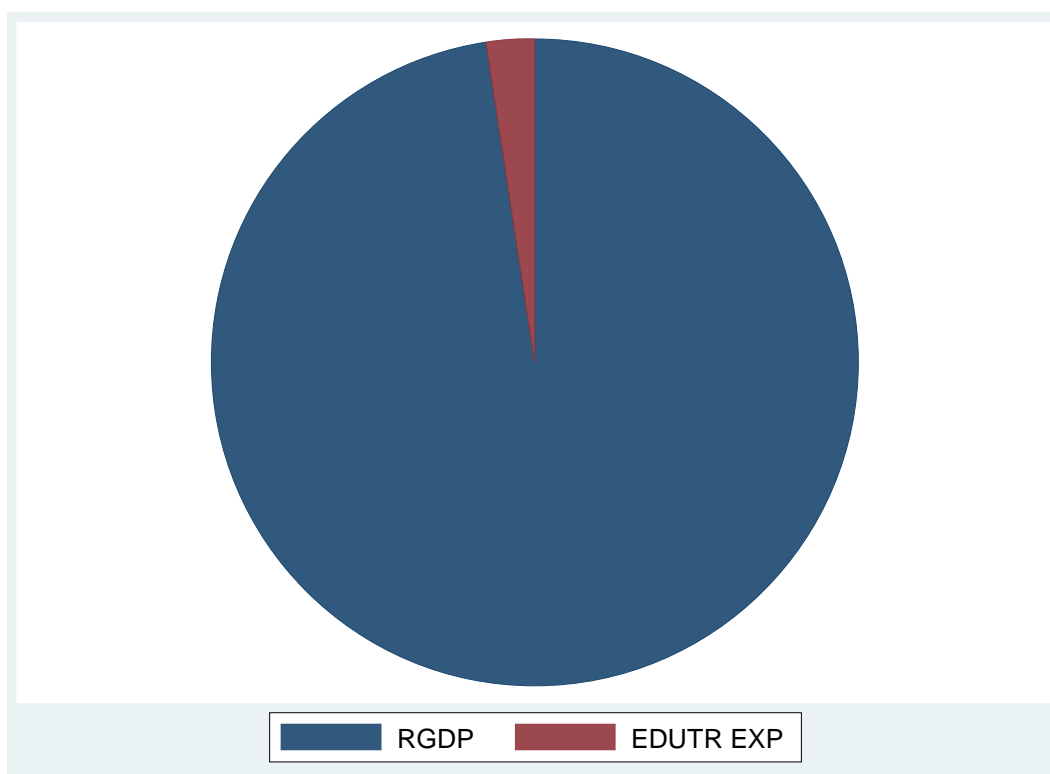


Figure 4.3 Share of total public expenditure on education in Ethiopia from 1978- 2018

Source: Model result

4.1.3.1 Trends of primary and basic education expenditure and growth in Ethiopia from 1978-2018

As shown below in figure 4.4, the trend of public expenditure on primary and basic education was not improved well. In 1978 government was spending for primary and basic education was only birr 62.7 million and in 2002 spending birr 304.00 million within 24 years spending increased by birr 241.30 million, which was very slight increase, as a result of governmental change in 1991, number of schools decline because of departure of Eritrean schools from Ethiopian schools in 1992/1993 were reasons. Beginning 2003, government tried to increase spending on primary and basic education, as a result of government adopting developmental state concepts in 2002, and spending reached to birr 13,885.01 million in 2015. After 2015 government increased its budget or spending dramatically and reached birr 25,554.23 in 2018.

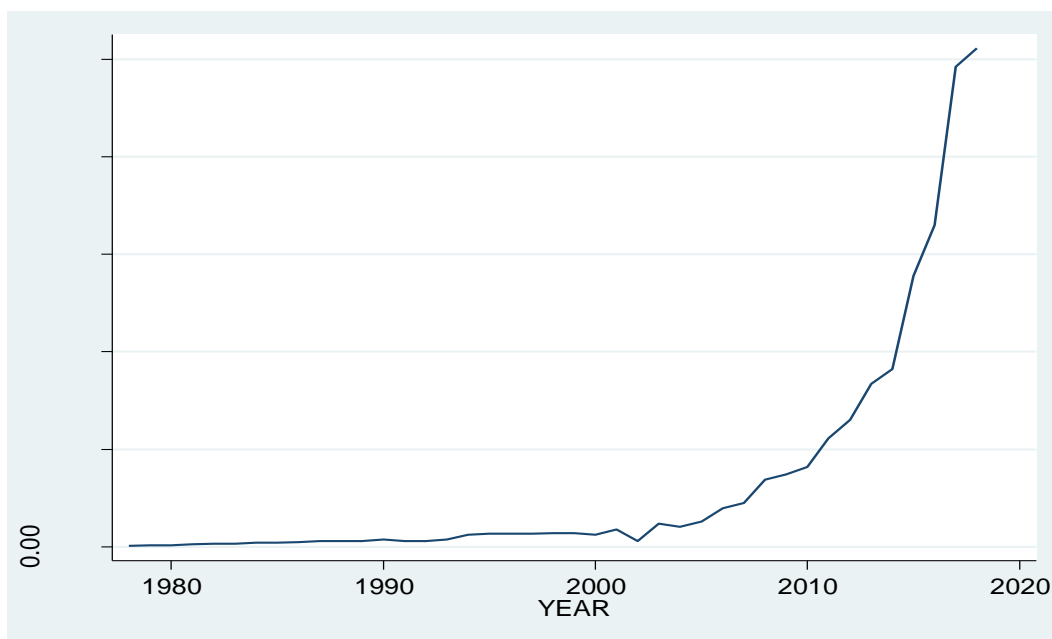


Figure 4.4 Trend of total public expenditure on primary education in Ethiopia from 1978-2018

Source: Model result

4.1.3.2. The share of primary and basic education expenditure from total expenditure on education and growth in Ethiopia from 1978-2018.

Before 1991, the share of primary and basic education expenditure from total expenditure to education was high. For example the share was 81.31% in 1990. But, in 1991 its share was declined. The reason was in 1991, there was government change and in 1992/1993 Eritrean primary and basic schools were departure from Ethiopia, and in 1993, there was economic reform as a result, big concern was goes to tertiary education that was technical and vocational schools were introduced. As shown in figure 6 below, even if the expenditure of primary and basic education was increased, it is below total expenditure for education and although the share of public spending to total education from GDP were increased up to 2015, its share to primary and basic education was continued to declined up to 2018.

