The Effect of Human Capital Investment on Employment in Uganda

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ABSTRACT

Unemployment in Uganda has always been a major issue especially for the youth with an education. Youth are especially struggling to find jobs in line with what they have studied and those who get jobs earn less than expected, those working in the informal economy find jobs faster, however, the benefits of being employed in the informal sector does not reflect the amount of work they are doing. In addition, private investments to further knowledge and health is not reflected from the returns made by the individual. Uganda, like other Sub-Saharan African countries, has a high percentage of the population employed in informal economy.

To investigate, the relationship of the effect of human capital investment on Uganda's employment, the study uses human capital indicators, education, health and their respective government expenditures. Since the study variables used are based on annual time series from 1991 to 2017, the study attempts to estimate a long run and short run causal relationship by applying cointegration and the error correction model. The stationarity tests were integrated at order one and the cointegration tests identified a long run relationship. The study suggested an increase in human capital investment to improve Uganda's employment.

Keywords: Human Capital Investment, Employment, Cointegration, Error Correction Model (ECM), Uganda.

ÖZ

Uganda'da işsizlik, özellikle eğitimli gençler için her zaman önemli bir sorun olmuştur. Özellikle gençler okudukları alanda iş bulmakta zorlanıyor ve iş bulanlar beklediğinden daha az kazanıyor, kayıt dışı ekonomide çalışanlar daha hızlı iş buluyor ancak kayıt dışı sektörde istihdamın faydaları miktarı yansıtmıyor. yaptıkları işlerden. Ayrıca, daha fazla bilgi ve sağlığa yönelik özel yatırımlar, bireyin yaptığı getirilerden yansımamaktadır. Uganda, diğer Sahra Altı Afrika ülkeleri gibi, kayıt dışı ekonomide istihdam edilen nüfusun yüksek bir yüzdesine sahiptir. Yine de, bu finansal olarak yeterli fayda sağlamaz.

İnsan sermayesi yatırımının Uganda'nın istihdamı üzerindeki etkisinin bu ilişkisini araştırmak için, çalışma insan sermayesi göstergelerini, eğitimi, sağlığı ve ilgili hükümet harcamalarını kullanır. Kullanılan çalışma değişkenleri 1991'den 2017'ye kadar olan yıllık zaman serilerine dayandığından, çalışma, eşbütünleşme ve hata düzeltme modeli uygulayarak uzun ve kısa vadeli bir nedensel ilişki tahmin etmeye çalışmaktadır. Durağanlık testleri birinci sırada entegre edilmiş ve eşbütünleşme testleri uzun dönemli bir ilişki tespit etmiştir. Çalışma, Uganda'nın istihdamını iyileştirmek için insan sermayesi yatırımında bir artış önerdi.

Anahtar Kelimeler: İnsan Sermayesi Yatırımı, İstihdam, Eşbütünleşme, Hata Düzeltme Modeli (ECM), Uganda.

To God and my family

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PREFACE

Laid out is the dissertation, “The Effect of Human Capital Investment on Employment in Uganda”, based on empirical evidence collected using secondary data. It has been written in partial fulfillment of the requirement for a Master’s degree in Economics at Eastern Mediterranean University. I conducted the research and writing starting from February 2021.

This research was taken up at the university where I study my masters. I would like to extend my gratitude to my supervisor for guiding me every step of the way in conducting this analysis.

My husband and my family deserve a special thanks for their wise counsel and constant support.

I hope you enjoy reading.

Elsie Kahunde

TABLE OF CONTENTS

LIST OF TABLES

Chapter 1

INTRODUCTION

Uganda has under gone many years of unemployment and underemployment which is now significantly defining the economic environment. The persistently growing challenges surrounding unemployment and underemployment has led to increased literature reasoning out the key determinants despite the continued growth of the economy's GDP (Konrad-Adenauer-Stiftung [KAS], 2017). The ever growing population further weakens the labour market and as a result, threaten the socioeconomic development (Mugisha & Kitamirike, 2017). Subsequently, an individual transitioning from childhood or youth to adulthood in terms of self-sustainability as well as the individual's preference for private investment to increase education and health remain low due to the delayed realization of the returns from further investment (Mugisha & Kitamirike, 2017).

Under those circumstances and to bring more attention to the challenges affecting employment, this research study on human capital investment will resultantly show a much needed attention to the employment status in Uganda through investing in human capital.

The central objective of this study is to pay attention to the need of investing in human capital as a key factor in creating job opportunities, improving job mismatch and improving low skills that challenge employment in Uganda. Based on the literature

theory, human capital investment improves labour productivity through the contribution of knowledge, skills and competence as an indistinct determinant for economic growth. In doing so, my findings are expected to provide necessary evidence supporting economic theory of human capital by using empirical literature through econometric analysis.

Uganda's economy has failed to progress at the level of its neighboring countries such as Kenya, Tanzania and the rest of Sub-Saharan Africa (SSA) since 2011, yet the years following 1990 and 2000 showed higher Gross Domestic Product (GDP) numbers and poverty reduction (International Monetary fund [IMF], 2019). GDP remained strong and continued to grow from 2018 to 2019 as result of investment and consumption, despite keeping development unsustainable and low (World Bank [WB], 2019). This can be seen by the insufficient growth per capita depreciating human capital development (WB, 2019). In order to look at the determining factors of the economy's growth and development, it is also vital to understand the value of, meaning and impact of human capital has on employment.

Economists throughout the years have looked at economic growth, perceiving development and sustainability at micro and macroeconomic levels (Fritz, 1982). The purpose of this is to enrich the factors of production, that is to say labour and capital in the long run (Fritz, 1982). However, developed and developing economies still differ sharply in productivity growth (Fritz, 1982). Since Economic development is only evident after long periods, more attention is given to economic growth through intensive and extensive utilization of the factors of production particularly, labour and capital especially from the 20th century motive for human capital (Fritz, 1982).

Human capital is defined as the acquisition of general and specific skills, technical and scientific knowledge to determine productivity of an individual for the economic and social development of a society (Organization for Economic Co-operation and Development [OECD], 1998). It is a vital underlying element as a means to and contributing factor of income increase, wages and productivity growth to transform and develop an economy (Fritz, 1982). World Bank measurement using the Human Capital Index (HCI) looks at the effect underinvesting has on the productivity of a worker in the following generation. Uganda's low labour productivity contributed mainly by the poor education quality is the key source to the poor human capital development and accumulation (WB,2019).

Considered as a means to economic growth through productivity, the term human capital in past literature was not well accepted until Arthur Cecil Pigou who, amongst other scholars gave light to the understanding of human capital (Fritz, 1982). Gradually and more so in the 20th century as mentioned, there has been increased literature on human capital with a focus on knowledge, skills and technology progress (Fritz, 1982). Human capital development has taken its place as the central focus for economic growth and development (Fritz, 1982). A brief overview into more recent economic literature surrounding economic growth models, particularly the endogenous growth, the theory human capital offers an explanation for the economic growth differences between developing and developed countries (Fritz, 1982). The Chicago school looked at differences in salary growth between economies and the contribution human capital accumulation would bring by looking at the relationship between years of schooling, work experience and earnings (Sweetland, 1996). Eventually, human capital became important in explaining economic productivity and wealth (Sweetland, 1996). In most

developing countries, especially with large informal sectors, the inadequacy of regular jobs limits the provision of substantial income to boost the general productivity which can only be boosted through the development of human capital in skills and training (Sweetland, 1996). For this reason, economic development can be enhanced through productivity and improved employment fueled by education (Sweetland, 1996). World Bank Human Capital Index (HCI) number ranges from the 0 to 1 and is interpreted as the level of productivity the next generation of productivity workers has relative to the complete reception of education and health of an individual (WB, 2021). While most poor countries have an index around 0.3, rich countries have an index around 0.9 (WB, 2021). This means that Uganda's low Human Capital Index number of 0.38, ranking at 137 out of 157 countries, is interpreted as the next generation of workers being less than average in labour productivity at the level current levels of health and education (WB, 2021). In addition to this, the education enrollment rates are predicted to remain stagnant till 2025 unless the quality, efficiency and financing towards the education improves (WB, 2021). The job mismatch in Uganda is a result of wrong job placement, leaving people in jobs with the irrelevant and unqualified skills for working (KAS, 2017). The general poor skill set has been the narrative surrounding the overall unemployment rate in Uganda thus questioning government education curriculum provided in schools (KAS, 2017). As a result, Uganda's quality of education has become a factor surrounding the poor employment structure.

For years now, labour productivity has only been commonly attached to the quantity of labour whereby the higher number of workers equated to higher productivity (Fritz, 1982). However, other inputs such as knowledge and skills contribute to the quality of labour that is only gained through education (Fritz, 1982). For the purpose of achieving

extensive economic growth, the quality and quantity of labour as a factor of production is key in improving the value of labour productivity through investing in human capital for its development and accumulation (Fritz, 1982).

