ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

THE IMPACT OF HUMAN CAPITAL DEVELOPMENT ON ECONOMIC GROWTH IN ETHIOPIA

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THE IMPACT OF HUMAN CAPITAL DEVELOPMENT ON ECONOMIC GROWTH

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DECLARATION

I Asegidew Lakew which I.D. number GSE/1194/10, the subscriber, hereby declares that the work contained in this thesis is my original work and that I have not previously sent in its entirety or part to any university for a degree.

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M.Sc. GRAGUATE PROGRAM IN DEVELOPMENT ECONOMICS

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ACRONYMS

ADF	-	Augmented Dickey Fuller
ARDL	-	Autoregressive Distributed Lag
ECM	-	Error Correction Model
GDPPC	-	Gross Domestic Product Per Capita
GNP	-	Gross National Product
HDI	-	Human Development Index
NGO	-	None Government Organization
MOH	-	Ministry of Health
MOE	-	Ministry of Education
UNICEF	-	United Nations International Children's Emergency Fund
UNDP	-	United Nations Development Programme
WB	-	World Bank
WHO	-	World Health Organization

ABSTRACT

Human capital is one of the required conditions to attain sustained economic growth. This study investigates the impact of human capital development on economic growth in the Ethiopian case, throughout the period from 1981 to 2019. Meantime, by subdividing human capital development into education and health human capital the study examines the impact on economic performance. Moreover, the study uses the autoregressive distributed lag (ARDL) technique of co-integration and Error Correction Model (ECM) are applied to look at the short and long-term impact of human capital development. The result shows that except for short-run health human capital has a significant positive impact on economic performance. However, education human capital has an insignificant and significant negative impact on economic growth in the short and long-run respectively. The error correction term is a negative sign and statistically significant at the level of 1%, Showing that the deviation of the previous year fairly adjusted. We will conclude that in the workplace there is incompatibility with essential skills and additionally the education quality is poor. Besides, an improved life expectancy rate may boost economic growth within the long-standing time. Therefore, policymakers and the government ought to reform education establishment capability and commit plenty of funds to the health sector to strengthen human capital development.

Keywords: Economic Growth, Human Capital development, Education, Health, ARDL method of Co-integration, Error Correction Model

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

The development of human capital is one of the necessary conditions for the economic, political, and socio-cultural development of a country (Harbison & Myers, 1964). The concept that investments in human capital promote growth dates back to Adam Smith's time (1776) and the first conventional economists have highlighted the importance of investing in human capital.

The analysis of the process of economic growth and its proper understanding has been a key area of interest in economics from the time of classical economists. In the 1980s, economic growth attracted economists' attention again. They tried to express how economic growth occurred because Solow's growth model may not have explained human capital. In this context, endogenous growth theories that emphasize the importance of human capital on economic growth emerged. Endogenous growth theories explained human capital with the education level of society and health. Lucas (1993) discusses that the main engine of economic growth is the accumulation of human capital, and the main reason for differences in standards of living among nations is differences in human capital. The effect of human resource development on rapid economic growth is evident from the experience of newly emerging East Asian countries. Substantial investment in education and human capital formation is vital in the history of the economic development of Korea, Singapore, Hong Kong, Taiwan, and China.

The modern theory of economic process argues that human capital, particularly education and health has the principal role in achieving economic process and development (Gyimah-Brempong and Wilson, 2005). In line with this, the African country has created some movements to form skilled and competent citizens through coming up with totally different education and health policies and implementing them. Although the degree of stress and success could vary from one regime to a different, African country has devoted abundant resource and efforts to the education and health sectors anticipating productivity improvement

and thereby economic process. Therefore, investigating the link between human capital (resources dedicated to this sector) and economic process is also a giant concern to policy manufacturers. As a result, the most objective of the study is to research the impact of human capital development on economic growth in Ethiopia.

Since the 1940s, Ethiopia has experienced three systems of political governance each distinguished by its education policy. The expansion of education in Ethiopia has long been viewed as an important means for changing the socio-economic condition of the people (MOE (2008). Ethiopia has made some moves to create qualified and competent citizens by designing different education and health policies. The most planned and coordinated educational system was registered during the imperial period of Haile Selassie. The main objective of education was to provide a skilled workforce. Hence, the confidence of the imperial regime that the instruction held the key to Ethiopia's development, they established the Ministry of Education in 1942. From 1942 to 1955, the Ethiopian government was involved in the extension of the education sector by spending a high government budget this activity leads to the rapid growth of schooling in the country. After the 1974 revolution, the Derg regime, the structure, and organization of the education system were changed and the objectives of the Socialist government, "There will be an educational program that will give free education, step by step, to the broad masses." The government barely worked to distribute schools uniformly throughout the country, which was ignored during the imperial administration period. Through the assistance of the Ministry of Education, the regime publicly held all private schools, excluding clergymen, and made them part of the public school system. The regime has managed to reduce the rate of illiteracy in the country. Although the scheme is more successful in expanding the distribution of education in the private sector and the development of the market incentive structure, both in the education sector and in the labor market, is extremely depressed. Following the fall of the military regime in 1994, the education sector strategy was designed by the current government. The main objective of the strategy is: to change the program; to expand primary, secondary and higher education; To improve the quality of education; To make education more adapted to the requirements of the community; restructuring the organization and management of the education (Birhanu. L, 2018).

The country's main health problems remain largely avoidable communicable diseases and nutritional disorders. Despite the significant progress made in improving the welfare of the population in the past two decades, Ethiopians still have a high rate of morbidity and mortality and the state of health remains relatively poor. After the government's change in 1991, the government has created a health policy that has been the first of its kind in the country and has been part of the various political and economic transformation measures put in place. The central elements of health policy are the decentralization of the health system, the development of precautionary and curative elements of health care, health care availability insurance for all segments of the population, and the promotion of the private sector and NGOs took part in the health sector (Ministry of Health report, 2010)

In Ethiopia, with more than 100 million people, with these human and natural resources, the country should have been a prosperous economy. However, the country is the poorest, with low per capita income and low human development rates. A low rate of human development remains common in Ethiopia, preventing the country's growth World Bank (2018). This thesis aims to provide an overview of the impact of human resources development on economic growth in the Ethiopian case. The rest of this thesis is organized, as follows. Chapter Two shows the theoretical and empirical literature, Chapter Three the methodology used to carry out this study. The results and deliberations were presented in chapter four, and the conclusions and policy implications are set out in chapter five.

1.2. Statement of the Problem

Human capital development is the main determinant for sustainable economic growth. Since better-educated people are more likely to innovate, adopt new technology, and increase productivity human capital development is a key to economic growth (Romer, 1993 and Fishlow 1966).

Education affects a country both socially and economically. An educated person respects national values, respects laws have a good way, and responds to his country. This study will attempt to assess this fact and will attempt to determine the main reason for conflict and low economic status or performance. Education creates citizens suitable for sustainable growth and development in the country. Education has a very positive impact on economic growth (Romer, 1990). The development of a skilled workforce contributes to development. An educated, trained, and more productive workforce contributes to higher economic growth. It can therefore argue for investment in education.

Improving primary enrolment will create responsibility for economic growth as individuals are not yet sufficiently skilled to achieve better productive jobs. However, the effect of enrolment in secondary and higher education has a positive impact suggesting that if the country improves, these people will improve economic growth by obtaining jobs in the labor market (Nadia Hanif, noman Arshed, 2016.)

The modern theory of economic growth argues that the development of human capital, in particular education and health, has an important role in achieving sustainable economic growth and development.