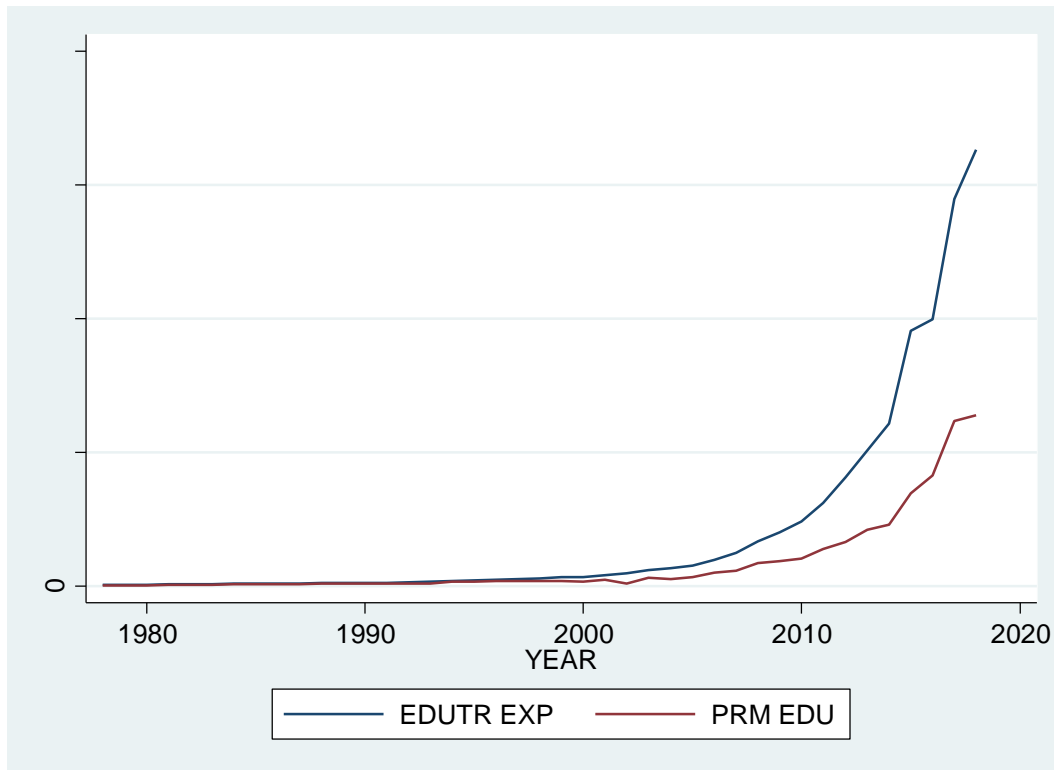


Figure 4.5 Share of primary and basic public expenditure from total public expenditure on education in Ethiopia from 1978- 2018

Source: Model result

4.1.4.1. Trends of secondary education expenditure and growth in Ethiopia from 1978-2018

As shown below in figure 7, the trend of public expenditure on secondary education in Ethiopia had little change which was stagnant until 2003, it was more or less ups and down until 2002. This happened because of government change in 1991, number of schools decline due to departure of Eritrean schools from Ethiopian schools in 1992/1993. But, in 2003 spending on secondary school started to increase until 2015, which was birr 233.70 million and birr 4,036.14 million respectively, an increase of birr 3802.14 million, because in 2002 government adopted developmental state. After 2015 government increased its spending dramatically to birr 9,554.11 million for secondary education in 2018.

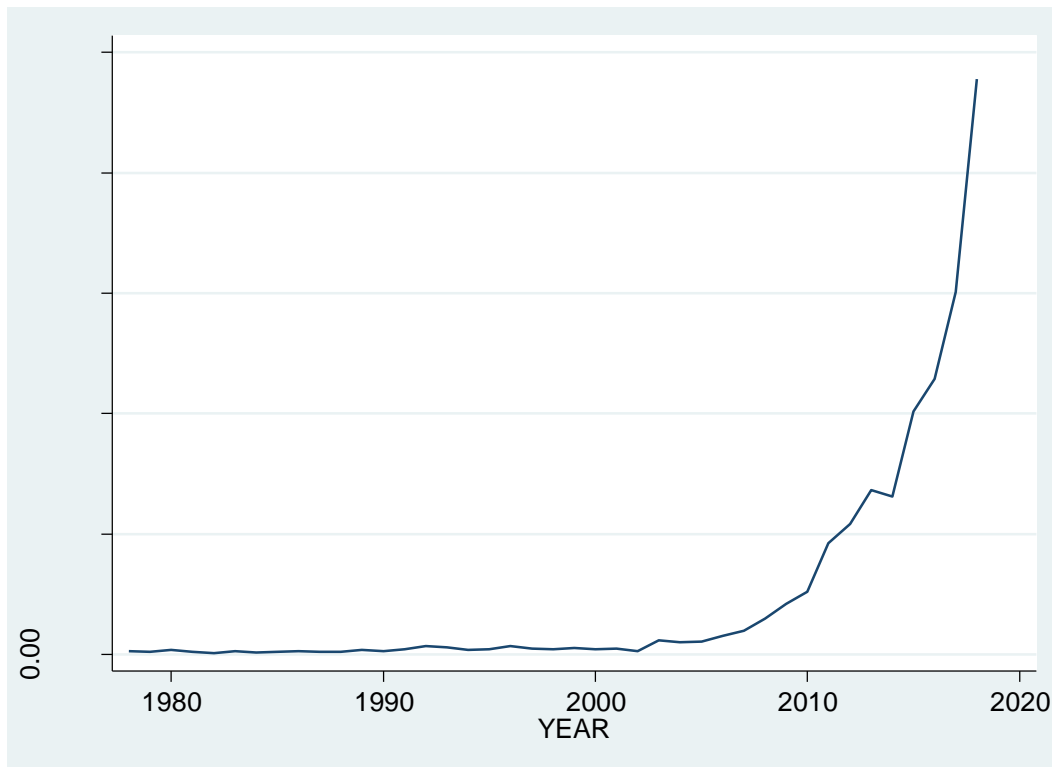


Figure 4.6 Trend of public expenditure on secondary education in Ethiopia from 1978-2018.

Source: Model result

4.1.4.2. The share of secondary education expenditure from total expenditure on education and growth in Ethiopia from 1978-2018

Until 1990, the share of secondary education spending from total education spending was better. But, after 1991, its share declined up to 2008. The reason were government change in 1991, separation of Eritrean secondary schools from Ethiopia in 1992/1993, and the economic reform of 1993 was create more attention to tertiary education, especially vocational and technical school. In 2009, its share increased to 10.48%, which was 10%. Onwards 2009, the share of secondary education expenditure from total expenditure on education was increased to 14.62 in 2018. As shown below in figure 8 even if the share of expenditure secondary education was increased, it is below total expenditure for education.

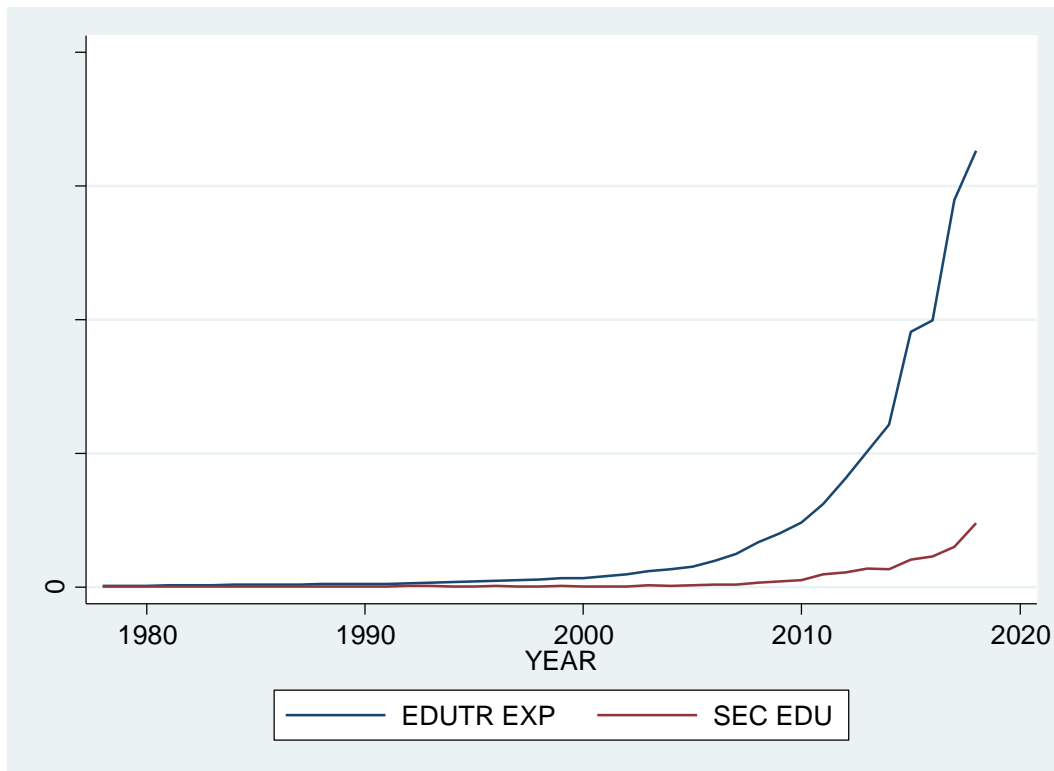


Figure 4.7 share of public expenditure on secondary education from total expenditure on education in Ethiopia from 1978-2018.