Productivity defined by (International Labour Organization [ILO], 2021) is an increase in outputs with minimal inputs. It is the output per unit with efficient utilization of resources (ILO, 2021). This can be achieved by establishing a relationship between skills and employment as will be the focus of this study given that development of human capital results in efficient utilization of resources to increase output (Fritz, 1982). To look at human capital when measuring growth of productivity, using labour productivity with respect to quantity of labour employed, is not a sufficient measure without considering the quality of labour (Fritz, 1982). However, human capital theory measures the quality by use of health and education attainment as a proxy for skills and knowledge (OCED, 1998). As seen by World Bank measurement, Uganda's human capital is affected by the education and as a result, the productivity of labour endures the challenges. Over the years, labour productivity has declined in Uganda especially years following 1962 due to the political instability, mismanagement in government and HIV/AIDS pandemic (United Nations Industrial Development Organization [UNIDO], 2005). Today, deteriorating numbers are seen from the employment gap that stems from people such as graduate students who are ready to enter job market, only to meet a shortage of office job availability hence a gap between jobs and job seekers (IMF, 2019).

Human capital development is achieved through investment (OCED, 1998). This is the initial cost on personal productive capacity such as tuition, training fees, the earnings foregone from job training and school learning (OCED, 1998). In return, the

investor/individual expects to reap benefits just as profits are earned from investments made to physical capital like machinery and factories (OCED, 1998). The more investments made towards knowledge accumulation and skills and accumulation, the more capital accumulated in a person. The accumulation of human capital, increases in personal capacity building, attained from education and knowledge through schooling, training and research (Shahjahan et al., 2016). Uganda's access to education has improved over the years especially through universal primary and secondary education thus positively contributing to the absorption of the knowledge however, the quality, efficiency and relevance has negatively affected the job sector (KAS, 2017). As a result, income is insufficient, increasing the country's entrepreneurship without proper skills and management (KAS, 2017). The low entrepreneurship experiences and knowledge has led to numerous startup companies failing to last for more than a year (KAS, 2017).

In essence, human beings are the most vital and encouraging factor for the development and growth in productivity especially since technology and physical assets are made from the human mind (Shahjahan et al., 2016).

With a constantly evolving global economy and increasing changes in technological progress for both developing and developed economies, more attention is required for human capital development (Feldman & Storper, 2018). Based on education and skills as a measure of human capital development, developed countries have maintained around 95% school enrollment that is slightly higher than developing countries (WB, 2019). In spite of a lower school enrollment percentage of about 88% the introduction of universal primary Millennium Development in 2015 is the reason for such a higher percentage than expected (WB, 2019). This gives a suggestive evaluation of the

progress and challenges in developing countries (WB, 2019). Uganda's low human capital index of 0.38 and rank of 137 out of 157, according to World Bank lies below SSA region average which further points out the level of human capital development (WB, 2019). World Bank describes that a child who fully enjoys education and health in Uganda is only about 38 percent productive when fully grown meaning that unless human capital development improves, labour productivity will continue to deteriorate (WB, 2019).

In addition to education, health is very important for the development of human capital, according to Schultz (Fritz, 1982). Following a human capital study done in Bangladesh (Shahjahan et al., 2016), using error correction model, results showed that health improves the possibility of getting an education because of an increase in the cognitive functioning unlike those with health problems which limit their education attendance, enrollment and overall attainment. In the same way, healthy workers function better in the work place thus efficient production unlike at health risk workers (Shahjahan et al., 2016). The HIV/AIDS pandemic in the 1990s gravely affected labour productivity, lowering labour force to about 10% in Uganda (UNIDO, 2005). Not to mention national pandemics over the past years that have brought attention to the importance of improving health care provision and nutrition in the country especially with the annual rate of the nation's growing population.

A study conducted in Tanzania by Wobst, *et al* (2005), showed the long term impact of school enrollment on economic growth using the dynamic computable general equilibrium model which resulted in a long run relationship when increase in school enrollment increases earnings and productivity. In essence, accumulation of human capital means improved economic growth and development through increased

employment and productivity thus human capital tends to have a direct relationship with the level of employment and wage rate that is only a result of skilled labour (Shahjahan et al., 2016).

1.1 Problem Statement

World Bank (2021), classifies countries into four categories including low income, lower middle income, upper middle income and high income while the United Nations classifies countries into three main groups; developed economies, economies in transition and developing economies (UNIDO, 2005). Based on these descriptions, Uganda is a developing and low income economy with insufficient per capita growth to take the economy to lower middle income (WB, 2019).

Due to the agriculture and service industry sector, GDP continues to increase however, the growing population of about 3% per year will not be sustained by the increasing rate of the GDP meaning attention must be given to human capital for the country to improve per capita and economic development through productivity (WB, 2019). Over the years, this growth in GDP has not resulted in increased job spaces unlike the rest of the world where a 1% percent increase in GDP leads to about 10,000 job spaces (KAS, 2017). Uganda's job spaces only increases to about 400 jobs whereby most of the employment is in the informal sector and precarious work (KAS, 2017). The growing population rate only increases labour supply that results in limited employment creation opportunities and higher rates of unemployment and underemployment (KAS, 2017).

The common knowledge surrounding Uganda's employment challenges have been low skills for employment opportunities and mismatch skills where an individual's

skills are irrelevant for a job (KAS, 2017). This has been identified as being contributed by the colonial education structure in relation to the current global dynamics (KAS, 2017). Following the report by (KAS, 2017), the challenge of unemployment rate is underemployment due to low pay, low skills development and limited labour demand hence low growth in firms, low productivity and low household enterprises.

Given that sustainable productivity is through human capital development that leads to economic growth and development, it is evident that Uganda's labour productivity has not contributed greatly to the economic growth. As mentioned above, foreign investments and telecommunications has contributed to the GDP (KAS, 2017). While there is abundant literature on Uganda's employment and unemployment challenges, there is minimal literature on human capital investment and employment. This study will look at how human capital investment has affected employment.

1.2 Aim and Objective of Study

The aim of this study is to investigate and explain the relationship between human capital investment and employment in Uganda using two human capital investment indicators, education and health based on literature theory.

The main objective is to show the importance of human capital investment for employment.

Other objectives of the study focus on analysis:

1. To explain the effect of education and health on employment.
2. To indicate the importance of human capital for employment growth.

1.3 Research Questions

The central research question of this study sets to answer is; what is the effect of human capital investment on employment in Uganda? To further achieve the aim and objective of this study, the central question is divided into two sub categories:

1. What purpose does a higher education and government expenditure serve for employment?
2. What is relevance of human capital for the development of the economy?

1.4 Research Methods

In order to achieve the objective of this study and answer the research questions, there are three possible approaches namely, quantitative methods, qualitative methods and mixed methods approach (Denzin & Lincoln, 2000). The quantitative methods look at numerical data using mathematical analyses to explain a phenomenon, for example the percentage of passing rate between private and public schools over a period of time to investigate the improvement of education standards (Denzin & Lincoln, 2000). Qualitative methods look at opinions and motivations to offer reasoning for data (Denzin & Lincoln, 2000). While quantitative methods use readily available numerical data, qualitative data provides a basis for developing a hypothesis to answer a problem (Denzin & Lincoln, 2000). The mixed methods incorporate a combination of quantitative and qualitative research to solve a problem (Denzin & Lincoln, 2000).

This research employs quantitative methods using secondary data for the empirical and theoretical literature as well as the time series data. The numerical data of education enrollment is collected from Uganda Bureau of Statistics and World Bank. Government expenditure was collected from Ministry of Finance, Planning and Economic Development and Uganda Bureau of Statistics.

1.5 Significance of the Study

As stated above, Uganda's GDP is mainly contributed by Foreign Direct investment especially by donors, taxes and telecommunications sector leaving individuals significantly affected and unable to gain substantial benefits especially with a growing population which is advantageous to the development and sustainability of the economy (WB, 2019).

Employment challenges have been a long time discussion in Uganda, more so in the recent decade given a largely growing population (KAS, 2017). This is only a great economic advantage for the people to be a contributing resource (KAS, 2017).

This study will bring attention to the importance of personal investment for the purpose of self-development in order to create a more inclusive growth economy, not to mention, the spillover effects of human capital investment from employment to the macro economy and the next generation. In addition, this study will give insight into the effect underutilization of the population has had on per capita growth and development. Like many SSA countries, Uganda has a large informal sectors that contribute to the employment (UNIDO, 2005). However, with low incomes pushing people to failing start-up businesses, low paying and low skilled jobs, human capital in Uganda remains dormant.

1.6 Limitations of the Study

This study used quantitative data collected from World Bank, Uganda Bureau of Statistics, International Monetary Fund and Ministry of Finance, Planning and Economic Development.

The study adopted time series data restricted from 1991 to 2017 due to limited availability of the data. Education variables included, enrollment at primary, tertiary level, school life expectancy and government expenditure on education. Health variable included life expectancy and government expenditure on health.

Limitations to the data was the failure to find readily available numerical data which is a general challenge in Uganda's overall database. As a result, there was a need to interpolate the missing data which is looked at further in later chapters.