Human Development Index for Ethiopia in 2018 was 0.47 (score) in 2018, which for the most developed country is far below a long and safe life, knowledge, and decent standard of living 1 (Human development report, 2019). Ethiopia has embarked on a huge initiative over the years to improve its education and health sector. It is therefore important to analyze the connection between the creation of human capital and economic growth in the case of Ethiopia. There are few studies done on this study title, as per my knowledge so far.

Ethiopia, as calculated by GDP per capita, was the third fastest-growing country with 10 million or more people in the world between 2000 and 2018, according to World Bank figures. The nation is the poorest in the world. More than 50% of the population in Ethiopia lived under the global Poverty line, which is the world's highest poverty rate. It is the performance of goods that the nation has, which is determined by the quality of labor. The low quality of labor damages the sustainable economic development of the country. The quality of human capital in a country is determined by human capital investment through quality education, training, and health serves. Therefore, the key production factors that influence economic growth are crucial for the rapid development of the Ethiopian economy to be human resources. Economic theories imply that an increase in the number of human resources would lead to an increase in the growth of the economy. The Ethiopian rate of growth is below the average rate of school enrollment. It is argued that the school does not produce graduates with sufficient skills and expertise that improve productivity. Instead of career creators, these companies produce job seekers because they do not have applicable experience and capacity in the workplace. The current weakness could make it difficult for the country to achieve sustained economic growth.

Some researchers have tried to study the relationship between the development of human capital and economic growth in Ethiopia. For example, Wubet (2006) found, based on enrollment as a proxy for human capital, that human capital had an insignificant influence on the level of production, and had the same result that proves the absence of a relationship between the two macroeconomic variables. However, the approach to measuring human capital ignores the health aspect of human capital development, while both education and health are an important part of human capital. The education and health sector, as a proxy for investing in human capital development, found Tofik (2012) to have a positive impact on the Human capital development fixed on economic growth in Ethiopia. However, it did not show the separate effects of the health and education sectors on economic growth. Since both education and health are important elements of human capital, using both indicators is a relatively better measure of human capital than using only education or health indicators. On the other hand, using secondary enrollment and public spending in the health sector Kidane Mariam (2013) found a positive impact of human capital development on economic growth in

Ethiopia. Since human capital is the accumulation of information from primary to higher levels, she assessed the effect of secondary education separately, as most of the studies conducted produced a biased result.

Therefore, this thesis has used both education and health indicators to empirically analyze the effects of human capital development on economic growth, taking the weighted average rate of school enrollment as a proxy for human capital in education and life expectancy as a proxy for health human capital. Except for Kidane Mariam, previous researchers who attempted to identify the relationship between human capital and economic growth in Ethiopia have used the same analysis technique (Johnson's Co-integration technique). Although this technique is one of the widely used methods of time series analysis, its result might not be reliable for a small sample size. and Smith, 2001); Therefore, this article has used the ARDL approach to provide valid empirical evidence on the effects of human capital development on economic growth, so this research would fill the gap with a full conceptual review of the effect of human capital production in economic growth.

1.2.1. Research Question

The following research question guided the study:

- How does human capital development affect economic growth during the years of the investigation period?
- To what extent the human capital development affect economic growth?
- Is there a long-run relationship between the real GDP per capita and human capital development?

1.3. Objectives of the Study

The main objective of the study is to analyze the short and long-run effect of human capital on economic growth in Ethiopia. This study has the following specific objectives.

- To assess the causal relationship between human capital development & economic growth in Ethiopia.
- To examine the validity of human capital-based endogenous growth theory.

1.4. Significance of the study

The production of human resources is an engine for economic growth. The goal of this study is to assess the specific situation in Ethiopia. Ethiopia is one of the developing countries in the world. Even though modern economic growth theories give much attention to human capital development, in Ethiopia less attention is given. Therefore this study is required on providing or adding knowledge to the literature on human capital development to boost the economic performance of the country.

This study is initiated to explore the current effect of human capital development on the economic growth of Ethiopia. In doing so, it is hoped that the study will add knowledge in the area of study, and may serve as a springboard to undertake future research. Therefore, this study tried to provide comprehensive evidence on the impact of human capital development on economic growth in Ethiopia from 1981 to 2019.

1.5. Scope and Limitation of the study

This study is restricted for the period between 1981 to 2019 covered 38 years of time-series data on a macroeconomic variable that will affect economic growth. Besides, the study emphasizes the impact of human capital development on the economic process within the case of Ethiopia.

The limitation of this study was the one associated with data availability. The most challenge while doing this study came from the inconsistency of data from a different organization. So on avoid such inconsistency attempt is created to stay to the identical source of information.

1.6. Organization of the study

The research was organized as follows: Chapter one offers an introduction; the prevalent literature is discussed in Chapter two. Following chapter three is intended to resolve methodological problems, analytical results, and discussion.in chapter four, and the conclusion and policy implication in chapter five.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Introduction

In general, this chapter deals with the theories and principles of the study under consideration; a summary of the relevant theoretical and empirical literature published on the relationship between human capital development and economic growth.

2.2. Definition

- Human capital development: Human capital contain education, training, first-contact treatment, and adding to a person's understanding and health gather or amass one thing work and even containing harmful addictions within the means that hot and dependence on an extrajudicial substance (Gary Becker, 1992)
- Gross domestic product (GDP) the total final output of goods and services produced by the country's economy, within the country's territory, by residents and nonresidents, regardless of its allocation between domestic and foreign claims (Michael.P. Todaro).

2.3. Theoretical Literature

The relationship between human capital formation and economic growth is one of the few topics that attracted the attention of development economists for several decades. The term "Human Capital" first appeared in 1961 by Nobel-prize winner economist Theodore W. Schultz, in his seminal article "Investment in Human Capital". The human capital theory is the most influential economic theory of education, and it becomes a key determinant for economic performance.

In the Wealth of Nations, Adam Smith (1776) included human capital in his definition of capital. When it was adopted by Theodore W. Schultz (1960), for the first time Becker (1964) and Mincer (1984) deepened this concept and showed how the concept of investment in human capital could influence future real income through embedding resources (skills & knowledge) in individuals.

Education can add value to the economy and also to the income of the person who has been educated. But even with the same level of income, a person may benefit from education in reading, communicating, arguing, in being able to choose in a more informed way, in being taken more seriously by others, and so on. Amartya Sen (1999)

Sustainable economic growth and sustainability are closely linked to health and education. The return on investment in education can be improved by greater health resources because health is an important factor in school attendance. The return to investment in education increases with a longer life; improved health at any point during working life will in effect lower the rate of depreciation of education resources. Improving the efficient quality of education expenditures increases the return on a lifesaving investment in health (Michael P.Todaro, 2010).

2.4. Growth Theory

2.4.1. The Classical Growth Theory

The classical theory of growth combines the ideas of Adam Smith, Ricardo, and Malthus. These economists considered economic growth as a process related to the rate of technological progress and population growth rate. According to them, technological progress depends on capital accumulation at any given period remains at the forefront for some time. But eventually, technological progress declines when a fall in the profit rates prevents further accumulation of capital. It is a stage when the economy will be headed into some condition of stagnation. The most important aspects of the classical theory of growth and stagnation include the discussion about production function, technological progress, investment, the determinants of profit, size of the labor force, and the wage system.