Source: Model result

4.1.5.1. Trends of public expenditure on tertiary education in Ethiopia from 1978-2018

The trend of total public expenditure on tertiary education in Ethiopia had very small change which was stagnant until 2003. However; there was government change in 1991, number of schools decline due to departure of Eritrean schools from Ethiopian, example Asmara University in 1992/1993. After 2002, government adopted developmental state and tried to give due attention to tertiary education. So, government started increasing spending more money to finance tertiary education. From 2003 up to 2015 increased birr 2661.70 million as a result of government expanding different universities both in number and taking capacity. After 2015, dramatic change was made on spending on tertiary education to birr 5572.00 million within 3 years in 2018.

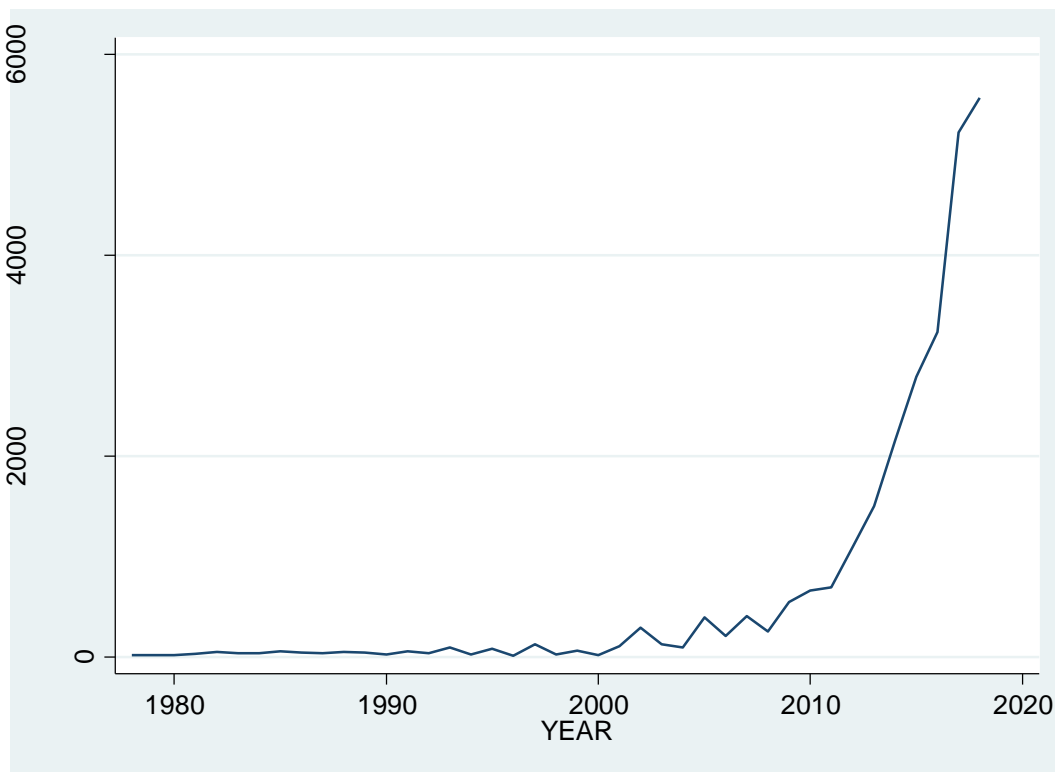


Figure 4.8 Trend tertiary public expenditure on education in Ethiopia from 1978-2018

Source: Model result

4.1.5.2. The share of tertiary education expenditure from total expenditure on education and growth in Ethiopia from 1978-2018

Before 1993, government spending small amount of money for tertiary education from total spending for education. Example in 1978 only 13.90 % of its total spending for education was spent for tertiary education. This figure was slightly decreased to 12.73% in 1991, as a result of government change. after 1993 as a result of economic reform government created technical and vocational schools, the share of government spending for tertiary education from total spending for education was increase to 32.53% in 1993.then after government adopted developmental state in 2002, tertiary education expenditure increase slightly until 2011,a as a result of additional second round universities built This figure continued increased after 2012 as a result of expanding third rounds universities built, which was 72.05%.After 2015 a slight decrease in spending for tertiary education from total spending to 8.5 % in 2018.The reason for declined spending to tertiary education expenditure from total spending was political instability in the countries. As shown in figure 4.9 below both total and tertiary education was increased but, tertiary education expenditure was below total expenditure on education. This means even if total expenditure for education was increased past time, the increased in tertiary education compared to the primary and basic education and secondary education was low.

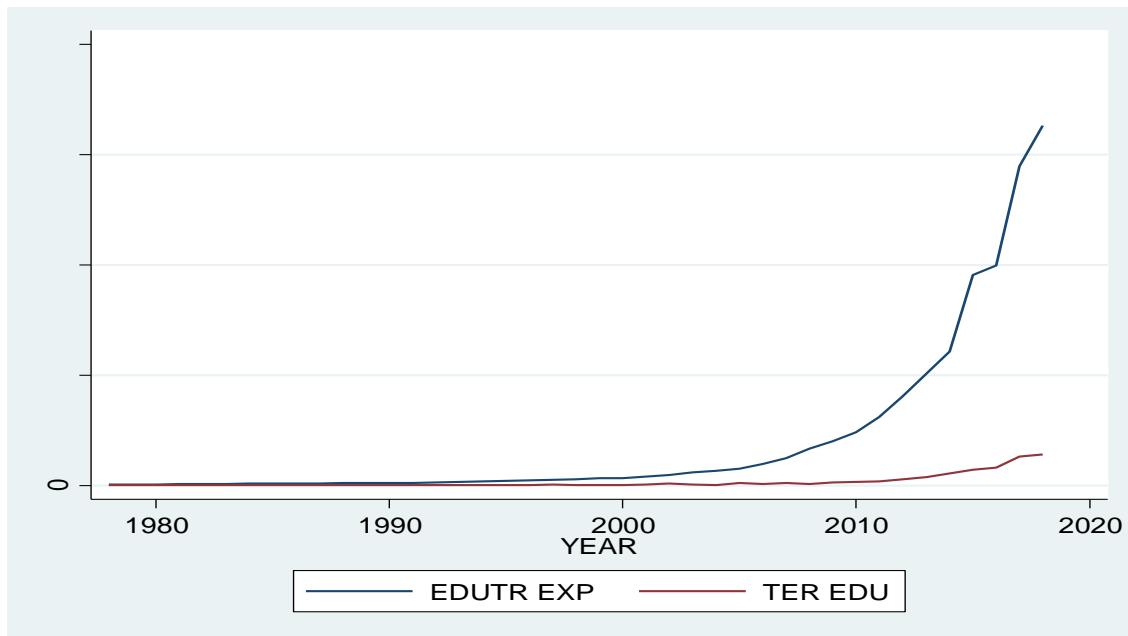


Figure 4.9 Share of tertiary public expenditure on education from total expenditure on education in Ethiopia from 1978-2018 Source: Model result

4.1.4. Description of variables mean, standard deviation, minimum and maximum

Within the period of 40 years between 1978 and 2018 Ethiopia's real GDP average was birr 336,742.93 million per year; where birr 99,233 million and birr 17,177.95 million was the minimum and maximum real GDP of the country. The maximum real GDP recorded was made in 2018 and the minimum was in 1978.