1.7 Outline of the Study

In order to achieve the aim and objectives set out by answering the research questions, this study is divided into five chapters. Chapter one, is the introduction, outlining problem statement, the aim and objectives of the study, the research questions, research methods, significance of the study and the limitations of the study. Chapter two looks at the literature review on human capital theory and investment, employment and economic growth. Chapter three, the research methods, introduces the chapter followed by research questions, time series analysis of the data, model specification, stationarity, cointegration, error correction model and causality. Chapter four looks at the findings from the study based on econometric analysis and interpretation of the results. The outline of this chapter is the introduction, summary of descriptive statistics, stationarity tests, cointegration tests, error correction model, causality tests and the conclusions and finally chapter five looks at the conclusions and recommendations based on the findings.

Chapter 2

LITERATURE REVIEW

2.1 Theoretical Review

For the longest time, capital as a concept has been commonly used to refer to physical goods, humanly made, with no attachment to natural resources such as land or minerals for the purpose of serving human beings (Akpa et al., 2018). Human beings were not seen as serving capital (Akpa et al., 2018). According to the Cambridge dictionary, capital is the ownership of land, businesses, industries and other categories of wealth in the society (Cambridge Dictionary, 1995). The view of human beings as capital was found offensive to many like Classicals and Marxists especially in regard to property and marketable assets since they viewed human being to be capital-free unlike Like Arthur Cecil Pigou, Theodore Schultz, Adam Smith, Irving Fisher and H. von Thünen also favored investment in human capital to be a source for economic growth (Akpa et al., 2018). Many economists view human beings as critical to the growth of economies especially with measuring output with the capacity labour productivity thus emphasis given to the need for large investments in people (Akpa et al., 2018).

As a result of the early literature on human capital, Theodore Schultz and Gary Becker focus on capital's intangible benefits that is to say education notwithstanding minimal focus on tangible benefits (Fritz, 1982). There has been an increase in research and literature on human beings as capital and the resulting returns in tangible and in tangible assets (Fritz, 1982). Scholars have focused on education, health and the

technical, mathematical and scientific research of the returns of investments made to education hence illuminating the importance of human capital for the growth and sustainability of an economy and its development (Fritz, 1982).

Previous studies such as the relationship between human capital and economic growth in Sub-Saharan Africa show that human capital measurement without education could not explain the economic growth in Sub-Saharan Africa and that focusing on education alone as a contributing factor to economic growth did not favor similar findings on human capital and economic growth (Michael, 2017). However, the study recommends further research to be conducted on the economic growth of Sub-Saharan Africa through human capital development in support of economic growth models that explain an increase in education and knowledge for the development of human capital to be vital for the progression of an economy (Michael, 2017).

In another study looking at the impact of human capital development on economic growth in Bangladesh, the econometric analysis used cointegration and error correction model (ECM) for evaluation (Shahjahan et al., 2016). The study found that increase in government expenditure on education and health was key for the development of human capital and resultantly the economic growth (Shahjahan et al., 2016). Largely based on the human capital theory, the study found that unskilled labour and low physical capital were a resource for the industrial development in order to improve the economy of Bangladesh, using the variables education enrollment and the Gross Domestic Product (GDP) as a proxy for economic growth.

In addition to this, a study looking at human capital investment on economic growth in Singapore showed that investment in education and health care objectively,

improves the human capital formation (Biswajit, 2016). This study applied the vector error correction model (VECM) (Biswajit, 2016). The study goes further to show that labour productivity is a contributing factor to economic growth in Singapore despite the diminishing marginal returns that were observed from the study (Biswajit, 2016). The increase in the economic growth in various sectors will increase the demand for labour (Biswajit, 2016).

While Theodore Schultz and Gary Becker are commonly known to have revived the subject of human beings as capital, Adam Smith first introduced the concept of human beings as the reason for the wealth of a nation (Cannan, 1904). In Adam Smith's, an inquiry into the nature and causes of the wealth of nations written in 1776, a clear distinction between human and physical capital was made (Cannan, 1904). The belief from his statements was that the wealth of a nation is not only comprised of physical capital but human capital thus the need for more attention to be given to its development through accumulation (Cannan, 1904). Physical capital is comprised of machines and factories that can only be run by human beings and improved by technology however, the increase and improvement of this productivity can only be achieved through human beings' skills and knowledge which was the essence of his argument (Cannan, 1904). Smith viewed education as an effective way to increase an economy's productive activity with the belief that skills could only buildout through training (Cannan, 1904).

Following Adam Smith, Theodore Schultz took a long standing position that people are imperative for the wealth of nations in his study of human capital where skills and knowledge is a form of capital that increases the productivity of human resources in relation to economic growth (Fritz, 1982). He focused on human being as a form of

capital because capital is in born and automatically led to future earnings. (Akpa et al., 2018). On the other hand, Gary Becker looked at return on education especially through schooling and training (Fritz, 1982). His argument was based on people invest in their own skills and efficiency which is then related to economic development (Fritz, 1982).

While Adam Smith's ideas became controversial on the basis of using human being as a form of capital, Alfred Marshall shared the same ideas, offering a similarly clear distinction of human capital as being personal (Fritz, 1982). From this, he stated that education of children cared for by their parents is for the purpose of being more efficient in the working industry (Fritz, 1982). Just like Alfred Marshall, other distinguished economists such as John Stuart Mill and Irving Fisher shared in the same matter regarding to human capital (Fritz, 1982).

2.2 Definition of Concepts

2.2.1 Human Capital and Human Capital Investment

Rutherford (2005), defined capital as durable goods that produce other goods and services over a period of time while Piazza-Georgi stated that at a cost of human effort, capital is applied and maintained meaning that without investment of human beings, capital cannot be productive. Given this distinction, land and labour can be differentiated through investment. Just as land is profitable by investing in irrigation and drainage, labour is also profitable by investing in education (Akpa et al., 2018). These investments in labour justify human beings as capital (Akpa et al., 2018).

Today, the definition of human Capital has broadened. According to World Bank definition, human capital is the accumulation of skills, knowledge, health and potential

capacity of people to be productive in society (WB, 2019). Intangible assets that increase the development of human capital according to World Bank include education where an additional year of schooling will in turn lead to higher wages (WB, 2019). Data from the United States of America (USA) showed that hiring more educated teachers increased students' lifetime income by US $250, 000 while in Nigeria, the increased provision for malaria testing and treatment increased employees' earnings by ten percent (WB, 2019). Another measure of human capital by World Bank is child mortality rate and the rate of stunted children under the age of 5 as a proxy for the health care indicator (WB, 2019). In Uganda, a child born today, fully enjoys health and all the benefits of education from the total 7 years of schooling by the age of 18 however, low levels of learning, cuts the education years to about 4.5 and the poor quality cuts it down further to about 2.5 (WB, 2019) However, in 2017, the human capital index rose by around 2% from 0.36 (WB, 2019). An increased investment in the quality of education will eventually improve the contribution to productivity.

Organization for Economic Co-operation and Development (OECD) defines human capital as the knowledge, skills and other attributes accumulated by an individual relevant to economic activity (OCED, 1998). Using the same intangible assets defined for human capital accumulation according to OECD is for the betterment of employment, innovation and production through organized learning from education and training (OECD, 1998). Similarly, OECD measures human capital through the completed years of education which in turn means higher wages given the time spent in school (OECD, 1998). In addition to this, is job training as mentioned above which is also a way to educate following the education attained by the individual (OECD, 1998). This way, an addition year in formal schooling results in training offered by

schools and job placements (OECD, 1998). The OECD report shows that students who completed lower level of secondary school earned about 10 and 40 percent lower than students who completed upper secondary school (OECD, 1998). On the job training proved to increase employability, enterprise competitiveness, wages and productivity (OECD, 1998).

Sushil Kumar defined human capital as a person having skills and abilities as a resource for an economy while human capital formation is increase in the number of people acquiring the skills and abilities important for economic growth through investment (OECD, 1998).

To further understand the definition of human capital, there are two economic approaches; at micro level focusing on the productivity and competitiveness of employees of an organization and at macro level focusing on the economic growth through the Gross Domestic Product (GDP) and Gross National Product (GNP) respectively (Ntombifuthi, 2017). At the micro economic level of human capital, organizations seek to be more productive and in so doing, use the human resource management of the company to recruit, manage and train employees with the objective of not only bettering the effectiveness of employees but also improving the assets of an organization (Ntombifuthi, 2017). The global increase in market productivity, trade and business expansion has led companies to invest more into their employees (Ntombifuthi, 2017). This is done to improve the resources taken up by companies that is to say machinery, equipment, energy and information as well as the market value from increased competition and flexibility (Ntombifuthi, 2017). In addition, this increases and improves the growing society and knowledge management when employees improve the general professional skills (Ntombifuthi, 2017). As stated

above, the GDP and GNP of an economy measure the economic growth from which human capital growth and development at macro-economic level increases and improves the extensive and intensive use of the factors of production (Ntombifuthi, 2017). Achieving this means increasing the quantity of labour through the population structures and distribution and improving the quality of labour through education and training to improve the employment opportunities (Ntombifuthi, 2017). The global trend in economic growth seen especially from the fast paced change in technology, shows human capital and labour go hand in hand since one cannot do without the other thus education playing a more vital role now in the enhancement of knowledge (Ntombifuthi, 2017).