Classical economists postulated the identical production function, which can be written as, Y = f (K, L, N, S). It means that output depends on factors such as the stock of capital, labor force, land, and the level of technology. In the generalized classical growth, model land is taken as the supply of known and economically useful resources. It is mainly because it is not the amount of cultivable land and its fertility that determines the national output but the total supply of known and exploitable natural resources. Because of most of the classical economists, the main constraint to technological progress is the lack of sufficient capital

accumulation. For instance, if an expected increase in profits brings about an increase in investment which adds to the existing stock of capital and the steady flow of improved techniques, then this increase in capital accumulation raises the wage fund so that wages would increase. Higher wages would accelerate population growth which further would raise the demand for food. In such a situation, food production would be raised by employing additional labor and capital, but on the other side, the diminishing returns to land would bring about a rise in labor cost. Consequently, the price of the food items goes up, raising the input cost. As a result rent and wages would increase, reducing the profit. Reduction in profits means a reduction in investment, retarded technological progress, cut in wages fund, slowing down of population growth, and capital accumulation. In a nutshell, according to the classical model, the end of capitalist development is stagnation. This kind of economic stagnation has resulted from the natural tendency of profits to decline and the consequent reduction in the accumulation of capital (Elhanan Helpman, HulyaUlka, 2004).

2.4.2. Neoclassical Growth Theories

The Neoclassical growth model explains how the proper amounts of the three driving forces, namely labor, capital, and technology, will achieve steady economic growth. Robert Solow, the American economist, and the British economist J. The two well-known economists contributing to the neoclassical theory of growth are E. Meade. The theory notes that in the production function, equilibrium could be achieved by varying labor and capital. The theory also argues that technological progress has a crucial effect on an economy's growth and that with any development in technology, economic growth cannot persist. It emphasizes the role of capital accumulation and its related decision of saving in determining the level of economic growth. The q has taken into consideration two-factor production functions with capital and labor as the factors determining the level of output. In addition to this, it has added an exogenous factor, technology, to the production function. The model stated as $Y = AF (K, L)$ in which Y denotes the Gross Domestic Product (GDP), K signifies the stock of capital; L represents the amount of unskilled labor, and stands for the exogenously determined level of technology. It is important to state that any change in the level of technology would shift the production function higher. In contrast to the fixed proportion production function of the

Harrod-Domar model of economic growth, the neoclassical growth model uses a production function with varied factor proportions. It means that the neoclassical growth model considers limitless possibilities of substitution between capital and labor in the production process (Elhanan Helpman, HulyaUlka, 2004).

2.4.3. New Growth Theories/Endogenous Growth Models

The new theory (Endogenous growth model) provides a theoretical framework for analyzing endogenous growth, persistent GNP growth that is determined by the system governing the production process rather than by forces outside that system.

The roots of the study encompass the endogenous growth model developed by Romer (1986, 1990) and Lucas (1988) which argue that a permanent increase in growth rate depends on the assumption of constant and increasing returns to capital. Endogenous growth theory revolves around the presumption that economic growth is primarily the wholesome effect of endogenous factors and not external factors. The theory holds that factors such as investment in human capital, innovation, and knowledge attainment are significant contributors to the long-run economic growth of a country. Romer has endogenized technological progress by introducing a research and development (R&D) sector in the model. Parameter A in the model refers to the number of ideas or the stock of knowledge accumulated until time t.

It is quite fascinating to see that most of the endogenous growth models predict that technological progress increases along with enlargement in population size. A stylized fact of history is that output growth typically translates into the growth of the population rather than the output per person. Kremer's model (Kremer, 1993) combines these two important characteristics. The result is that the rate of population growth should have been rising over some time. Technological progress leads to higher growth of output which translates into population growth which further accelerates technological progress. The theory also highlights the positive externalities and spill-over effects of a knowledge-based economy which will eventually contribute to economic development.

Similarly, Barro and Lee (1994) examine the empirical association between human capital and economic growth, and the results directly support Romer's growth model. It is important to recall that Solow's growth model has taken technological progress undefined so it has become an exogenous variable in the model. However, Romer's endogenous theory has addressed this issue by endogenizing this factor. In this model the equation to denote real output is given as, $Y = F(A, K, L)$ in this, capital accumulation is referred to as $dK/dt = sY - dK$, and savings (s) represent both domestic savings plus the inflow of foreign savings (foreign investment).

Romer's model identifies a research sector specializing in the production of ideas. This sector invokes human capital along with the existing stock of knowledge to produce ideas that can be termed as new knowledge. To him, ideas are more important than natural resources. He connects this to the growth experience of Japan which has very few natural resources but it was open to new western ideas and technology.

According to Romer, the production function shows that technology is endogenous. When more human capital is employed for the research and development of new designs, then technology increases by a larger amount. If more capital is invested in research laboratories and equipment to invent the new design, then technology increases by a larger amount. Further, the existing technology A also leads to the production of new technology ΔA.

Human capital contributes greatly to the production and growth of the economy. The country's sustainable growth can be accomplished through human resources, according to Lucas (1988). This theory has been backed by the study of macroeconomic regression, which emphasizes the positive impact of education on growth and development in the work of economic historians such as Barro and Sala-i-Martin, 1995; Fogel, 1990; Mankiw et al., 1992).

2.5. How does Human Capital Affect Growth?

The first has the impact of human capital on growth is the direct effect implied by way of its accumulation. This is an influence analogous to physical capital accumulation. Following Lucas (1988), we can rewrite the production function as: $Y = A F(K, vH)$ the place v denotes the element of the current stock of human capital devoted to production and (1-v) the

component committed to skill acquisition. We can suppose v and (1-v) as a share of each unit of time that the representative agent devotes to the two activities. As a result, the most appropriate choice of the agent is characterized by using the same trade-off of the original Becker model. Investing in human capital (skill acquisition) comes at the possible cost of not the usage of the time in production. The implication is a law of action of human capital that parallels the regulation of motion of investment in physical capital. Just as the output that is no longer bump off (net of depreciation) will increase the capital stock, so the human capital that is not fed on in production will increase the human capital stock. Empirically, this potential that we count on GDP increase to be a feature of the boom of human capital. In addition to quantity, also the satisfaction of human capital matters. A simple way to permit heterogeneous human capital is via introducing the distinction between knowledgeable (S) and unskilled (U) workers. Then, the manufacturing characteristic assumes the following greater established formulation: Y=A F (K, vSHS, vUHU) where the investment selections vS and vU are now skill-specific. Human capital accumulation legal guidelines of movement will then also be skill-specific. The second effect of human capital on growth is thru its affect technological progress, as represented by way of the inventory of expertise A. In the lengthy run, the monetary boom depends on A's growth. In Solow's model, this process is exogenous to the financial forces described in the model. In endogenous boom models, long-run monetary boom (A's growth) is endogenously determined, along with as a function of human capital. As a result, the increase goes on indefinitely due to the fact the returns to a large category of capital items do not scale down as the financial system develops [Barro and Sala-i-Martin, 1998, and Howitt (1998)].

In general, from the theoretical literature review, we can conclude that the theory of endogenous growth indicates that the creation of human capital is the distinct key production factor. There is a spillover effect of a knowledge-based economy which leads to sustainable economic growth and development. Hence, this study uses this theory to investigate the Ethiopian case.

2.6. Empirical Literature

There are several related studies on the relationship between human capital and economic development. Oleg, Daniel, and Romain (2012) argue in the decomposition of labor productivity growth that physical capital accumulation is the largest share of economic growth, Whereas Jeffrey and Andrew's (1997) evidence suggests that Africa's sluggish growth is due to weak economic policies owing to a lack of trade openness to foreign markets and geographical factors.

Despite the postulations of economic theory, investment in human resources and physical capital is growing, leading to an increase in economic development. However, according to Nelson and Fredrick, this is not true in the East African economy, especially in the case of Kenya (2006).