The maximum total expenditure on education was registered as birr 65,313.67 million in 2018 and the minimum was birr 138.48 million in 1978; within these 40 years the average total expenditure on education was birr 8091.50 million per year. In Ethiopia the average of primary and basic education expenditure within the period 1978 and 2018 was birr 3380.64 million; where, the minimum primary and basic education was appeared in 1978 which is birr 62.78 million and the maximum was occurred in 2018 which is birr 25,554.23 million.

In Ethiopia between 1978 and 2018 the maximum secondary education expenditure was birr 9554.11 million which was registered in the year 2018 and the minimum was birr 25 million it recorded in 1982. Within these 40 years the average secondary education expenditure was 955.33 million. Between 1978 and 2018 the maximum and minimum tertiary education expenditure was birr 5,572 million which was registered in 2018 and birr 11.63 million in 1996 respectively. Within these 40 years the average tertiary education expenditure was birr 644.3. Within these 40 years the average of total physical investment expenditure was birr 108,498.8 million. Between 1978 and 2018, the maximum and minimum total export was birr 72713 million in 2018 and birr 300 million 1992 respectively. The average total export within these 40 years was birr 14,750.1. Between the 1978 and 2018 in Ethiopia, the maximum and minimum total import was birr 397,115 million in 2018 and birr 1384 million in 1978 respectively. The average of total import within these 40 years was birr 66,941.66 million. Finally, in Ethiopia the maximum and the minimum general inflation was recorded 55.2 in 2008 and -11.8 in 1986. The minimum inflation recorded during was due to great drought in Ethiopia in 1986, because at that time economic activities was not active so demand for goods and services was declined. The average general inflation within these 40 years was 9.48.

Table 4.1 Summary of Descriptive Statistics of Model

Variable	Mean	Std. Dev.	Minimum	Maximum
Real GDP	328529.7	390994.7	99,233	17,177.95
Total Education Expenditure	8091.50	15557.71	138.48	65,313.67
Primary and education Expenditure	3380.64	6211.968	62.78	25,554.23
Secondary Education Expenditure	955.33	1952.484	25.00	9,554.11
Tertiary Education Expenditure	644.3	1318.688	11.63	5572.00
Total Export	14750.1	22932.27	300	72,713
Total Import	66941.66	114427.1	1,384	397,115
General Inflation Rate	9.48	13.20118	-11.8	55.2

Source: Model Result

4.2. Econometrics Model Results

4.2.1. Unit root test

Most macroeconomic time series data are trended and unit root (non-stationary). Non-stationary macro variables are not efficient; it would lead to the problem of spurious regression. It means false relationships among the variables. Therefore, before customizing the data in estimating VECM, checking whether the data is stationary or not and changing to stationary by differencing method. The stationary criteria are three common criteria. If a data is stationary, it should be fulfilled those three criteria. The criteria are the absolute value of test statistics must be greater than 5% critical value, p value should be significant (less than 5%) and coefficient of lag 1 should be negative. If the data fulfilled those three criteria, it can be stationary. The researcher takes unit root test of every variable by using Augmented Dickey-Fuller Test. Primarily all variables had unit root and entire variable changed to stationary by first difference.

The unit root test result is shown in the following table. Except RGDP and inflation all variables are in the form of real GDP ratio.

Table 4.2 ADF Unit Root Test Results

Variables	Difference	Test	5% critical	p-value	Coefficient	Result
RGDP	1st D	-4.728	-2.961	0.0001	-.7581364	Stationary
REDU	1st D	-3.806	-2.961	0.0028	-.5928087	Stationary
RPEDU	1st D	-10.380	-2.961	0.0000	-1.488755	Stationary
RSECEDU	1st D	-8.401	-2.961	0.0000	-1.396777	Stationary
RTEREDU	1st D	-10.440	-2.961	0.0000	-1.49315	Stationary
INFR	1st D	-9.600	-2.961	0.0000	-1.429951	Stationary

Source: Model
result

R =Represents real for real GDP and real GDP ratio for other variables. D =Represents Difference level.

4.2.2. Determination of the lag length

Co-integration testis usually preceded by a test of optimal lag length as the result of the test is affected by the number of lags included in the customized model. In the Johansson maximum likelihood approach, the first step towards the co-integration analysis is the determination of an appropriate lag length that is going to be used in the VAR or VECM estimate. There are many tests that can be used to choose a lag length ,The Likelihood Ratio test[LR],the Final Prediction Error test[FPE],the Akaike information criteria[AIC],the Schwarz information criteria[SIC] and the Hannan-Quinn information criteria[HIC]are used to determine the optimal lag length. The smaller value of the information criteria is the better the model. The lag exclusion test confirms the second lag is the appropriate lag. Because the smaller value of LR,AICand HQIC are at lag two; the most lag selecting criteria's recommended to select lag two. The model result is tabulated below.

Table 4.3 Lag selection for co-integration model

Sample: 1981– 2018					Number of observation: 38			
Lag	LL	LR	DF	P	FPE	AIC	HQIC	SBIC
0	-36.341				8.8e-11	2.38637	2.52436	2.77422
1	131.899	336.48	81	0.000	1.0e-12	-2.20519	-.825253	1.6733
2	344.683	425.57*	81	0.000	2.1e-15*	-9.14119*	-6.5193*	-1.77205*

Source: Model result

* indicates lag order selected by the criterion

4.2.3. Co-integration test

Engle and Granger,(1987)disclosed that linear combination of two or more non stationary series may be stationary. If such a stationary linear combination exists, the on-stationary time series are said to be co-integrated. The stationary linear combination is called the co-integrating equation and may be interpreted as a long-run equilibrium relationship among the variables. In this study the Johansen maximum likelihood testing procedure was applied to determine the number of co-integrating relations. Therefore, the numbers of co-integrating vectors are determined with the trace statistics: the trace statistics and the maximum rank. 'r', we proceeded sequentially from 'r= 0' to 'r=k-1' until we fail to reject, where k is the number of endogenous variables. The trace statistic tests the null hypothesis of "r" co-integrating relations against the alternative of, k" co-integrating relations, for r = 0, 1... K-1.The result of Johansen Co- integration test presented in the Tables below.

Table 4.4 Johansen Tests for Co-integration

Trend: constant		Number of obs =38
Sample:1983 -2018		lags=2
Maximum rank	Trace Statistic	5% critical value
0	153.1227	94.15
1	84.9869	68.52
2	53.2820	47.21
3	31.5641	29.68
4	14.4334*	15.41
5	0.0003	3.76

Source: Model result

* denotes rejection of the null hypothesis at 5 % significance level.

Ho: There is co-integration (long run association) between variables if the rank is out of zero.

The above table shows that maximum rank where trace statistic less than 5% critical value at first time is at third rank. It means that the explanatory variables have long run association with the explained variable. Therefore, the estimation was customized by long run model which is vector autoregressive (VECM) model. VECM model is used to estimate both long run and short run relationship between dependent variable and independent variables and the right and left model to estimate this study was vector error correction model.