2.2.2 Education

Education systematically involves individuals giving and receiving logic, reasoning and analysis through instruction, teaching, training, coaching and guidance offered at schools, home, colleges, universities and other work spaces (Ntombifuthi, 2017).

Education is also defined as societies intentionally channeling accumulated information, knowledge, understanding, skills, values, competences and behaviors across generations for the purposes of bringing learning (United Educational Scientific and Cultural Organization UNESCO, 2020).

In addition to these definitions is deliberat and organized attempt to provide and receive knowledge, skills and values by learning in organizations either the purposes of a job or generically to improve emotional intelligence (Ntombifuthi, 2017).

There are three commonly known types of education systems that include informal, formal and non-formal education where informal and non-formal education is learning

outside the classroom, for instance home schooling (Ntombifuthi, 2017). Another form of informal education happens when the individual involuntarily continues to gain knowledge and insight especially through daily activities and skill development (Ntombifuthi, 2017).

2.2.3 Health

The simplest definition of health is the absence of disease. According to World Health Organization 1948 constitution, health is more than without disease or infirmity, it is the mental, physical and social well-being of an individual to be a resource of living not the object of living (World Health Organization [WHO], 1998). Schultz and Becker recognized the efforts into being and remaining health as not easy but delivers benefits in the long run (Fritz, 1982). For an economic analysis, this definition of health does not give an effective analysis without looking into indicators such as life expectancy, birth crude rate and infant mortality when identifying the health status of a society. In fact, this definition better suits medical professionals in carrying out their work (Himanshu & Narayan, 2007).

In the past 60 years, this definition of health by WHO has been re-evaluated, given the changes in population ages and patterns in illness that health professionals have sought to focus on health and wellness of people (Huber et al., 2011). By defining healthy or one's health status as being a complete well-being, this eliminates most people and countries from the category of healthy which narrows down the definition of healthy to those associated with medical professionals in organizations (Huber et al., 2011).

Based on the new definition in the *British Medical Journal*, redefining health meant looking at the ability to adapt and self-manage the physical health when placed in different environmental and situational circumstances while the definition of mental

health was based on criteria (Huber et al., 2011). In more detail, when an individual is undergoing physiological stress, a healthy person is able to build up the response of protection that restores the individual back to balance (Huber et al., 2011). The mental health is where an individual has the capacity to cope and recover from physiological stress thus preventing post-traumatic stress disorders (Huber et al., 2011). Social health was redefined as capability to participate and fulfill the potential and obligations of life and work (Huber et al., 2011). A socially health person is one who is able to manage the responsibilities of a social life and work life through participation regardless of being on medication (Huber et al., 2011). In addition to society participation, an individual had to be able to balance life's opportunities and limitations given external environmental circumstances (Huber et al., 2011).

2.3 Development of Human Capital Theory

The importance given to human capital investment for economic growth increased notably and much later in the twentieth century as stated above following Theodore Schultz publication of human capital (Tisdell, 2004). He stated how skills and knowledge of people is capital, encouraging the development of human capital theory (Tisdell, 2004). To further understand the application of human capital today and its calculations, needs an understanding of the development of human capital theory.

2.3.1 Classical Thought of Human Capital Theory

As stated above, the concept of human as capital is attributed to Adam Smith's 1776 publication, an inquiry into the nature and causes of the wealth of nations where he looks at the wealth of nations rooted in the efforts of human beings (Sweetland, 1996). To understand this framework means applying the principal element that the abilities of human being is qualitative and that these abilities always come at a cost (Sweetland, 1996). Such abilities included knowledge, skills and perception that can be acquired

through an education, training, apprenticeship and any other form of study (Sweetland, 1996).

John Stuart Mill in 1848 expressed further that for a valid definition of the wealth of a nation, there needs to be a market exchange of the abilities (Sweetland, 1996). In the market, the value of these abilities can be determined, otherwise, without the exchange these abilities, they fail materialize (Sweetland, 1996). He viewed human abilities to be economic utilities and a means to wealth (Sweetland, 1996).

Alfred Marshall like Adam Smith and John Stuart Mill shared the same view on human capital however, Marshall's more general definition expresses human capital abilities as a means to producing personal wealth just as John Stuart argued (Sweetland, 1996). In addition to this, he argued personal wealth to be viewed as capital, the stock of wealth, since the human abilities is accumulated for the production of materials and the benefits are out of personal income (Sweetland, 1996). While Marshall and Mill shared the same argument of human capital, Marshall's argument disregarded the need for market exchange of human abilities into a value (Sweetland, 1996). This is because he viewed personal wealth as part of the stock of human abilities (Sweetland, 1996).

Irving Fisher in 1906, did not look at human capital to be defined as a market exchange (Sweetland, 1996). He instead found empirical difficulty in estimating the abilities of human capital with the perception that, since public goods such as knowledge provided are not valued, would this then disregard the work put in, for example teachers in public schools or the public library. (Sweetland, 1996). Following this, estimations of human capital were calculated the same as is done for physical capital (Sweetland, 1996).

2.3.2 Economic Foundation Studies of Human Capital Theory

Before human capital theory was officially known literally, there are four studies which attributed to the primary assumptions on which the field of human capital is based, despite only focusing on the United States. Firstly, in Jacob Mincer 1958 studies of the nature and causes of personal income inequality, in the United States, he estimated that human capital which includes skills and knowledge determines the personal income gap. (Sweetland, 1996). His argument was based on more skills and knowledge equated to better income and industries having high labor capital ratios (Sweetland, 1996). These industries with high capital ratios are willing to financially provide for employee training which meant investing in the employees (Sweetland, 1996). Mincer's model looked at formal and informal training as well as the years of work experience and education (Sweetland, 1996). He concluded that from the age-earnings of those who had more years of work experience, had higher earnings and those who had more years of education, had higher earnings (Sweetland, 1996). In addition to his study he found changes in age to be a factor in income distribution differences whereby, earnings of an older person continued to decline as they got older except for those with specific jobs like surgical doctors where the older the person, meant the more years they had in the field therefore making higher earnings (Sweetland, 1996). His study concluded that more training in the industry meant better earnings (Sweetland, 1996).

In 1959, Solomon Fabricant study of productivity from 1889 to 1957 concluded that the assumptions and methods used to estimate production activity values undervalued investment in intangible capital which meant that productivity was over estimated (Sweetland, 1996). The purpose of his study was to clarify the technical issues from

inconsistent statistical results thus his expressed importance on statistical inconsistencies and the need for alternative labor and capital indexes and their effect on productivity (Sweetland, 1996).

Gary Becker in 1960 estimated a model on the personal income differences accumulated by college students in order to find out if government expenditure on college students was enough and whether it needed to improve their quality of education (Sweetland, 1996). In his study he looked at the income differences between those in college and those in high school relative to the amount of costs invested in their education from high school up to college (Sweetland, 1996). His findings concluded that returns from college education were both direct and indirect and therefore underinvesting in college was not wise (Sweetland, 1996). He further concluded that an increase in the number of college students would increase the average returns for the students (Sweetland, 1996).

During the period of 1900 to 1950, Theodore Schultz stated that there was an increase in the national income contributed by those educated in the work force (Sweetland, 1996). However, with this result, it was not clear whether the education indicators of knowledge and skill were indeed a form of capital, that is to say for consumption or they were intended investments (Sweetland, 1996). Consequently, to estimate human capital, Schultz expressed the need to separate between consumption expenditures and investment expenditures by having three separate categories of pure consumption, pure investment and expenditures that are for both consumption and investment (Sweetland, 1996). A human capital indicator such as education, according to Schultz belonged to the third category of expenditures for consumption and investment (Sweetland, 1996). Based on this, most of his studies are for the purpose of clearly identifying what rate

of return education contributes to, if it is not a total return like national income (Sweetland, 1996). In addition to the work of his colleague, Schultz stated that Mincer and Fabricant's studies were based on total return while Becker was based on the rate of return (Sweetland, 1996). Apart from his affirmation of the relationship between education and human capital stock, Shultz widened the indicators of human capital stock to health and services which impact life expectancy and the vibrancy of the people, on the job training like apprenticeship, formal education at all levels and migration of people in search of jobs (Sweetland, 1996).

2.3.3 Benchmark Studies of Human Capital Theory

As stated above, while Adam Smith first introduced the view of human capital as the wealth of nations that is to say economic growth, Theodore Schultz 1960 publication on human capital brought about many studies surrounding the topic (Sweetland, 1996). However, in United States, part of the economic growth was left an accounted for by use of the conventional economic measurements. He found that the increased personal income resulted from higher levels of education (Sweetland, 1996). For clarity to measure other economic growth determinants that were left unexplained, these studies are considered to be the benchmark of human capital theory for the estimation of these findings (Sweetland, 1996).

Denison in 1962 estimated the United States economic growth with the use of aggregate production function model, but by including education levels and the effect of wage rates, a complete account of the economic growth was measureable (Sweetland, 1996).

In addition to this, Denison estimated total economic growth and found that the growth rate measured by real national income was about 2.93 percent with about 2 percent

accounted for by an increase in inputs categorized to be around 0.67 percent in education and about 0.59 percent knowledge (Sweetland, 1996).