In Khaled and Willi's (2006) analysis using the Solow model, the effect of human capital on Egyptian economic growth was not able to form an agreement on the causality between human capital and growth. The study by Mohamed and Nassima (2003) in Algeria concluded that the key issues behind the low labor market contribution are: the problem of the labor market, the absence of economic diversification, and the low economic participation of the private sector.

Barro and Sala-i-Martin (1995) consider the probability of beneficial effects of educational externality on fertility and health, another study more applicable to developing countries. And they do find that education has a major positive influence on fertility and wellbeing. The weight of evidence tends to be growing that schooling is positively related to economic development and has many other positive externalities.

A well-organized study by Norman Gemmell (1996) showed that the positive impact of human capital on growth is important. He added that primary education appears to be important for the least developed poorest countries; secondary education appears to be relevant for the least developed intermediate countries, whereas tertiary education appears to be relevant for advanced countries.

Research by Lant Pritchet (1996) showed that the growth of educational capital per worker in developing countries has a negative or no impact on the growth of these economies. Three explanations were submitted: 1st Due to its low quality, Can schooling do not increase cognitive schools or productivity. 2. Stagnant demand for skilled labor triggers a rapid decline in the economic return to education. 3rd The enhanced cognitive skills gained through education are privately remunerative yet socially dysfunctional or unsustainable practices due to the institutional set-up in these countries, so that aggregate production stagnates or even falls.

A study by Ying Wang, Shasha Liu (2016) showed that primary and secondary education doesn't have an important positive impact on economic performance whereas higher education has an important positive result on economic growth. This might be as a result of that employees with higher education will higher master new technology and have a lot of innovative ability.

The study by way of Suna Korkmaz (2016) reveals the relationship between higher schooling rate, life expectancy, and economic growth, showing a unidirectional causality relationship from monetary boom to greater education schooling rate and life expectancy.

A research study by Syed Mohsin Kazmi, Kazim Ali, and Ghamze Ali (2017) show that investment in the educational sector maximizes the human capital could lead to economic growth and development improvement in Pakistan.

In Ethiopia, researchers investigating the impact of human capital development on economic growth have shown that human capital alone is not strongly linked to Ethiopia's total production.

Using statistical and econometric facts, Berhane Melles (2000) used descriptive analysis to see the difference in enrolment between regions, genders, and overall returns on investment in education to assess the position of education in Ethiopia's economic growth, to evaluate the state of education and its role in the economy, It indicates that the enrolment rate is too poor to be assumed to have a major positive effect on the economy.

To evaluate the influence of human capital on Ethiopia's economic development, Wubet (2006) used an error-correction approach and time-series data and found that the human capital variable in the form of education has a statistically insignificant effect on production growth.

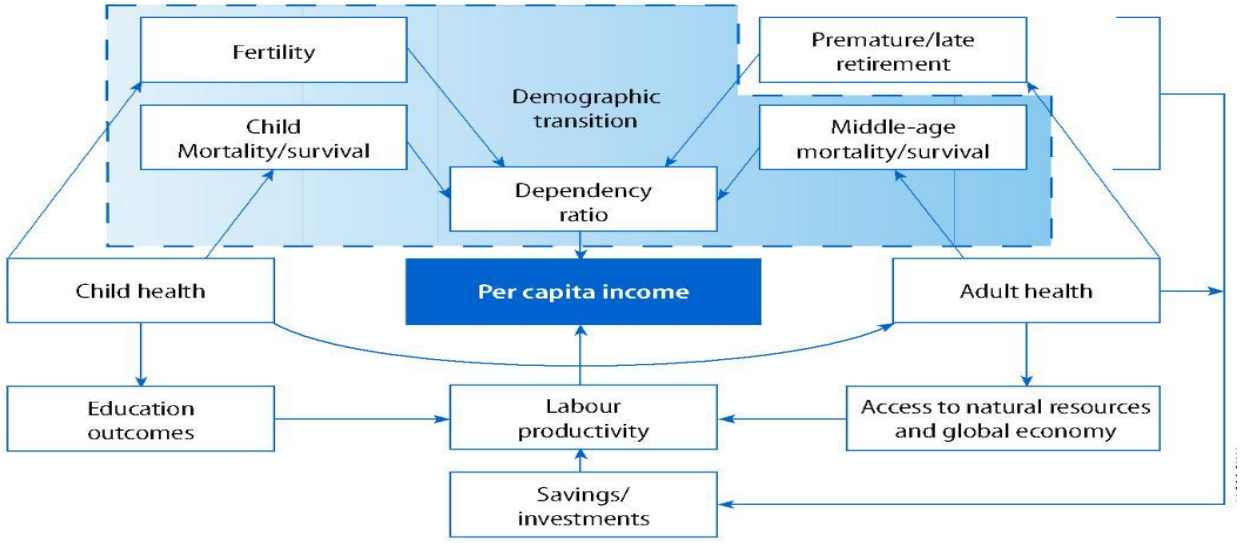
Tofik (2012) found that investing in human capital development has a positive impact on the economic growth in Ethiopia. However, it did not show the separate effects of the health and education sectors on economic growth.

A study by Kidanemariam. G (2013) found that improving the production of human capital contributes to change in productivity and growth in performance, which is close to the theory of endogenous growth.

We can conclude that to achieve sustainable economic growth and sustainability, the development of human resources has a crucial role in modern thought. While so much literature on the case is generated, there is no consensus on its growth and development effects. Its influence varies across countries throughout the world.

2.7. Conceptual Framework

Figure-1: The Relationship between Health, education and Per-capita income



Source: WHO: The World Health Report, 1999, p 11

The World Health Organization (1999) catches and analyzes the link between health and per capita income as depicted in Figure 1. There is put to test evidence that adult health depends ahead on a very young person's health and itself straightforwardly influences labor productivity. In other words, bettering child health, for instance, indicates a reduction in child death rates; translate into bettering adult health fashionable subsequent age. Arising from this, various options happen noticeably. First, better adult health implies declining middle-age mortality and a decline in premature retirement. This improves the mathematical transition by lowering the dependency ratio fashionable the economy accompanying ultimate something bettered fashionable per capita income by work or investments. Besides, improved adult health means a long period of working life. This means higher savings with improvements in the savings-investment ratio. The made better labor productivity give off from this donate positively to per capita income this leads something bettered in economic growth.

Human capital theory suggests that more educated individuals are more fruitful and obtain higher income. The improved labor productivity contributes definitely to per capita income improvement.

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Research Design

The research design adopted in this study is a time series of existing secondary data.

3.2. Data Type and Source

This thesis carries out the empirical analysis of all the variables defined in the model by using data sets for the period 1981-2019. The data needed for the analysis are secondary time, GDP per capita, life expectancy, gross capital formation, labor force, government spending, and development assistance extracted from the development indicators of the World Bank. Data on school enrollment, on the other hand, is extracted from UNICEF**.**

3.3. Econometric Model and Method of Analysis

3.3.1. Econometric Model Specification

ARDL Co-integration Approach would be accustomed to capture the target of the study and therefore the model of this study would follow the work of Jayeoba (2015) that took its roots from increased Solow theory and extension of Makiw, Romer, and Weil (1992) with modifications. to look at its result on the economic process, this study follows the framework of recent growth theories that think about human capital as associate degree input into production. For growth accounting determinations, the Solow growth model has been extensively used. Omitting human resources as associate degree input into the output can result in estimates being biased result. One of the explanatory variables of the production function Romer-Mankiew-Weil Model is the modern growth model/endogenous growth model that involves human resources. Instead of $Y= A K^{a} L^{1-a}$, proposes $Y= A K^{a} H^{b} L^{1-a-b}$. Therefore, the model for this study is presented as below:

GDPPCt=f (Kt, Lt, HCt, EHCt, Gt, DAt, Dt).....3.1

GDPPC=B0+B1Kt+β2Lt+B3EHCt+B4HCt+B5Gt+B6DAt+Dt+et.....3.2

Equation (3.2) would be transformed into equation (3.3) to linearize the non-linear variables and to account for potential simultaneity bias.

$$LnGDPPCt=B0+B1lnKt+\beta 2lnLt+B3lnEHCt+B4lnHCt+B5lnGt+lnB6DAt+Dt+et,\ldots\ldots \quad (3.3)$$

Whereas

LnGDPPC = Natural logarithm of real GDP per capita at time t.