4.2.4. Causality analysis

According to Granger (1969) the idea of Granger causality is based on the principle that a cause cannot come after its effect. A test for causality is performed on variables of interest to

detect the presence and direction of causality between pairs of variables. Following the VAR, causality test is made to identify the presence and direction of causality. In this section, it was employed the Pair-wise granger causality between real GDP and education human capital indicators. The estimated F-statistics of the causality test is presented in table 4.5.

Table 4.5 Granger Causality Test Result

Equation	Excluded	Prob>chi2
RGDP	D_REDU	0.000***
RGDP	D_RPEDU	0.000***
RGDP	D_RSDU	0.000***
RGDP	D_RTEDU	0.000***
RGDP	D_REXP	0.000***
RGDP	D_RIMP	0.000***
RGDP	D_INF	0.001***
RGDP	ALL	0.000***
D_REDU	RGDP	0.000***
D_RPEDU	RGDP	0.000***
D_RSDU	RGDP	0.000***
D_RTEDU	RGDP	0.000***
D_REXP	RGDP	0.000***
D_RIMP	RGDP	0.000***
D_INF	RGDP	0.000***
ALL	RGDP	0.000***

Source: Model result

NB: The causality criterion is 1% and 5% significant level of probability value

As per the result shown total expenditure for education to RGDP ratio, secondary education expenditure to RGDP ratio, tertiary education to RGDP ratio, export to RGDP ratio, and inflation does cause real GDP, that means all variables are caused GDP. On other hand RGDP does

caused total expenditure for education to RGDP ratio, secondary education expenditure to RGDP ratio, tertiary education to RGDP ratio, export to RGDP ratio, import to RGDP ratio, and inflation, that means RGDP causes all variables mentioned above. Therefore, we can conclude that education human capital and economic growth have bi-lateral causality. And also inflation caused RGDP and vice versa. Both education human capital and economic growth are essential each other. The development of education human capital is essential and supplementary to economic growth and vice versa. This finding was supported by finding of Wilson,(2004).In Ethiopia the finding was supported by (Teshome(2006), Tewodros,(2014), Kidanemariam,(2015), and Tefera(2017).

4.3. Long Run and Short Run Model Estimation Results

After identifying the existence of long-run relationship among the relevant variables, the variables are estimated by vector error correction model estimator. The VECM has co-integration relations built in to the specification so that it restricts the long run behavior of the endogenous variables to converge to their co-integrating relationships while allowing for short run adjustment dynamics (Harris, 1995).The co-integration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short run adjustments. According to VECM estimation result, co-integration equation (error correction term) is significant and its coefficient is negative; it means that overall explanatory variables which are total public expenditure on education to RGDP ratio, primary and basic education expenditure to RGDP, secondary education expenditure to RGDP ratio, tertiary education expenditure to RGDP ratio, and General inflation rate and the explained variable which is real GDP(proxy to economic growth) have a long run association and they affect real GDP positively in the long run. The coefficient of error correction term indicate show quickly variables converge to equilibrium. It measures the adjustment of real GDP towards the long run steady path. Moreover, it should have negative sign astatically significant at standard significant level (i.e.1%or5% significant level).

In vector error correction model the sings of the coefficients are reversed; meaning that the coefficient's sign of co-integrated equation and other variables is interpreted inversely. Moreover, the co-integration term determined the long run association of exogenous variables.

With endogenous variable and the results disclosed the short run association of the explanatory variables with explained variable. The result displayed in the table below revealed that, cointegration equation is significant at 1 percent significant level and the sign of its coefficient is negative. It means the entire six explanatory variables jointly have positive association with real GDP in long run. The exogenous variables positively affect real GDP in long run. Holding other things remains constant; when one percent changes in total education expenditure, primary and basic education expenditure, secondary education expenditure, tertiary education expenditure, total export, total import, and general inflation rate, 14.12 percent change at the same direction in real GDP in long run. When an incident occurs in the system each year, about 14.12 percent of it will be adjusted towards its long run equilibrium. Therefore, education human capital has a big role on economic growth in long run.

Table 4.6 Long Run and Short Run Model estimation Results

Sample: 1981– 2018		Number of observation =40		
Prob>F=0.0000		AdjR-Squared = 0.9097		
Variables	Coefficient	Std. Error	Z	P> z
Ce1 atL1.	-1.412066	.0557815	-25.31	0.000***
REDU	-.5853836	3.821624	-0.15	0.879
RPREDU	-6621759	4593895	-1.44	0.159
RSECEDU	-3.58e+07	1.26e+07	-2.83	0.008***
RTEREDU	-2.34e+07	1.06e+07	-2.21	0.034**
REXP	-1673049	943095.2	-1.77	0.086
RIMP	-984305.4	191622.8	-5.14	0.000***
INF	843.0082	195.6478	4.31	0.000***
Constant	69287.02	51953.08	1.33	0.192

Source: Model result

NB: The significant criterion is 1% and 5% significant level of probability value

As we seen from table 4.6, education human capital indicators, secondary education expenditure to RGDP ratio is insignificant at 1 percent significant level and tertiary education expenditure is also significant at 5 percent significant level. To add more, both total export and import to RGDP ratio are significant at 1 percent significant level. Except general inflation rate, the signs of all variable's coefficient are negative. It means these variables have positive association with real GDP in short run. In other words, these variables have positive effect on economic growth in short run.

Holding other things remain constant, when 1 percent increases in secondary education expenditure, 0.8 percent increases in real GDP and vice versa in short run. In short run 1 percent increases in tertiary education expenditure, 3.4 percent increase in real GDP and vice versa *ceteris paribus*. when 1 percent increase in total import, 9843.05 percent increase real GDP and vice versa in short run keeping other things constant. 1 percent increase in general inflation rate causes 843 percent decrease in real GDP and vice versa in short run.

The remaining variables (Total education expenditure to RGDP ratio, primary and basic education expenditure to RGDP ratio and total export to RGDP ratio) are insignificant. It means these variables have no association with the explained variable. Individually these three variables have no effect on economic growth in short run but have effect on economic growth in long run. However, as per the result of Granger causality test, entire seven variables jointly have causality with real GDP. It means human capital has positive effect on economic growth in short run. The other test that is commonly used for testing the appropriateness and of capacity of the explanatory variables in terms of explaining the explained variable is adjusted R^2 . The model result shows that 90.97 percent of the endogenous variable is explained by exogenous variables in the model.

The real GDP growth equation is given by:

$$\begin{aligned} \text{RGDP} = & 69287.02 + 0.58.53\text{REDU} + 6621759\text{RPEDU} + 0.35\text{RSECEDU} + 8.43\text{RTEREDU} \\ & + 163049\text{REXP} + 9843.05 - 843.0082\text{INF} \quad (0.192) \quad (0.879) \quad (0.159) \quad (0.008^{***}) \quad (0.034^{**}) \\ & (0.889), (0.086) \quad (0.000^{***}) \quad (0.000^{***}) \quad \text{***, **}, \text{ represents the level of significance at 1\%} \\ & \text{and 5\% respectively} \end{aligned}$$

Based on long run and short run model estimation result, it can be concluded that human capital has positive effect on economic growth in Ethiopia in long run and short run. An increase of spending on education has vital role in economic growth in long run and short run. This finding is supported by finding of Wilson,(2004); Oreffice,(2015); Abdu,(2014), Muhdin, (2016);Muhammed et al.(2017), and Tefera (2017).