2.4 Approaches to Human Capital Theory

Human capital as indicated from the definition is an intangible asset which means the approaches for measurement are formulated indirectly unlike measurements for physical capital. The purpose of this is to offer a better understanding of the factors steering economic growth and how to sustain long term economic development (Liu & Fraumeni, 2020). Literature identifies three approaches used to measure human capital that include, monetary-based approaches which is further divided into two categories, indicators-based approaches and an integrated approach (Liu & Fraumeni, 2020). The monetary-based approach is further divided into income-based approach and cost-based approach (Liu & Fraumeni, 2020). The income-based approach looks at future benefits earned from investing in human capital (Liu & Fraumeni, 2020). The cost-based approach looks at past investment from the labor earnings of households, employers and all governments costs obtained from producing human capital as a result of inputs made to investment (Liu & Fraumeni, 2020). The third approach, indicators-based approach focuses on education-based approach measuring qualitative physical variables of education such as the class size, number of students and expected years of schooling, to mention but a few (Liu & Fraumeni, 2020).

2.4.1 Cost-Based Approach

Under the cost-based approach formulated by Ernst Engel, he estimated human capital stock to be the cost of child birth to be equal to the accumulated cost of raising children till the age of 25 which at the time is the age commonly considered to be a fully independent adult (Liu & Fraumeni, 2020).

Kendrick and Eisner's use of this method focused only on the costs of child rearing indicated by health, education and training (Liu & Fraumeni, 2020). Health and mortality however, as indicators were eliminated from this method because it did not factor in population growth, making the results to only stem from the investment of education, labor earnings or the duration of the education period and the difference in time when the investment were realized to when the educated individual enter the job market (Liu & Fraumeni, 2020).

2.4.2 Income-Based Approach

Before Ernst Engel's 1883 formula measuring human capital, in 1960, Petty's formula for calculating England's human capital using income-based approach, in its simplicity did not account for England's diverse population (Le et al., 2005). The formula sustained the wage bill through capitalizing (Le et al., 2005). Petty's method estimated a laborer's money value (Le et al., 2005).

Since then, other researchers like Dublin and Lotka's 1930 modified formula of human capital that was first estimated by Farr, showed results from United States 1950's human capital stock when more attention was given to non-human capital (Le et al., 2005).

In 1867, Wittstein developed an approach evaluating and individual's human capital at different stages of an individual's growth and development by combining Engel's method and Farr's method however, this method was critiqued for assuming lifetime and maintenance costs of an individual are equal (Le et al., 2005).

In 1891, Nicholson's measurement of England's human capital stock concluded that the human capital stock was five times greater than ordinary stock but by combining

retrospective and prospective methods, his method was criticized due to duplicated values (Le et al., 2005).

Studies such as the ones mentioned show that the income-based income approach do provide more reasonable results about human stock in spite of the limitations because the prospective method gives a value to the future earnings while the retrospective method shows an individual's expenditure on his/her potential (Le et al., 2005). To calculate this, the income-based method sums all the discounted amounts of money from streams of future income that is expected to be earned throughout the lifetime of a particular population with depreciation as a factor unlike the cost-based approach (Le et al., 2005). The need for information on earnings, unemployment or employment rate and education is readily available and sensitive to timely and accurate provision of results (Le et al., 2005). However, the need for information of wages to be based on the assumption of difference in wages is a key limitation in the model since there exists differences in productivity (Le et al., 2005). Failure for the assumption, invalidates the findings of the model (Le et al., 2005). Developing countries that suffer accurate provision of data especially on wage rates pauses a limitation to the use of the approach (Le et al., 2005). However, other researchers have modified the model to cab these limitations such as Weisbrod in 1961 who used cross-sectional data on Unites States human capital stock for the earnings, rate of employment and survival probabilities in order to capture the changes in age that was part of the limitation in the difference of retirement age earnings found that using cross-sectional data and using median instead of mean left specific ages unaccounted for (Le et al., 2005). In 1979 Graham and Webb research on the males in the United States from ages 14 to 47 showed that education had a strongly positive relation to the wealth across all ages in order to capture the

economic growth and there was room for depreciation which was not found randomly (Le et al., 2005). From 1989, Jorgenson and Fraumeni human capital study on the United States, captured market and non-market activities, human and non-human capital, calculating backwards the future earnings in order to find the present value of the lifetime earnings at each age (Le et al., 2005). Mulligan and Sala-i-Martin 1997 study on the United States, incorporated the uneducated on the basis that human capital does not only look at an employee's working skills but their physical skills as well (Le et al., 2005). Calculating this, the model focuses on a particular state in a given year where the total labor income per capita is divided by the wages of the uneducated (Le et al., 2005).

2.4.3 Indicators-Based Approach

The focus of this method is to measure human capital stock on the basis of investment in education as a key element in the development and human capital (Le et al., 2005). Education in this approach is a representation of human capital stock by use of indicators such as literacy rate, enrollment rates, completion rates, average of years of schooling and passing rates (Le et al., 2005).

The census or survey-based estimation method to measure human capital stock using education indicators, first done by Psacharopoulos and Arriagada in 1986 and 1992 respectively, looked at the average years to complete school at country level represented by;

$$\bar{S} = \sum L_i D_i$$

Where $\bar{S}$, is the mean years of schooling for the labor force in 99 countries L_i, is the proportion of labor force participants at the $_i^{th}$ level of schooling, D_i, is the completed years of schooling at the $_i^{th}$ level of schooling where *i* is the illiterate, incomplete and

complete primary secondary and university education (Le et al., 2005). From their findings, some West African regions Mali, Nigeria and Nigeria had low numbers of education attainment at labor participation with an average below 1.8 years of schooling unlike Eastern European countries like East Germany and the United States that had an average over 10 years of schooling (Le et al., 2005). Information regarding L_i, was available from the census however, limitations from the model do not explain the years of schooling finished at each level of schooling for those who did not complete (Le et al., 2005).

Following this study, researcher like Kyriacou in 1991 used the projection method for cross-sectional data that attained five observations covering 113 countries which resulted in larger data sets than Psacharopoulos and Arriagada's study by looking at the enrollment rate at each level of schooling in relation to the averages years of schooling in which results showed a strong lag (Le et al., 2005).

The perpetual inventory method done by lieu in 1991 using time series data on education stocks in 58 developing countries showed results to be poorly correlated with Psacharopoulos and Arriagada's study due to fabrication of data and lack of standard by population census (Le et al., 2005). In addition, dropouts, class repetition and migration the data was biased (Le et al., 2005). To correct the class repetition and dropout in Lau's data, Nehru's data dated back to 1930, 1902 unlike Psacharopoulos and Arriagada's data (Le et al., 2005). The data assumes class repetition and dropouts to constant over time at each level of education due to hindrances thus results showed Sub-Saharan Africa having the least educated yet highest growth in school together with East Asia however, the model received criticism for ignoring the census population at the attainment levels (Le et al., 2005).

Studies done by Barro and Lee sought to close gaps in the data by increasing the sources of information which increased the variables and filled the missing data improving the average years of schooling and attainment rates for the application of Psacharopoulos and Arriagada's calculation (Le et al., 2005). In doing so, other researchers such as Ahuja and Filmer's, modified Barro and Lee's model resulting in a high correlation of average years of schooling in their estimation of education attainment on the population age of 6 to 60 in developing countries (Le et al., 2005). However, Barro and Lee improved on their estimations by adding 5 years to their data which showed South Asia does not have low average years of schooling and that females and males equally receive schooling (Le et al., 2005).

Authors have indicated that using average years of schooling as an education indictor for measuring human capital has errors in failing to capture the difference and variety in the quality of education across countries, as is the study by Behrman and Birdsall on brazil (Le et al., 2005). This study identifies miss leading results when the quality of education is neglected (Le et al., 2005). In addition to this short coming, is education does not evidently show an increase in productivity although it shows an improvement in the capabilities of the individual as shown by Arrow in 1973 (Le et al., 2005).

2.4.4 Integrated Approach

Acknowledging that there is no single approach to measuring human capital given the limitations stated from the above methods, authors integrated both cost-based approach and income-based approach to measure investment as a determinant of human capital (Le et al., 2005). In doing so, the cost-based approach and income based approach which is viewed as human capital rent shows that increased investment in cost-based approach determines the future earnings of an individual (Le et al., 2005).

Tao and Stinson's approach to estimate human capital is represented by the function

$$Y_{s,a,e} = W_t, h_{s,a,e}$$

Where Y and h is the earnings and human capital respectively given by s, a, e that indicate the sex, age and education level of an individual. W_t, is the rent of human capital in a year (Le et al., 2005). Tao and Stinson chose to focus on base entrants as a representation of human capital stock since the rent of human capital stock and the earnings are unobservable variables (Le et al., 2005). Individuals who enter the labor market immediately after finishing school with no influence from on-the job training and years of work experience create a consistency in the findings and results the human capital stock (Le et al., 2005). This then comes down to human capital stock equating to education expenditure accumulated over the years (Le et al., 2005). The authors found that the method did not have the problem of depreciation and appreciation by eliminating what categorizes as investment in human capital through education (Le et al., 2005). As a result, there was no double counting from improved health through medical spending from personal costs, as this would already be part of earnings (Le et al., 2005). This method however had it short comings such as the assumption that the base entrants are immediately receiving payment from their employment based on their academic performances (Le et al., 2005).