LnKt = Natural logarithm of gross capital formation at time t.

LnLt = Natural logarithm of labor force growth rate at time t.

LnEHCt = Natural logarithm of education in human capital at time t.

LnHCt = Natural logarithm of health in human capital at time t.

LnGt = Natural logarithm of total government expenditure at time t.

LnDAt = Natural logarithm of development assistance at time t.

D= Policy change dummy, and et = Error term

ß1, ß2, ß3, ß4, ß5, ß6, and ß7 are coefficients

The model showing the relationship between economic growth and the creation of human capital development in Ethiopia is defined in this study as follows; GDP per capita is specified as a function of gross capital formation, labor force participation rate, weighted average school enrollment, life expectancy, government spending, development assistance, and policy change.

3.3.2. Method of Analysis

The study employed ARDL Co-integration and error correction technique to explore the impact of human capital development on economic growth. This method of estimation would be used to estimate the short-run and the long-run analysis of this study. The Auto-Regressive Distributed Lag (ARDL) approach to co-integration, which is proposed by Pesaran and Shin (1997) and Pesaran, Shin, and Smith (2001) is used to test the long-run co-integration relationships between variables. This approach has a lot of advantages to estimate for small size sample estimation. Therefore, the following ARDL model is specified.

$$\Delta LnGDPPC_t=\beta_o+\lambda_1 LnGDPPC_{t-1}+\lambda_2 LnL_{t-1}+\lambda_3 LnK_{t-1}+\lambda_4 LnHC_{t-1}+\lambda_5 LnEHC_{t-1}+\lambda_6 LnG_{t-1}+\lambda_7 LnDA_{t-1}+\lambda_{78} LnD_{t-1}+\beta_1\sum\Delta LnGDPPC_{t-i}+\beta_2\sum\Delta LnL_{t-i}+\beta_3\sum\Delta LnK_{t-i}+\beta_4\sum\Delta LnHC_{t-i}+\beta_5\sum\Delta LnEHC_{t-I}+\beta_6\sum\Delta LnG_{t-I}+\beta_7\sum\Delta LnDA_{t-i}+\beta_8 t+\beta_9 D1+e_t \quad \text{......................(3.4)}$$

Where:
λ_1, λ_2, λ_3, λ_4, λ_5, λ_6, and λ_7 are coefficients that measure long-run relationships.
β_1, β_2, β_3, β_4, β_5, β_6, and β_7 are coefficients that measure short-run relationships.
e_t is an error term and n denotes a lag length of the autoregressive process.
t is the time trend of the model.

The next step is to estimate the vector error correction model that indicates the short-run dynamic parameters (adjustment parameters that measure the speed of correction to long-run equilibrium after a short-run disturbance). The standard ECM is estimated as follows:

$$\Delta LnGDPPC_t = \beta_o + \beta_1\sum\Delta LnGDPPC_{t-i} + \beta_2\sum\Delta LnL_{t-i} +\beta_3\sum\Delta LnK_{t-i} + \beta_4\sum\Delta LnHC_{t-i} + \beta_5\sum\Delta LnEHC_{t-i}+\beta_6\sum\Delta LnG_{t-I}+\beta_7\sum\Delta LnDA_{t-i}+\beta_8 t+\beta_9 D1+\delta ECT_{t-1}+u_t \quad \text{.................... (4)}$$

Where: B1, B2, B3, B4, B5, B6, and B7 are coefficients that represent the short-run dynamics of the model. ECT-1 is an error correction term lagged by one period. D1 is dummy variables for policy change. δ is an error correction parameter that measures the speed of adjustment towards the long-run equilibrium.

To test whether there is a long-run equilibrium relationship between the variables; bounds test for co-integration is carried out as proposed by Pesaran, Shin, and Smith (2001). After confirming the existence of a long-run relationship among the variables, the following stable long-run model is estimated: After estimating the long-run and short-run model specification test, normality test, serial correlation test, and heteroscedasticity test is undertaken to check the robustness of the model.

3.3.3. Definition of Variables

Real GDP per capita is the dependent variable in this research. Physical capital (K) data is the proxy for gross capital creation, while L is the share of the country's working population in a given year. Here, we expect human resources to play a significant role in the country's economic growth. Economic growth is influenced by skillful and unskilled labor. However, it is believed that skills contribute a lot to countries' development rather than unskilled ones. The definition of the extensive variables is presented as follows:

i. GDP Per Capita (GDPPCt)

As a proxy for economic growth, the dependent variable Real GDP per capita, which shows the overall market value of all domestically produced final products and services divided by the total population, is taken as a proxy.

ii. Gross capital formation(Kt)

Gross capital formation, is a proxy for the economy's physical capital stock. Barro and Sala-I-Martin (1995; 2004), show that the predicted sign of capital accumulation is optimistic since, through further development of new goods and services, it fosters economic growth.

iii. Labor(Lt)

A significant aspect of sustainable economic growth and sustainability is labor force participation. For a labor-intensive economy like Ethiopia, it could be the engine of development. Due to the high unemployment rate, wasteful usage, and an unproductive labor force may be a burden to the economy. The symbol is, therefore, supposed to be positive or negative.

iv. Human Capital Development(HCt and EHCt)

A factor affecting labor productivity is human resources development. It is measured by life expectancy and weighted average enrollment at school. The creation of human resources in the form of education and healthcare is therefore anticipated to have a positive effect on economic

growth. Because human capital is the accumulation of information from primary to higher levels, it is therefore misleading to assign an equal weight or evaluate separately the effect of each level of education, as most studies have done (Aghion et al., 1994). We assign a certain weight according to their contribution to eradicate this prejudice and find a weighted average of aggregate school enrollment as an education human capital proxy. The research, therefore, uses education human capital based on weighted average enrollment in colleges. Life expectancy, identified as living a long and healthy life (UNDP, 2015), is seen as an important predictor for measuring the HDI and thus analyzing the relationship between economic growth and human capital development.

v. Government Expenditure(Gt)

Only spending from domestic sources is taken over by government expenditure. Since budgetary expansion will boost the economy and trigger an increase in the real GDP growth rate, the projected public expenditure coefficient is a positive sign.

vi. Development Assistance(DAt)

Different claims arise concerning the role of development assistance in economic growth. The first view is that assistance contributes positively to the recipient country's socio-economic status. The second point is based on the idea that aid could lead to low or negative productivity by discouraging alternative policies and institutions for growth. (Chung-Yee Liew, Masoud Rashid Mohamed, and Said Seif Mzee, 2012). The other point is that the marginal contribution of assistance is contingent on the recipient country's institutional climate (policy).

vii. Policy Change dummy(D)

Economic policy changes will impact the performance of the economy by investing in human resources, infrastructure and improving political and legal institutions (Easterly, 1993). Except for the policy change dummy, all variables discussed above are given in logarithm form. For the period 1981-1991/92, the dummy for policy reform takes one and zeroes otherwise.