4.3.3. Vector Error correction Diagnostic Test

4.3.3.1. Autocorrelation Test

Autocorrelation is checked by Durbin-Watson statistics test. The autocorrelation verification criteria is the probability values of the variable at each lag is more than 5%. It means it should be insignificant. In this study, the variables show autocorrelation problem. Because the probability values at lag 1 and lag 2 shows 0.03523 and 0.00050 respectively. However, it was removed the autocorrelation problem by using Prais-Winsten command. After removed the autocorrelation problem, the result of probability value is transformed to 2.367547. Therefore, it passed the autocorrelation test.

4.3.3.2. Normality Distributed Disturbance Test

Normality distributed disturbance test is checked by Jarque-Bera test verification criterion of normality distributed disturbance test is the probability values of most variables are insignificant (more than 5%). In this test, only one variable (primary and basic education) is significant. Other remaining variables are insignificant. Therefore, the test result indicates that residuals are normally distributed.

Table 4.7 Normality distributed disturbance test

Variable	Prob>chi 2
Real GDP	0.47762
RPREDU	0.00000
RPREDU	0.01046
RSEDU	0.62046
RTEREDU	0.55534
REXP	0.45597
RIMP	0.54593
INFL	0.86440
All	0.00000

Source: Model Result

4.3.3.3. Stability test

Stability test is checked by stability test in graph. The criterion is entire variables are found within the circle. In this test, all variables are placed within the circle, no variable found outside the circle. Therefore, the variables are stable.

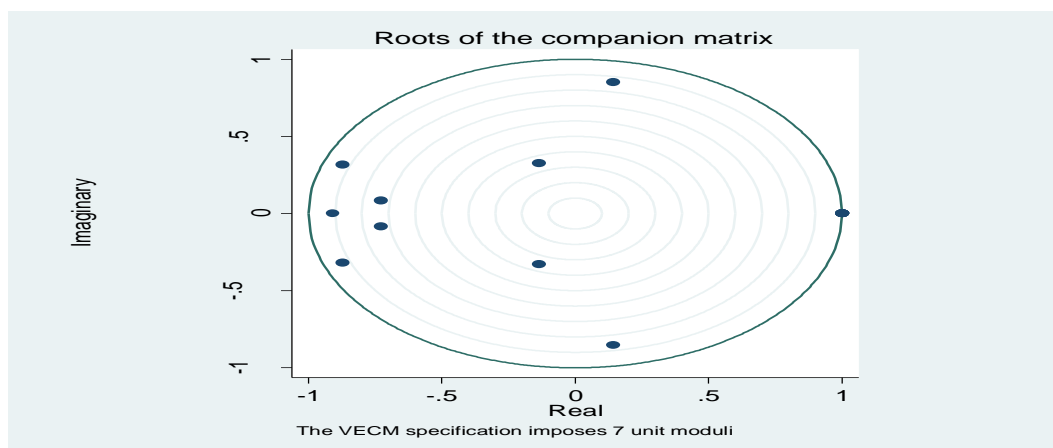


Figure4.10 Stability Test

Source: Model result

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter contains summary, conclusion and recommendation of the study. The summary part includes objective and methods and findings, the conclusion capture the overall results of the findings of the study. In recommendation part, policy implications takes place policy implication part disclosed opinions, suggested issues to address related in the study standing from the outcomes of the study.

5.1. Summary and Conclusions

This study is supported by related theoretical and empirical literature reviews; descriptive statistics is computed and found significant and positive association between the residuals in both long run and short run. Although there are various previous studies done on the topics of the effect of human capital proxed by education expenditure and economic growth, entire studies customized by aggregating total education expenditure as one proxy to human capital, ignoring. It was major research gaps identified by the researcher. The objectives of the study were to assess the status different levels of total public expenditure on education such as, primary and basic education expenditure, secondary education expenditure, and tertiary education expenditure. This study included apart from total public expenditure on education, all those levels of education expenditure.

The objectives of the study were to assess the effect of human capital proxed by education expenditure and economic growth in Ethiopia both in short run and long run. The methodology of study employed a longitudinal research design and used time series data from 1978–2018 and vector error correction model in this study. The data was collected from Ministry of Education, Ministry of Finance, National Bank of Ethiopia, and World Bank.

The study has tried to develop descriptive analysis and to establish a short run and long run dynamics, causal relationship of explanatory variables with explained variable within the period of 1978-2018. In descriptive part the trends and growth of explained variable, real GDP was discussed, and explanatory variables of human capital, total education expenditure, primary and basic education expenditure, secondary education expenditure, and tertiary education expenditure were also discussed. From descriptive finding the trend both explained and

explanatory variables showed growth year to year. But, the share of Total education expenditure from Real GDP was very small and slightly decreasing in current time. The share of primary and basic education, secondary education expenditure, and tertiary education expenditure from total public education expenditure showed ups and down year by year. Before 1993, the share of primary and basic education expenditure and secondary education expenditure from total spending for education was high compared to tertiary education expenditure. After 1993, their share became decline, because in 1993 there were economic reforms, so big concern was shifted to tertiary education. In aggregate, recently all level of education expenditure share become declining.

In econometrics part, the data was tested for its stationary; firstly data at level got unit root and entire variables could transferred to stationary by using first difference. That means the variables are integrated of first order (1) confirmed by augmented Dickey Fuller (ADF) test. Then the co-integration test revealed that the presence of long run association among variables. Furthermore, post estimation diagnostic tests which are autocorrelation, normality distributed test and stability tests were done and the study all was passed. The VECM estimation shows that entire variables jointly affect economic growth positively in the long run. Both human capital indicators, secondary and tertiary education expenditure are significant at 1% and 5% significant level and have positive effect on economic growth in the short run. To add more, total import and general inflation rate are both significant at 1 percent significant level. Except general inflation rate, secondary education expenditure, tertiary education expenditure, and total import have positive effects on economic growth in short run and vice versa. But, general inflation rate have negative effect on economic growth in short run. It means except general inflation rate all these variables have positive association with real GDP in short run. In other words, these variables have positive effect on economic growth in short run.

The remaining variables (Total education expenditure, primary and basic education, investment, and total export) are insignificant. It means these variables have no association with the explained variable in short run. So, according Granger causality test education human capital has bi-lateral causal relationship with economic growth.

5.2. Recommendations

According to descriptive and empirical analysis, it is observed that education human capital have a long-run and short run effect on economic growth in Ethiopia. In Ethiopia it was only a small amount of money spent on education. According the result observed from the research minimum, the share of education expenditure from total GDP. Although education have long run and short effect on economic the government did not give due attention as a result, poor quality of education is observed in the county .poor quality of education in turn resulted to not bring economic growth in Ethiopia. Education is an engine for all types of activities in the economy, from the research result, observed that both secondary and tertiary education expenditure have positive effect on economic growth.

Firstly, I recommended that government should increase the share of total public expenditure from GDP to education, especially to secondary and tertiary education.

Secondly government should observe education policy to bring quality education because yearly, more students' graduates from different universities, but the economy did not absorb them, which resulted more unemployed in the country.

Presently, there is a problem related with administration of education, quality of teachers is a comma. Further language policy of Ethiopia, which is above primary school uses English language as medium of education, students are not able to understand the course, because English is the second language for Ethiopian people and some private schools uses different languages as medium of education. To add more system of education evaluation, quality assurance, and academic freedom is poor. further, now in Ethiopia the economy does not pay attention for educated people like giving more payment for capital and land, more educated teachers goes to abroad for better payment in western country. This increases in brain drain decreases productivity the Ethiopian economy.

Finally I, recommended that, government should observe its administration on education, staff quality like teachers knowledge, language policy, system of educational evaluation, system of quality assurance, academic freedom and intellectual migration.