To measure human capital as seen above requires indicators such as education and rearing stemming from the cost based-approach and education-based approach (Le et al., 2005). In addition to this is an individual's earnings based on income-based approach which literature has shown was for the purpose of identifying the wealth and power of nations (Le et al., 2005). However, recently, attention on human capital stock is for the purpose of economic growth, development and sustainability (Le et al.,

2005). Therefore, these measurements are not without their short comings and limitations on the quality of data resulting into poor outcomes of human capital (Le et al., 2005).

2.5 Content and Proxies of Human Capital

The studies stated above from the work of Adam Smith, Theodore Schultz, Jacob Mincer and Gary Becker show Human capital to mainly revolve around formal education indicated by years of school, informal education indicated by work experience and the importance of investing in education as a cost (Devadas, 2015). Empirical studies use education as an easier measure of human capital theory due to the costs being quantitative, the years of tenure together with the contribution education towards improving health and nutrition (Devadas, 2015).

Economic Foundational Studies and bench mark human capital theory studies look at the total return on education and the internal and external rate of return on education while other studies done on developing countries look at adult literacy rate, average years of schooling and education attainment post-secondary level (Devadas, 2015). (Wöẟmann, 2003) measured the quality of education using education proxies such as student-teach ratio, government expenditure as a percentage of GDP, government expenditure per student.

2.6 Growth Models

By definition, economic growth through quantitative measures increases real national income and per capita over time in material production by the input of factors of production that is to say Gross Domestic Product (GDP) and Gross National Product GNP increase (Chhetri, 2017). However, economic growth alone cannot be constant in an economy without development whereby economic development through

qualitative measures not only increases the material production but the socio economic well-being and structural changes (Chhetri, 2017). Since economic development is only evident after a long period of time, emphasis for economists is mostly economic growth Chhetri, 2017). Still, this study mentions the economic growth and development of Uganda (Chhetri, 2017). The measure of changes in the structure of resource production and distribution or supply of factors of production, technology changes, skills, population and human capital capture the quality of life an economy, its development, government investment, spending, and GDP (Chhetri, 2017).

Classical economists like David Ricardo and Robert Solow observed that following the industrial revolution, education, health and infrastructure offered little explanation to the increased amount of economic growth which they believed to be mainly contributed by technological innovation (Chhetri, 2017). Just like many other economists, who focus on human capital stock and economic growth, applying human capital to neo classical and endogenous growth models is not the same (Chhetri, 2017).

2.6.1 Neo Classical (Solow) Growth Model

In this model, physical capital like human capital is a factor of production meaning that growth in human capital would increase the marginal productivity of physical capital (Chhetri, 2017). Consequently, the physical capital accumulation would increase total output level causing the economy to reach a steady state due to the increased demand for human capital (Chhetri, 2017). The model was given by the function $Y= f (L, K)$ where by (Y) is the total output, (L) is the number of hours to produce (Y) and (K) is the stock of capital in the economy (Ntombifuthi, 2017).

The production was later modified to a Cobb-Douglas function explaining technological relationship between human and physical capital and other inputs given

by the function $Y = (L, K, A)$ where (Y) the total output is a function of, labour force (L), (K) is physical capital and (A) is other inputs (Ntombifuthi, 2017).

In addition to the model, Solow stated that any more increase in the economic growth would be due to technical progress causing a permanent increase which is given by the function $Y = f(L, K, t)$ whereby total output (Y), is a function of labour (L), capital (K) and technological progress (*t*) (Chhetri, 2017).

The augmented Solow growth model developed by Mankiw, Romer and Weli stated that economies would converge to the same point of income level on condition that savings, labour growth, productivity and depreciation were at the same level although this only accounted for 78% of cross country variance (Ntombifuthi, 2017).

2.6.2 Endogenous Growth Model

Based on the Harrod-Domar model which views labour as a substitute for capital to bring about technological change, human capital resulted in the increase of economic growth as far as making natural resources such as land, machines and factories accessible to man (Ntombifuthi, 2017). The model showed that enriching human capital led to economic growth in the long run (Akpa et al., 2018). This accounted for the short coming of the neo-classical model and the failure to account for 80% percent of the economy despite the factor of residual in the model explaining historical growth in industrialized cities as a contributor to economic growth (Ntombifuthi, 2017). Schultz and Becker' s focus on human capital increased literature contributed to factors of economic growth that later explained the residual in Solow model to be human capital and largely contributing to economic growth (Ntombifuthi, 2017).

Following the literary breakthrough of endogenous growth accounting theories, the first model by Findlay and Kierzkowski in 1983 explained the contribution of human capital to economic growth by expanding the production function output (Y) to be a function of technology (A), capital (K), labour (L) and human Capital (H) (Ntombifuthi, 2017).

Answering the sustainability of economic growth, Aghion and Howitt stated that through human capital accumulation, the economy is sustained and this can be evident from the economic growth rate differences cutting across countries based on the human capital accumulation (Chhetri, 2017). In addition, Nelson-Phillips saw that technological progress through innovation from human capital accumulation led to the sustainability of the economy which was evident from the Paul Romer's model explaining economies growing faster is due to the accumulation of human capital stock (Chhetri, 2017).

In addition, Paul Romer and Robert Lucas rejected diminishing marginal returns when observing economic growth and instead factored in true knowledge as increasing marginal return that would in turn spill over thus increasing economic growth (Chhetri, 2017). Together with Gregory Mankiw, they showed that a highly educated and largely education working population and increased government expenditure and investment on research activities for both private and public sectors increased an economy's GNP (Ntombifuthi, 2017).

In order for economies to achieve development and sustainability in an economy, equal importance should be given to the investment of human capital as it is given to physical capital especially to low income countries with high population where human capital

accumulates through education, health and knowledge (Chhetri, 2017). This is seen from Barro's extension of the endogenous model that includes government investment and expenditure through taxation as having significant impacts to the growth and development of an economy that are either permanent or temporary (Chhetri, 2017).

The economic growth models show that including human capital accumulation further explains the differences in economic growth across countries and leads to economic growth. In addition to this, studies applying human capital theory show that human capital accumulation improves on economic growth and also shows that an increase in GDP increases job opportunities that is to say job creation therefore increasing the level of employment. However, in order to achieve the objectives of this study as stated above, the aim is to explain the relationship of the human capital investment indicators used on employment.

2.7 Labour Market

Having looked at human capital theory and the studies done related to employment and economic growth and development, a look into understanding labour theories and studies done in relation to labour structures gives insight into the current employment and unemployment situation and trend in Uganda. This contributes to understanding Uganda's employment challenges and how productive the society is since the resultant effect of human capital development is ones' contribution to a society's productivity.

Classical economist framework of labour market using perfect competition model points out that employment is achieved when labour demand, that is firms, is met by labour supply, that is the labour force from the population (Knapinska, 2011). This model was based on the assumptions of full transparency whereby there is perfect

knowledge of information flowing between employers and employees regarding wages and available employment opportunities and that employers and employees are rational beings seeking maximum profit by firms and maximum wage satisfaction by the employees (Knapinska, 2011). Other assumptions in this model include employers and employees being part of a small portion in labour demand, the labour force mobility and labour production (Knapinska, 2011). Factors incurred such as loss of jobs cause no hindrances and employers and employees act independently of each other during wage payments and the employment decisions (Knapinska, 2011). In addition, unemployment in the model is looked at as voluntary based on employees' actions since the labour market in this model is balanced (Knapinska, 2011). Like classical economists, neo classicals believed that unemployment is voluntary, however, it is temporary due to changes in economic conditions in a country and insufficient human capital thus people having to accept possibilities of suffering unemployment (Knapinska, 2011).

Adam Smith's view of unemployment revolved around wage flexibility where some markets face high labour demand due to relatively high wages and high labour supply due to relatively low wages resulting in labour force mobility causing imperfections in the labour market (Knapinska, 2011).

John Maynard Keynes argument for unemployment and labour force mobility is centered on labour and wages being inflexible (Knapinska, 2011). According to Keynes, lowering nominal wages was no a guarantee of full employment like classical and neo classical economists had argued (Knapinska, 2011). He argued that market demand is the effect for labour market imbalance at which lowering nominal wages in the name of increasing employment opportunities does not change the situation of an

unemployed individual (Knapinska, 2011). Lowering nominal wages means lower interest rates which brings in investors into a country however, this is not a sure guarantee thus the only possibility of changing the unemployment status is by government intervention (Knapinska, 2011).

In recent literature, there exists more developed and modified approaches towards the imbalances in the labour market with one group similar to Keynes' approach that labour market imbalances is caused by wage inflexibility (Knapinska, 2011). Theories explaining this approach include efficient work theory and inside-outsider theory that mainly focus on wage differentials that are above the wage balance (Knapinska, 2011). The last approach to the imbalances in labour market is explains the long lasting or delayed adjustments in the labour the market using human capital theory which is central focus in this study, job search theory or unemployment theory (Knapinska, 2011). In this group, labour market imbalances might be due to people searching for jobs or changes in the qualifications that alter their job requirements (Knapinska, 2011). Using time series dating from 1998.