CHAPTER FOUR

4. RESULTS AND DISCUSSIONS

Using the ARDL and EC econometric technique, this research aims to examine the effect of human capital development on economic growth using recent annual data from 1981-2019. The topic starts with the unit root test tests whether or not the time series is stationary. The existence of the co-integrating vectors is evaluated using the ARDL bound test after identifying the optimal lag length. Besides, there is also a long-run and short-run relationship is also identified.

4.1. Econometric Results and Analysis

4.1.1. Unit Root Test

While using the time series data for analysis, testing for stationary is essential. The outcomes we get by using non-stationary time series may be spurious. That is, they may indicate a relationship between variables that do not exist. To obtain a consistent and reliable result, we must transform the non-stationary data into stationary data by differencing. In contrast to the non-stationary process that has a variable variance and a mean that does not remain near, or returns to a long-run mean over time, the stationary process reverts around a constant long-term mean and has a constant variance independent of time.

For unit root tests, the Augmented Dickey-Fuller (ADF) unit root tests are added. Interpretation of the ADF test the null hypothesis of the unit root is rejected if the ADF test statistics are greater than the critical value in absolute terms, but if the ADF test statistics are smaller than the critical value in absolute terms, the null hypothesis is not rejected.

Table 4.1 Unit root test result

Variables	Test-statistics at level	Test statistics at difference	Critical Values			Decision for Stationary
			1%	5%	10%	
LnGDPPCt	2.008	-4.586***	-3.668	-2.966	-2.616	At difference
LnKt	0.753	-8.006***	-3.668	-2.966	-2.616	At difference
LnLt	-4.235***	-5.627***	-3.668	-2.966	-2.616	At difference
LnHCt	1.504	-2.809*	-3.668	-2.966	-2.616	At difference
LnEHCt	0.184	-2.781*	-3.668	-2.966	-2.616	At difference
LnGt	0.581	-6.922***	-3.668	-2.966	-2.616	At difference
LnDAt	-1.278	-6.982***	-3.668	-2.966	-2.616	At difference

Note: *** denotes significant at 1%, ** significant at 5% and * significance at 10%

At a given degree of importance, the absolute values of the measured test statistics for most variables are less than their critical value. The outcome reveals that certain variables at the level are non-stationary, i.e. the series tends to have a unit root. So the Augmented Dickey-Fuller test cannot reject the null hypothesis that each variable has a unit root. But we reject the null hypothesis after applying the first difference because the data for all variables tend to be stationary at the first difference.

Five variables are stationary at a difference at 1% significance but two variables are significant at 10%. Thus, such a result of stationary would not allow applying the Johansson approach of co-integration. Hence, this study applies the ARDL approach (bound test approach of co-integration) developed by Pesaran, Shin, and Smith (2001). Autoregressive distributed lag (ARDL) models are often used to analyze dynamic relationships with time-series data in a single-equation framework.

4.1.2. ARDL Bound Test for Co-integration

Table 4.2 Pesaran/Shin/Smith (2001) ARDL Bounds Test Lower and Upper critical value

Description	At 1% level		At 5% level	
	Lower bound, I(0)	Upper bound I(1)	Lower bound I(0)	Upper bound I(1)
Critical value F	2.32	3.50	2.96	4.26
Critical value t	-2.57	-4.23	-3.43	-5.19
The calculated F statics			8.053	
The calculated t statistics			-6.530	

Source: own computation

HO: no levels relationship, we accept if F<critical value for I (0) regressors and reject if F> critical value for I (1) regressors or we accept if t<critical value for I (0) regressors and reject if t> critical value for I (1) regressors. As depicted in the table above the calculated F-statics 8.053 and calculated t statics -6.530 is higher than Pesaran, Shin, and Smith (2001) upper bound critical value at 1% level of significance the null hypothesis that there is no long-run relationship is rejected. Thus, there is a long-run relationship between the variables so that we proceed to estimate both the short and long-run model.

4.1.3. Short Run Model Estimation

Table 4.3 Short-run estimation result

Dependent Variable: dLnGDPPC				
Regressor	**Coefficients**	**S.E**	**T-Ratio**	**Prob**
dLnkt	-0.0405694	0.0357982	-1.13	0.276
dLnlt	8.682291	1.8791	4.62	0.000***
dLnlt(-1)	5.443867	1.818901	2.99	0.010***
dLnlt(-2)	3.492328	1.424976	2.45	0.028**
dLnhct	-1.900059	1.236656	-1.54	0.147
dLnehct	0.3951563	0.2055598	1.92	0.075*
dLngt	-0.1032508	0.0482322	-2.14	0.050**
dLngt(-1)	-0.1148745	0.0525736	-2.19	0.046**
D1	0.1284658	0.0591062	2.17	0.047**
cons	32.01916	6.522374	4.91	0.000***
ECM(-1)	-1.632764	0.2500322	-6.53	0.000***

Note: ***significant at 1%, ** at 5% and * at 10%

R-Squared	0.9987	Root MSE	0.0219
Adj-R-Squared	0.9969	Log-likelihood	100.10544
F-stat	556.61[0.0000]		

The coefficient of the adjustment or error correction term is negative and statistically significant at a 1% level of significance. This tells us that the long-run steady-state is fairly adjusted. Although GDP per capita may temporarily deviate from its long-term equilibrium value, this implies that it will eventually converge into equilibrium. Based on the result, 163% of the disequilibrium in one period will be corrected in the following period.

The short-run estimates revealed that education human capital and health human capital have an insignificant contribution to economic growth in the short run. However, labor force participation is the main contributor to economic growth in the short run.

4.1.4. Long-run Model Estimation

Table 4.4. Estimation Result of Long-Run Model

The dependent Variable is LnGDPPC				
Regressor	**Coefficients**	**S.E**	**T-Ratio**	**Prob**
Lnkt	0.0579144	0.032708	1.77	0.098*
Lnlt	-5.759871	0.6847528	-8.41	0.000***
Lnhct	2.844804	0.4360742	6.52	0.000***
Lnehct	-0.0955327	0.0302468	-3.16	0.007***
Lngt	0.1548501	0.0197382	7.85	0.000***
Lndat	-0.003873	0.0177101	-0.22	0.830
D1	-0.0436544	0.0436408	-1.00	0.334

N.B: *** significant at 1%, ** at 5% and * at 10%

R-Squared	0.9555	Root MSE	0.0219
Adj-R-Squared	0.8918	Log-likelihood	100.10544

Source: own computation

As it is shown in the table above, labor force participation, health human capital, education human capital, and government expenditure on the model are statistically significant in the long run. The estimated coefficients of gross capital accumulation, development assistance, and policy change dummy have an insignificant impact on economic growth in the long-run during the estimation period. Labor force participation has an expected sign this is due to the low quality, and the low productivity, and the rigid nature of the labor market.

From the estimation result the elasticity figure of 2.84 for health human capital which implies a 10% increase in health human capital will bring about a 28.1% increase in GDP per capita. However, for education, human capital 10% increase in education human capital will bring about a 0.9% percent decrease in GDP per capita. This means that healthy human capital has a larger influence on GDP per capita in the long run. The elasticity of health human capital is greater than one means that healthy human capital is more sensitive for economic growth.

Education human capital has a distortionary impact on economic growth. The result is the same as Wubet. k (2006) and Lant Pritchet (1996) study for developed countries. However, the result of health human capital is the same as Kidane Mariam. G (2013).