5.3. Further Research Implication

Education human capital has long run and short run positive effect in economic growth in Ethiopia. There is a need further research in education. In Ethiopia there is no adequate and perfect data, Government should concern for the availability of data in education such as private schools data is not available in order to do researches in private schools. Further to improve quality of education, there is a need for detail research on education.

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7. APPENDICES

Appendices A: Descriptive statistics of variables

Summarize RGDP EDUTREXP PRMEDU SECEDU TEREDU INV EXP IMP INF LF

Variable	Mean	Dev.	Min	Max
RGDP	41	328529.7	390994.7	99233.13
EDUTREXP	41	8091.508	15557.71	138.479
PRMEDU	41	3380.638	6211.968	62.78
SECEDU	41	955.3348	1952.484	25
TEREDU	41	644.3	1318.688	11.63
EXP	41	14750.1	22932.27	300
IMP	41	66941.66	114427.1	1384
INF	41	9.48409	13.20118	11.82
LF	41	30233.68	11808.39	15668

Appendices B: Unit Root Test

Dickey-Fuller Test for Unit Root Number of obs = 39

----- Interpolated Dickey-Fuller							
	Statistic	Value	Value	Value	Value	Value	Value
Z(t)	-4.728	-3.655	-2.961			-2.613	
MacKinnon approximate p-value for Z(t) = 0.0001							
D.rgdp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]		
L1.	-.7581364	.1603471	-4.73	0.00	-1.08303		-.4332424
Cons	32130.46	20195.08	1.59	0.120	-8788.666		73049.58

Dickey-Fuller Test for Unit Root Number of obs = 39

Interpolated Dickey-Fuller							
Test	Statistic	1% Critical Value	5% Critical Value	10% Critical Value	Value	Value	Value
Z(t)	-3.806	-3.655	-2.961				-2.613
MacKinnon approximate p-value for Z(t) = 0.0028							
D.redu	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]		
L1.	-.5928087	.1557616	-3.81	0.001	-0.9084118		-.2772057
_cons	1067.622	602.7052	1.77	0.085	-153.575		2288.818

Dickey-Fuller Test for Unit Root Number of obs = 39

Interpolated Dickey-Fuller						
Test	1% Critical	5% Critical	10% Critical			
Statistic	Value	Value	Value	Value	Value	Value
Z(t)	-12.835	-3.655	-2.961	-2.613		
MacKinnon approximate p-value for Z(t) = 0.0000						
D.rpedu	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
rpedu						
L1.	-1.635597		.1274315	-12.84	0.000	-1.893798 -1.377396
_cons	.0006013		.0002734	2.20	0.034	.0000475 .0011552

Dickey-Fuller Test for Unit Root Number of obs = 39

Interpolated Dickey-Fuller						
Test	1% Critical	5% Critical	10% Critical			
Statistic	Value	Value	Value	Value	Value	Value
Z(t)	-8.401	-3.655	-2.961	-2.613		
MacKinnon approximate p-value for Z(t) = 0.0000						
D.rsdu	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
rsdu						
L1	-1.396777		.1662631	-8.40	0.000	-1.733658 -1.059896
_cons	.0001645		.0001056	1.56	0.128	-.0000495 .0003785

Dickey-Fuller Test for Unit Root Number of obs = 39

Interpolated Dickey-Fuller						
Test	1% Critical	5% Critical	10% Critical			
Statistic	Value	Value	Value	Value	Value	Value
Z(t)	-10.440	-3.655	-2.961	-2.613		
MacKinnon approximate p-value for Z(t) = 0.0000						
D.rtedu	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
rtedu						
L1.	-1.49315	.1430154	-10.44	0.000	-1.782927	-1.203373
_cons	.000118	.000082	1.44	0.159	-.0000483	.0002842

Dickey -Fuller Test for Unit Root Number of obs = 39

----- Interpolated Dickey-Fuller -----						
Test	1% Critical	5% Critical	10% Critical			
Statistic	Value	Value	Value	Value	Value	Value
Z(t)	-4.014	-3.655	-2.961			-2.613
MacKinnon approximate p-value for Z(t) = 0.0013						
D.re	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
rexp						
L1.	-.6069598	.1511957	-4.01	0.000	-.9133114	-.3006082
_cons	.0005571	.0015656	0.36	0.724	-.0026152	.0037294

Dickey -Fuller Test for Unit Root Number of obs = 39

--Interpolated Dickey-Fuller -----						
Test	1% Critical	5% Critical	10% Critical			
Statistic	Value	Value	Value	Value	Value	Value
Z(t)	-6.399	-3.655	-2.961			-2.613
MacKinnon approximate p-value for Z(t) = 0.0000						
D.rimp	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
rimp						
L1.	-1.050528	.1641676	-6.40	0.000	-1.383163	-.7178926
_cons	.0058435	.0074732	0.78	0.439	-.0092987	.0209857

Dickey-Fuller Test for Unit Root Number of obs = 39

----- Interpolated Dickey-Fuller -----						
Test	1% Critical	5% Critical	10% Critical			
Statistic	Value	Value	Value	Value	Value	Value
Z(t)	-2.602	-3.655	-2.961			-2.613
MacKinnon approximate p-value for Z(t) = 0.0926						
D.lf	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
lf						
L1.	-.2941733	.1130538	-2.60	0.013	-.5232421	-.0651044
_cons	280.684	121.309	2.31	0.026	34.88863	526.4794

Appendices C: Lag Selection Order

varsocrgdpredurpedursdurtedurinvrexpimpinf, maxlag(2)									
Selection-order criteria									
Sample: 1981 - 2018					Number of obs = 38				
Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC	
0	-36.341	8.8e-11	2.38637	2.52436	2.77422				
1	131.899	336.48	81	0.000	1.0e-12	-2.20519	-.825253	1.6733	

2	344.683	425.57	81	0.000	2.1e-15*	-9.14119*	-6.5193*	-1.77205*
Endogenous: rgdpredurpedursdurtedurinvrexpiminf								
Exogenous: _cons								

Appendices D: Co-integration Test

Johansen tests for co integration						
Trend: constant		Number of obs =		38		
Sample: 1981 -		2018		Lags =		2
5%						
maximum	trace		critical			
rank	parms	LL	eigenvalue	statistic	value	
0	90	79.391563	529.5257	192.89		
1	107		173.08202	0.99278	342.1448	156.00
2	122		223.91886	0.93114	240.4711	124.24
3	135		261.10326	0.85873	166.1023	94.15
4	146		292.09549	0.80430	104.1179	68.52
5	155		311.30283	0.63611	65.7032	47.21
6	162		327.48652	0.57334	33.3358	29.68
7	167		336.90303	0.39080	14.5028	15.41
8	170		343.99355	0.31146	0.3217	3.76
9	171		344.15441	0.00843		

5%

maximum			max	critical	
rank	parms	LL	eigenvalue	statistic	value
0	90	79.391563	.	187.3809	57.12
1	107	173.08202	0.99278	101.6737	51.42
2	122	223.91886	0.93114	74.3688	45.28
3	135	261.10326	0.85873	61.9845	39.37
4	146	292.09549	0.80430	38.4147	33.46
5	155	311.30283	0.63611	32.3674	27.07
6	162	327.48652	0.57334	18.8330	20.97
7	167	336.90303	0.39080	14.1810	14.07
8	170	343.99355	0.31146	0.3217	3.76
9	171	344.15441	0.00843		

Appendices E : Vector Error Correction Model Estimation

crgdpredurpedursdurtedurinvrexpimpin, trend(constant)