2.8 Empirical Review

A study done on the impact of human capital development on economic growth in Bangladesh using time series data from 1981 to 2014 employed the error correction model (ECM) with estimates indicating that expenditure on health and education had a positive relationship with GDP as a proxy for economic growth (Shahjahan et al., 2016). Primary and secondary enrollment also showed a positive relationship with GDP however, tertiary enrollment had a negative relationship (Shahjahan et al., 2016). The model also showed a long run relationship given by the error correction term coefficient which was negative and statistically significant (Shahjahan et al., 2016).

An econometric study looking whether human capital is a cause for the economic growth in India using time series data from 1960 to 2006 employed Vector Auto Regressions analysis from which the estimates showed that innovations made to education only brought about changes in education however innovations made health increased brought about changes to the country's economic growth (Haldir & Mallik, 2010).

In another econometric study looking at the rate of education enrollment versus the rate of employment in Nigeria using time series data from 1970 to 2017 employed the Auto Regressive Distributed Lag Model (Adejummo, 2021). The estimated results from this showed a short run and long run relationship between education at levels and employment where education at all level had a statistically significant and positive relationship with employment in the short run however, in the long run, education was not significant (Adejummo, 2021).

In Pakistan, an econometric analysis looking at the impact of education and health on employment by employing the Vector Error Correction (VECM) estimated that expenditure on education and health was statistically significant for inducing employment in long run and the coefficient of the error correction term was negative and statistically significant also showing that any disturbances in the short run would be temporary (Bashir et al., 2012).

In another econometric analysis looking at the effect of human capital investment in Nigeria from 1980 to 2019 using the Ordinary Least Squares (OLS) method, the researcher used four basic baseline models of government expenditure on education, government expenditure of health, primary school enrollment and secondary school

enrollment (Saka, 2020). Results from the model showed the variables to be statistically significant with a positive relationship however, health showed a negative relationship in lag 1 (Saka, 2020).

Still, in another econometric study dated 1981 to 2015, using the OLS method to look at the effect of human capital investment on unemployment volatility in Nigeria, the research employed the error correction model to estimate the results of the relationship between government expenditure on education, government expenditure on health and unemployment found that the variables were statistically significant on the rate of unemployment together with a negative coefficient of the error correction term that was statistically significant at 5% which indicated a long run relationship with temporary deviations in the short run (Kenny, 2019).

Chapter 3

METHODOLOGY AND DATA

3.1 Introduction

In this chapter, we apply the quantitative research methods to study the relationship between human capital investment and employment specifically conducting an econometric analysis of study. Given that this approach looks at the casual effect relationship between the independent and dependent variables, this study used the (OLS) method because it provides the best linear unbiased estimators when deriving values for the variables. The study uses data from 1991 to 2017 focusing on Uganda's economy.

Outlined in this chapter is the restated research questions that guided the research followed by the definitions of the different methods to estimate results such as the descriptive statics, the stationarity tests, cointegration tests and the VECM establishing a long run relationship followed by the results of the test and finally the conclusion.

3.2 Research Questions

This study, as stated already, sought to understand the impact human capital investment has on employment by answering the following questions;

1. What purpose does a higher education and government expenditure for employment?
2. What is the relevance of human capital for the development of the economy?

3.3 Methodology

The econometric approach using time series analysis data is based on the model and appropriate for understanding the relationship between variables, since this study is looking at the relationship between human capital investment and employment. The dependent variable is the Employment-to-population ratio. This variable is identified and cannot be manipulated by the researcher in order to prevent any alterations to the data and still carry the authenticity of the variable. The effects of the independent variables namely, education enrollment at primary level, tertiary level and school life expectation is a representation of education. Government expenditure on education and government expenditure on health. Literature shows that, it is expected for employment to be readily available and easily accessible to those who invest more in education and health. Investments done by government toward health and education, will accumulate and develop the human capital, improving the employment status and lowering unemployment in Uganda. Otherwise, low or poor investments in human capital means depreciation of the human capital where peoples' contribution to society only deteriorates lowering productivity and only creating idle capital which then becomes evident from high unemployment rate. In this way, Uganda human capital investment, explained by the variables studies the country's employment status.

The table below shows the different sources where the data was collected.

Variables	Measurement	Source
Employment-to-Population ratio	Employment rate	World Bank 2021
School Enrollment	Gross Enrollment ratio	World Bank 2021
School life Expectancy	Years of schooling	World Bank 2021
Education Expenditure	Government expenditure on education	Uganda Bureau of Statistics 2020

Health Expenditure	Government expenditure on health	Uganda Bureau of Statistics 2020

Despite finding data from the sources, some of the short comings encountered in the data were missing gaps or points in the data that might have been removed which needed to be filled in order to proceed with analysis. This was done interpolation. This method is specific to time data with gaps to be filled, data with predictions of similar content and variability of the observations (Lepot et al., 2017). Based on the criteria of little data required to fill missing variables and estimating parameters and missing values are done as the same time, interpolation of the data was done by compounding (Lepot et al., 2017). A deterministic method of basic interpolation between the last known point of the gap and the first known point of the gap (Lepot et al., 2017). It should be pointed out that while the independent variables needed to be interpolated due to missing data, the same was not done for the dependent variable for the purpose of maintaining authentic results.

In light of the literature, the cost-based approach method to human capital indicates that the costs incurred by a parent figure when investing in the education and the health of an individual from childhood until they relatively become an adult should indeed be rewarded back from future earnings. A combination of the two different approaches to human capital measurement; cost-based approach and income-based, now termed the integrated approach to human capital investment is of use to this analysis because the more investments are put into education and health, the higher the opportunities of being employed and creating employment. Otherwise there are negative implications when there is failure or stagnation in employment opportunities or job creation making human capital investment ineffective for the economy.

The variables used and restricted to Uganda economy for the purpose of this study are factors for encouraging employment creation, opportunities and growth. These include education and health.

3.4 Model Specification

To understand the effect of human capital investment on employment in Uganda, a function represented by employment and indicators of human capital that explain the relationship,

$$EMP = f(PENR, TENR, SCHEXP, GED, GHL)$$

This model is given as.

$$EMP = \beta_0 + \beta_1(PENR) + \beta_2(TENR) + \beta_3(SCHEXP) + \beta_4(GED) + \beta_5(GHL) + \varepsilon$$

Where, (*EMP*) is Employment-to-population ratio, (*PENR*) is primary school enrollment, (*TENR*) is tertiary school enrollment, (*SCHEXP*) is school life expectancy, (*GED*) is government expenditure on education and (*GHL*) is government expenditure on health. Based on the literature review, it is expected that a percentage increase in *PENR* will lead to an increase in employment at a given percentage based on the sign given to the variable. The same is expected for *TENR, SCHEXP, GED* and *GHL*. However, if the sign of any of the variables is negative this will mean that a percentage increase will lead to a percentage decrease in employment which literature tells us is an indication of low human capital investment and not a good indication for human capital contribution to productivity.

3.5 Stationarity

It is commonly found that time series will show a trend in the data based on whether the data is stationary or nonstationary (Wooldridge, 2012). Time series is stationary when the variables in the sequence has a stable probability distribution meaning an identical distribution where (x_1, x_2) has the same joint distribution as (x_t, $x_{t=1}$)

(Wooldridge, 2012). Simply put, stationarity means that all the values are not affected by changes over time. The purpose of having stationary values is to avoid a spurious regression that provide non-meaningful results. (Wooldridge, 2012). For purposes of this study, to understand the relationship between employment and the human capital indicators from the analysis, the data needs to indicate stability where by it will not easily change overtime. Meaning the data needs to be changed to stationary. Following this, we can be able to make reasonable and correction conclusions from how a change in one variable could affect changes in another variable over time instead of drawing such conclusion from a single point in time (Wooldridge, 2012). To know whether the data has a trend or not, a unit root test using Augmented Dicky-Fuller (ADF) test, the Phillips-Perron (PP) test and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test was performed for the purpose of knowing whether to remove the trend at first difference or not.

Augmented Dicky-Fuller (ADF)

The first unit root test to be conducted, the ADF test allows higher-order autoregressive processes by including lagged changes in y_{t-1}. Given by the regression;

$$\Delta y_t = \beta D_t + (\rho - 1) y_{t-1} + \sum_{j=1}^{p} \delta_j \Delta y_{t-j} + \varepsilon_t$$

Where $\delta = \rho - 1$.

The null hypothesis tests that the series has a unit root against the alternative hypothesis that the thesis has no unit root. Stated as;

H_0: $\delta = 0$ (Non-Stationary)

H_1: $\delta < 0$ (Stationary).

The null hypothesis is rejected when the t-statistic is smaller than the critical value. This will mean that the series is stationary.

The lagged changes included in the ADF test accounts for serial correlation. For this study one lag or two lag is sufficient of correct test results because very few lags makes incorrect results and man lags leaves out initial variables.