4.1.5. Estimation Diagnostics Tests

It is crucial to know the model post estimation diagnostic results. To check the verifiability of the estimated long-run model, some diagnostic test is undertaken.

Table 4.5: Diagnostic test results

Test Statics	LM Version	F Version
Serial Correlation test	CHSQ(1)=4.392[0.0661]	
Functional Form Test		F(3,7)=1.90[0.1875]
Normality Test	CHSQ(1)=0.64[0.4229]	
Hetroscedacity test	CHSQ(34)=35[0.4204)	
A: Lagrange multiplier test of residual serial correlation B: Ramsey's RESET test using the square of the fitted values C: Based on a test of skewness and kurtosis of residuals D: Based on the regression of squared residuals on squared fitted values		

Source: Own computation

A) The null hypothesis of no serial correlation (Brush Cod fray LM test) is failed to reject for the reason that that the p-values associated with the test statistic is greater than the standard significant level (I.e. 0.0661> 0.05).

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

C) The third diagnostic test is the residual test. As the result indicates that we could not reject the null hypothesis which says that the residuals are normally distributed, for the reason, that the p-value associated with the kurtosis normality test is larger than the standard significance level (I.e. 0.4229>0.05)

D) The last diagnostic test is for the heteroscedasticity test. As we have seen from the above table, we can reject at 5% significant level due to its p-value associated with the test statistics are greater than the standard significance level(I.e. 0.4204> 0.05).

CHAPTER FIVE

5. CONCLUSION AND POLICY IMPLICATION

5.1. CONCLUSION

The education human capital has an insignificant impact on economic growth in the short and significant negative impact in the long run during the study period. To understand the unexpected result from a theoretical perspective, various factors are considered. For the amount and quality of human capital produced and for the uses to which it is put, the structure of the labor market is important. In Ethiopia, the labor market is static and unresponsive to either the reform pressure or, in this case, the rise of educated unemployment. Another concern, which is very closely linked to the fair and successful use of the skilled labor force stems from brain drain, high-level migration, which has become common and directly imposes the contribution that would have been made. Very little is known about the way educated manpower is utilized in Ethiopia. Another factor that brings into question is the declining standard of education during substantial expansion in the sector. The education sector's policy course has also been top-down.

Health human capital has a major positive and insignificant impact in the long run and short run respectively. It established that a high rate of life expectancy would spur economic growth in the long-run. More emphasis is needed for more efforts in Ethiopia to increase its level of healthy human capital, which has a major role in the long-term performance of the economy. The surprising result from a theoretical perspective throughout the short run is due high rate of life span could lead to an increment in dependency quantitative relation. Finally because of the high-level unemployment rate those productive labor forces couldn't get access to contribute to economic performance.

Besides labor force participation significantly affects the economic growth in the long run which is unexpected as compared from the theoretical perspective. The result emanated from the result of the country's high unemployment rate, wasteful usage, and an unproductive labor force.

We can conclude that, in the absence of other factors, such as a suitable market, legal and governmental structures, and an adequate policy climate in other sectors of the economy to sustain a functioning modern economy, we can conclude that merely providing further education will produce little in the way of economic development. Schooling by itself is not a sufficient engine of growth.

5.2. RECOMMENDATION

The empirical findings of this study have some policy recommendations: Education institutions in Ethiopia have an important mission to play concerning the country's economic growth. Those institutions should also address the issue of the mismatch of skills that are currently provided and also skill needed in the workplace. In Ethiopia, graduated students remained unemployed and or underemployed and must be re-trained to fit the labor market. It is wastage of resources when the excess supply of graduate students remained unemployed.

Major initiatives toward reforming education institutions addressing the issue of relevance and quality of education should be done. That is the higher institution in the country should urgently need internal changes and innovation in terms of structure, curricula, teaching methods, and redeployment of resources in the production of critical skills. Besides the institutional workings of the labor market and employment conditions; and having a comprehensive database related to the workings and relationships of education, labor, and the economy would essentially help tap the contributions that could be made from education.

Finally, the government ought to place the desired education, and training policy that aims to upgrade unceasingly a large spectrum of human capital to a better level and to re-invigorate innovation capability which will assure quality schooling for primary, secondary, and tertiary education. Since the life expectancy rate would boost economic growth, the government ought to commit a lot of funds to the sector of the health sector to reinforce human capital development.

REFERENCE

Albert. F. (1966). Productivity and Technological Change in the Railroad Sector, pp.1840–1910

Barro, Robert J. (2001). Human capital and growth, American Economic Review, Vol: 91, No. 2: pp. 12.

Barro, R and X. Sala-i-Martin. (1995). Economic Growth. New York: McGraw-Hill.

Benhabib, J, and Mark, S. (1994). The role of human capital in economic development evidence from aggregate cross-country data, Journal of Monetary Economics 34: 143–73.

Becker, G. (1964). Human Capital: A Theoretical & Empirical Analysis. The University of Illinois at Urbana-Champaign's Academy.

Berhane, M. (2000). The role of education in economic development in Ethiopia, School of Public Policy and Global Management, KDI.

Birhanu, L. (2018). Education Policy & the Politics of Change in Ethiopia. East African Policy Research Institute.

Chopkeng, A, Maxime.N. (2014). Macroeconomic Volatility and Physical Capital Accumulation in Sub-Saharan Africa. International Journal of Economic Sciences, Vol. III, No. 2/2014, pp.

Chung-Yee, L, Masoud, Rashid, and Said, S. (2012).The Impact of Foreign Aid on Economic Growth of East African countries, Journal of Economics and Sustainable Development ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online) Vol.3, No.12.

David, B, David, C, and Dean T. Jamison. (2004). Health, Wealth, and Welfare, Finance & Development.

Easterly, W. (1993). How Much Do Distortions Affect Growth, Journal of Monetary Economics, 32(2):187–212.

Elhanan Helpman (2004), the mystery of Economic Growth, Harvard University Press, Cambridge (2004)

Frederick, H and Charles, A. Myers. (1964). Education, Manpower, & Economic Growth: Strategies of Human Resource Development. McGraw-Hill, New York.

Gemmell, N. (1996) Evaluating the Impacts of Human Capital Stocks & Accumulation on Economic Growth. Oxford Bulletin of Economics & Statistics 58:1, 9–28.

Harris, R. (1999). Using Co-integration Analysis in Econometric Modeling. London Prentice hall.

IGAD (intergovernmental authority for development). (2016). Report on the formulation of IGAD strategy & medium-term implementation plans.

Jacob, M. (1981). Human Capital and Economic Growth. Columbia University.

Jeffrey D. Sachs and Andrew,M. (1997). Sources of Slow Growth in African Economies, Journal of African Economies, Volume 6, Number 3, PP. 335-76.

Johansen, S. (1995). Estimation & Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models.

John, S; Duncan, T. (1998).Health, Nutrition, and Economic Development, Journal of Economic Literature, Vol. 36, No. 2.

Khaled, E, and Willi, S (2006). The Role of Education and Human Capital for Economic Growth in Middle-income countries: Egypt's Case. The City University of New York.

Kidanemariam, G. (2013). The Impact of Human Capital Development on Economic Growth In Ethiopia, A Peer-Reviewed Indexed International Journal of Humanities & Social Science, II (IV).

Lant, P. (1996). Where Has All the Education Gone? The world bank economic review, vol. 15, no. 3 367–391

Lucas, R. (1988). On the mechanics of economic development, Journal of Monetary Economics 22: 3–42.

Luca Flabbi and Roberta Gatti (2018). A Primer on Human Capital. Human. World bank group Development Global Practice Group.