Vector error-correction model

Sample: 1981 - 2018

Number of obs = 38

AIC = -3.485311

Log likelihood = 173.2209

HQIC = -1.844718

Det(Sigma_ml) = 8.88e-16

SBIC = 1.125787

Equation	Parms	RMSE	R-sq	chi2	P>chi2	
D_rgdpc	11	20003.2		0.9874	2114.466	0.0000
D_reduc	11	1488.17		0.9042	254.7216	0.0000
D_rpeduc	11	001344		0.9144	288.4709	0.0000
D_rsduc	11	.000312		0.9430	446.6422	0.0000
D_rteduc	11	.000568		0.7686	89.66372	0.0000
D_rexpc	11	.007153		0.7263	71.63781	0.0000
D_rimpc	11	.023787		0.9088	268.9475	0.0000
D_inf	11	23.9219		0.5771	36.84621	0.0001

Coef.	Std. Err.	z	P> z	[95% Conf. Interval]			
D_rgdpc							
ce1							
LD.	-1.412066		.0557815	-25.31	0.000	-1.521395	-1.302736
rgdpc							
LD.	1.536891		.0920605	16.69	0.000	1.356456	1.717326
reduc							
LD.	54.8443		2.716769	20.19	0.000	49.51953	60.16907
rpeduc							
LD.	3442691		2436236	1.41	0.158	-1332244	8217626
rsduc							
LD.	-1.01e+07		9905599	-1.02	0.309	-2.95e+07	9347221
rteduc							
LD.	-181119.9		58753.42	-3.08	0.002	-296274.5	-65965.32
rexpc							
LD.	2160464		610730	3.54	0.000	963454.8	3357472
rimpc							
LD.	-477673.7		142672.1	-3.35	0.001	-757305.9	-198041.5
inf							
LD.	40.24757		129.3755	0.31	0.756	-213.3237	293.8189
--more--							

Appendices F: Autocorrelation Test

. veclmar

Lagrange-multiplier test

lag	chi2	df	Prob> chi2
1	105.4772	81	0.03523
2	129.4883	81	0.00050

H0: no autocorrelation at lag order

Prais-WinstenAR(1) regression -- iterated estimates

Source	SS	df	MS	Number of obs	=	40
F(8, 31)	= 51.27					
Model	7.1232e+11	8	8.9040e+10	Prob> F	=	0.0000
Residual	5.3834e+10	31	1.7366e+09	R-squared	=	0.9297
Adj R-squared	= 0.9116					
Total	7.6616e+11	39	1.9645e+10	Root MSE	=	41672

rgdp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
redu	.0206739	3.789203	0.01	0.996	-7.707457 7.748805
rpedu	-7979467	4627095	-1.72	0.095	-1.74e+07 1457555
rsdu	-3.24e+07	1.27e+07	-2.54	0.016	-5.83e+07 -6403098
rtedu	-2.33e+07	1.05e+07	-2.23	0.033	-4.46e+07 -1952268
rexp	-2301792	1040103	-2.21	0.034	-4423096 -180488.2
rimp	-926051.3	194350.2	-4.76	0.000	-1322431 -529671.6
inf	368.1222	268.0378	1.37	0.179	-178.5444 914.7888
cons	66502.86	49401.63	1.35	0.188	-34252.43 167258.1
rho	.8850848				

Durbin-Watson statistic (original) 1.845743
 Durbin-Watson statistic (transformed) 2.351339

Appendices G: Normality Test

vecnorm, jbera

Jarque-Bera test

Equation	chi2	df	dfProb> chi2
D_rgdp	1.478	2	0.47762
D_redu	210.19	3	20.00000
D_rpedu	9.121	2	0.01046
D_rsdu	0.955	2	0.62046
D_rtedu	1.176	2	0.55534
D_rexp	1.571		0.45597
D_rimp	1.211	2	0.54593
D_inf	0.291	2	0.86440
ALL	227.77	2 18	0.00000

Appendices H: Raw data customized in the study (In millions of birr)

YEAR	RGDP	EDUTR EXP	PRM EDU	SEC EDU	TER EDU	EXP	IMP	INF
1978	99,233	138.48	62.78	50.98	19.26	844	1,406	18.5
1979	102,859	156.05	85.78	45.27	16.64	849	1,418	18.5
1980	108,023	179.56	80.25	68.96	21.89	857	1,433	3.9
1981	108,920	205.46	125.84	41.08	29.43	852	1,384	5.4
1982	109,170	238.17	150.89	25.00	49.14	778	1,642	5.2
1983	120,202	269.44	158.21	56.82	36.74	809	1,753	-0.2
1984	111,616	296.72	209.36	30.11	38.55	929	2,065	9.0
1985	101,803	328.60	225.83	40.40	56.25	744	1,770	20.5
1986	111,910	346.39	249.63	49.40	41.85	923	2,201	
1987	126,611	379.40	285.36	45.16	39.14	754	2,237	-4.7
1988	125,936	405.50	299.30	45.40	52.36	734	2,275	6.9
1989	126,868	425.60	300.96	72.40	44.58	848	2,110	11.1
1990	132,336	456.20	370.96	55.81	24.85	686	1,824	5.0
1991	128,347	447.10	297.24	83.69	56.92	536	2,130	45.0
1992	125,406	490.30	300.12	141.36	40.22	300	1,811	2.1
1993	139,412	604.00	385.25	117.25	98.25	932	3,618	4.7
1994	139,480	741.00	610.32	74.40	27.3	1,404	4,739	6.3
1995	147,455	863.50	673.25	86.40	83.5	2,737	6,546	14.8
1996	162,373	941.01	690.11	140.11	11.63	2,499	7,708	-9.0
1997	169,247	1,032.40	679.06	91.40	124.20	3,635	8,505	-2.7
1998	167,917	1,120.14	706.44	89.84	27.00	4,019	9,338	0.1
1999	178,513	1,260.76	709.36	109.96	66.70	3,437	11,702	10.4
2000	184,881	1,337.98	618.65	85.63	17.10	3,755	11,438	1.9
2001	198,595	1,576.46	883.79	99.76	107.10	3,378	12,314	-10.8
2002	201,840	1,907.48	304.00	50.41	294.20	3,378	14,485	-1.2
2003	197,604	2,395.43	1,192.18	233.70	126.60	4,137	16,067	17.8
2004	220,782	2,623.17	1,026.78	198.33	97.90	5,178	22,295	2.4
2005	248,698	2,981.00	1,297.32	209.15	396.30	7,331	31,434	10.7
2006	277,396	3,906.35	1,982.72	310.29	212.90	8,685	39,873	10.8
2007	310,115	4,896.34	2,238.72	391.93	405.50	10,457	45,126	15.1
2008	344,775	6,621.00	3,440.91	596.35	257.60	13,644	63,147	55.2
2009	379,362	8,008.50	3,725.55	838.47	548.50	15,218	84,677	2.7
2010	419,218	9,654.20	4,092.00	1,037.75	661.50	26,115	108,956	7.3
2011	475,648	12,370.47	5,555.76	1,850.45	692.70	44,525	129,693	38.0
2012	517,027	16,246.00	6,523.24	2,161.94	1104.80	54,495	191,587	20.8
2013	568,432	20,303.28	8,370.20	2,731.55	1505.50	56,124	196,871	7.4
2014	626,977	24,301.40	9,121.76	2,620.64	2162.10	62,243	261,837	8.5
2015	692,222	38,169.60	13,885.01	4,036.14	2788.30	59,860	330,794	10.4
2016	1,449,397	39,912.74	16,510.06	4,578.87	3235.50	59,726	353,013	7.5
2017	1,595,316	57,900.96	24,626.96	6,022.04	5223.80	63,686	354,271	8.4
2018	1,717,795	65,313.67	25,554.23	9,554.11	5572.00	72,713	397,115	16.8