Mankiw, N. G, Romer, D & Weil, D. N. (1992). A contribution to the empirics of economic growth, Quarterly Journal of Economics, 107, 407-437.

MoE. (2008). National Report of the Federal Democratic Republic of Ethiopia: Development of Education and Inclusive Education. Ministry of Education, Addis Ababa, Ethiopia.

MoE. (2010). Health Sector Development Program IV: Final draft. Ministry of Education, Addis Ababa, Ethiopia.

Michael P.Todaro/Stephen C.Smith. (2010). Economic development. 11th edition

Nadia, H, and Noman, A. (2016). Relationship between School Education and Economic Growth: SAARC Countries, Lahore University of Management, Pakistan.

Nelson, W & Fredrick, M. (2006). Investment in Human Capital through Institutions of Higher Education for the Revival of Kenya's Economy. Kenyatta University and the University of Arkansas.

Richard R. Nelson and Edmund S. Phelps. (1966). Investment in Humans, Technological Diffusion, and Economic Growth.

R, Solow. (1956). A Contribution to the Theory of Economic Growth, The Quarterly Journal of Economics, PP 65-94.

Romer, D. (1993). The New Keynesian Synthesis, Journal of Economic Perspectives.

Schultz, Theodore W. (1962). Investment in Human Beings, Journal of Political Economy.

Smith, A. (1776). The Wealth of the nations. Reprinted 1975. London: J. M. Dent and Sons

Suna, K. (2016). Granger Causality between Life Expectancy, Education and Economic Growth in OECD Countries. The Economic Research Guardian – Vol. 6(1)

Syed, M, Kazim, A and Ghamze, A. (2017). Impact of Human capital on Economic Growth: Evidence from Pakistan. A publication of the Sustainable Development Policy Institute (SDPI).

Tofik, S. (2012). Official Development Assistance (ODA), Public Spending and Economic Growth in Ethiopia. Journal of Economics and International Finance.

Williams, B.J. (1967). Education change and economic development. Sociology of Education, 40(2), 101-114.

World Bank. (2019). World Bank, World Bank Database. Washington DC.

Woubet, K. (2006). Human Capital and Economic Growth in Ethiopia. Master. Addis Ababa University, Addis Ababa, Ethiopia.

Ying Wang, Shasha Liu (2016). Education, Human Capital and Economic Growth: Empirical Research on 55 Countries and Regions (1960-2009). School of Government, Beijing Normal University, Beijing, China.

ANNEX

I. Stationary Test Results

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. dfuller lngdppct, lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        37

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
——————————————————————————————————————————————————————————————————————————
 Z(t)             1.144           -3.668            -2.966            -2.616
——————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.9956

. dfuller d.lngdppct, lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        36

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
——————————————————————————————————————————————————————————————————————————
 Z(t)            -3.801           -3.675            -2.969            -2.617
——————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.0029

. dfuller lnkt, lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        37

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
——————————————————————————————————————————————————————————————————————————
 Z(t)             0.837           -3.668            -2.966            -2.616
——————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.9922

. dfuller d.lnkt, lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        36

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
——————————————————————————————————————————————————————————————————————————
 Z(t)            -3.060           -3.675            -2.969            -2.617
——————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.0297
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. dfuller lnlt, lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        37

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -3.477            -3.668            -2.966           -2.616
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0086

. dfuller d.lnlt, lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        36

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -3.031            -3.675            -2.969           -2.617
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0321

. dfuller lnhct, lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        37

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)              0.619            -3.668            -2.966           -2.616
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9881

. dfuller d.lnhct, lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        36

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -2.726            -3.675            -2.969           -2.617
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0696

. dfuller lnehct, lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        37

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -0.659            -3.668            -2.966           -2.616
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8571
```

```
. dfuller d.lnehct, lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        36

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -2.697           -3.675            -2.969           -2.617
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0745

. dfuller lngt, lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        37

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             0.005           -3.668            -2.966           -2.616
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9589

. dfuller d.lngt, lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        36

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -3.955           -3.675            -2.969           -2.617
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0017

. dfuller lndat, lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        37

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -1.800           -3.668            -2.966           -2.616
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3803

. dfuller d.lndat, lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        36

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -3.327           -3.675            -2.969           -2.617
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0137
```

II. ARDL Bound Co-integration Test Result

Pesaran/Shin/Smith (2001) ARDL Bounds Test

H0: no levels relationship F = 8.053
t = -6.530

Critical Values (0.1-0.01), **F-statistic**, Case 3

	[I_0] L_1	[I_1] L_1	[I_0] L_05	[I_1] L_05	[I_0] L_025	[I_1] L_025	[I_0] L_01	[I_1] L_01
k_7	2.03	3.13	2.32	3.50	2.60	3.84	2.96	4.26

accept if F < critical value for I(0) regressors
reject if F > critical value for I(1) regressors

Critical Values (0.1-0.01), **t-statistic**, Case 3

	[I_0] L_1	[I_1] L_1	[I_0] L_05	[I_1] L_05	[I_0] L_025	[I_1] L_025	[I_0] L_01	[I_1] L_01
k_7	-2.57	-4.23	-2.86	-4.57	-3.13	-4.85	-3.43	-5.19

accept if t > critical value for I(0) regressors
reject if t < critical value for I(1) regressors

k: # of non-deterministic regressors in long-run relationship
Critical values from Pesaran/Shin/Smith (2001)

III. Short and Long-Run Model Estimation Result

ARDL(4,1,3,1,1,2,0,1) regression

Sample: 1985 - 2019	Number of obs	=	35
	R-squared	=	0.9555
	Adj R-squared	=	0.8918
Log likelihood = 100.10544	Root MSE	=	0.0219

D.lngdppct	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ADJ						
lngdppct						
L1.	-1.632764	.2500322	-6.53	0.000	-2.16903	-1.096498
LR						
lnkt	.0579144	.032708	1.77	0.098	-.0122373	.1280661
lnlt	-5.759871	.6847528	-8.41	0.000	-7.22852	-4.291222
lnhct	2.844804	.4360742	6.52	0.000	1.909517	3.78009
lnehct	-.0955327	.0302468	-3.16	0.007	-.1604057	-.0306597
lngt	.1548501	.0197382	7.85	0.000	.1125159	.1971842
lndat	-.003873	.0177101	-0.22	0.830	-.0418575	.0341115
d1	-.0436544	.0436408	-1.00	0.334	-.1372545	.0499457
SR						
lngdppct						
LD.	.7304089	.1811803	4.03	0.001	.3418158	1.119002
L2D.	.2134798	.1348318	1.58	0.136	-.0757057	.5026652
L3D.	.3288727	.1078554	3.05	0.009	.0975458	.5601995
lnkt						
D1.	-.0405694	.0357982	-1.13	0.276	-.1173488	.0362101
lnlt						
D1.	8.682291	1.8791	4.62	0.000	4.652024	12.71256
LD.	5.443867	1.818901	2.99	0.010	1.542712	9.345022
L2D.	3.492328	1.424976	2.45	0.028	.4360587	6.548597
lnhct						
D1.	-1.900059	1.236656	-1.54	0.147	-4.552422	.7523051
lnehct						
D1.	.3951563	.2055598	1.92	0.075	-.0457257	.8360382
lngt						
D1.	-.1032508	.0482322	-2.14	0.050	-.2066986	.000197
LD.	-.1148745	.0525736	-2.19	0.046	-.2276337	-.0021154
d1						
D1.	.1284658	.0591062	2.17	0.047	.0016956	.2552361
_cons	32.01916	6.522374	4.91	0.000	18.03006	46.00826