Phillips-Perron (PP)

This is given by the equation;

$$y_t = \rho y_{t-1} + \varepsilon_t$$

The PP test, similar to the ADF test holds the same hypothesis testing for unit root but differs in the account for serial correlation and heteroscedasticity which is corrected in the errors ε_t.

The null hypothesis is rejected when the t-statistic is less than the critical value in favor of the alternative hypothesis which will mean that the series is stationary. Otherwise when the t-statistic is greater than the critical value, we fail to reject the null hypothesis which will mean the series is non-stationary. The hypothesis test is stated as;

H_0: $\rho = 0$ (Non-stationary)

H_1: $\rho < 0$ (stationary).

Using the PP test in addition to ADF test is that the test is robust to heteroscedasticity in the error term ε_t.

Kwiatkowski-Phillips-Schmidt-Shin (KPSS)

While unit root tests are done using the ADF test and PP show by the statistical power that a series y_t, is I (1). KPSS tests performs a stationarity tests to show that y_t is I (0) and with a higher statistical power than ADF and PP, KPSS is useful for double checking in order to comprehend the tests better. Given by the equation;

$$X_t = r_t + \beta_t + \varepsilon_1$$

Since KPSS tests for stationarity, the hypothesis states that we reject the null hypothesis if the LM-statistic is greater than the critical value which is different from the ADF and the PP test. Formulated as;

H_0: $\delta\varepsilon = 0$ (Stationary)

H_1: $\delta\varepsilon > 0$ (Not Stationary).

KPSS is useful because it stationarity while ADF test and PP test for unit root. While these yield the same results, KPSS tests heteroscedasticity and auto correlation of the error term ε_1 where the covariance reverts to the mean unlike ADF and PP that has a permanent change on the mean.

3.6 Cointegration

Following the unit root tests and a stationarity test performed using ADF, PP and KPSS respectively to identify the appropriate trend in the model, variables at I (1), when regressed are limited in providing enough information surrounding the relationship to be estimated (Wooldridge, 2012). With cointegration, regressing the model provides more meaningful results that offer more information to answer any research questions.

Cointegration is a linear combination between two series y_t and x_t integrated at order zero when all the variables were initially integrated at order one (Wooldridge, 2012). This means if the variables are integrated at the first difference then there are

coefficients of the same variables explaining the cointegration of this linear combination (Wooldridge, 2012). Therefore, at cointegration, the equilibrium relationship is stationary.

Non-stationary time series data is normally expected to indicate the existence of a long-run equilibrium relationship when a cointegration test is performed proving a relationship between two or more variables (Wooldridge, 2012). In this way, non-stationary time series, though spurious, are integrated and cannot deviate from the mean. Any deviations are seen to be temporary (Wooldridge, 2012).

Cointegration tests include two scenarios; at most one cointegrating vector and cointegrating vectors ranging from $0 \leq r < n$ using the residual-based cointegration test and the Johansen cointegration test (Wooldridge, 2012).

The first cointegration test, the Engle-Granger test, follows a two-step procedure by first carrying a static regression followed by extracting the residuals to perform the ADF unit root test (Wooldridge, 2012). The hypothesis test states the null hypothesis is no cointegration against the alternation of cointegration. Illustrated by the cointegrating residual, $\beta' Y_t = \varepsilon_t$ from which residuals ε_t tested for unit root, this method is limited by identifying at most 1 cointegrating equation while the Johansen identifies more than one cointegrating equation (Wooldridge, 2012). Another limitation to this method is that it is only based on the ADF test (Wooldridge, 2012).

The second test, the Johansen cointegration test adopted in this study to test the existence of a long run relationship is more appropriate given that it tests for more than one cointegrating equation as mentioned above. In addition, it meets the criteria of

having large sample otherwise a small sample size is renders the model unreliable. The following steps achieves the Johansen cointegration test; specifying and estimating a Vector Auto Regressive (VAR (*p*)) model followed by constructing a likelihood rank test r in order to determine the number of cointegrated equations from which the normalization equation identifies the restrictions on the cointegrated vectors and finally estimating the resulting error correction model.

Ultimately, to estimate the error correction model, given by the equation;

$$\Delta y_t = \Pi y_{t-1} + \Gamma_1 \Delta y_{t-1} + \varepsilon_t$$

where Π is the number of linear combinations existing among the variables is based on the rank of the long run effect Π. The null hypothesis states no cointegration exists against the alternative hypothesis, which means there is cointegration.

The trace statistic test rank Π:

These test the likelihood ratio of the unrestricted VECM against the restricted VECM. Formulated by the hypothesis stated below,

H_0: No cointegration

H_1: Cointegration.

The maximum eigenvalue statistic test rank Π:

H_0: No cointegration

H_1: Cointegration

3.7 Error Correction Model (ECM)

An error correction model is appropriate for estimating short run and long run effects of the relationship between variables *y* and *x* given that cointegration exists. The Error

correction coefficient term estimates the adjustment speed of short run deviations from the long run equilibrium and how the error term explains movement in the short run. Given by the equation below;

$$\Delta y_t = \alpha_0 + \sum_{i=1}^{n} \beta_i \Delta y_{t-1} + \sum_{i=0}^{n} \beta_i \Delta x_{t-1} + \delta(y_{t-1} - \beta x_{t-1}) + u_t$$

whereby the error correction term given as $(y_{t-1} - \beta x_{t-1})$ has a coefficient of δ<0. The long run equation given by;

$$y_t = \beta_0 + \beta_1 x_1 + \varepsilon_t$$

This tell us that any deviations from the long run equilibrium point, the coefficient of the error term, δ shows the duration in any influences in the short run. Therefore, the error term is a coefficient explaining the dependent variable and how the adjust will return to equilibrium.

3.8 Causality

Following the cointegration test and having established that there is a long run relationship between variables *x* and *y*, the granger causality test determines if the data is a useful in forecast for another (Wooldridge, 2012). This test indicates that a series with cointegration equation, may have a relationship where *x* affects *y* meaning that short run causality running from the independent variables to the dependent variable (Wooldridge, 2012). Developed by Granger (1969), the causality test method is meant to show if the current and lagged values of a variable improve upon the future variables of another series this means the variable has a 'granger cause' on another variable (Wooldridge, 2012).

Given by the equation $E(y_t|I_{t-1}) \neq E(y_t|J_{t-1})$ where I_{t-1} contains past information on variables *x* and *y* and J_{t-1} contains past information only on variable *y*, we follow the null hypothesis that x does not granger cause y.

H_0: $\beta_1 = \beta_2 = \cdots = \beta_p = 0$ (No causality)

H_1: $\beta_1 > \beta_2 > \cdots > \beta_p > 0$ (Causality).

Chapter 4

FINDINGS OF THE STUDY

4.1 Introduction

This chapter presents the findings from this study following the methodology. The purpose is to show estimated results from a sample explaining the effect of human capital investment on employment in Uganda. The outline of the chapter is as follows, a summary of the descriptive statistics, stationarity tests, a Johansen cointegration test to showing the existence of a long run relationship and finally the ECM showing the short run and long run relationship. The conclusion of this chapter will interpret the meaning and significance of these results in relation to was to be expected based on literature and what this means for Uganda's employment status.

4.2 Summary of Descriptive Statistics

To better understand the variables used for explaining the overall model, the table below shows a summary of the descriptive statics explaining how the variables are distributed and if any outliers exist. This will be interpreted by looking at the mean, standard deviation, skewness and kurtosis.

Table 1: Descriptive Statistics

	EMP	PENR	TENR	SCHEXP	GED	GHL
Mean	68.8559	109.249	3.32703	9.42385	17.3375	8.03413
Median	68.89	117.718	3.62161	10.7	15	7.69
Maximum	69.71	138.275	6.22642	11.56	35.45	11.7928
Minimum	67.93	63.9763	1.31603	5.13635	10.1049	3.8
Std. Dev.	0.50761	24.0167	1.409	2.19744	6.99495	2.08784
Skewness	-0.192	-0.8281	0.16145	-1.0423	1.17685	0.059
Kurtosis	2.02165	2.28341	2.10086	2.38978	3.69898	2.58077
Jarque-Bera	1.24275	3.6639	1.0268	5.30785	6.782	0.21339
Probability	0.53721	0.1601	0.59846	0.07038	0.03368	0.8988
Sum	1859.11	2949.71	89.8298	254.444	468.112	216.921
Sum Sq. Dev.	6.69924	14996.9	51.6173	125.547	1272.16	113.336

Source: Self computation using E Views 10

To highlight, central tendency is represented by the mean, median and mode while dispersion is measured by the standard deviation. Kurtosis and skewness are other measures explaining distribution.

The kurtosis distribution measures how thick and heavy the tails of the expected values are. The kurtosis also indicates outliers. When kurtosis equals 3, then it is normally distributed. If the kurtosis is greater than 3, then it has a heavier and thicker tail than the normal random variable. From the table 1, government expenditure on education is a peaked (leptokurtic) distribution because the kurtosis is greater than 3 meaning its tail is heavy-tailed. If the kurtosis is less than 3, this means the random variable has less mass in its tail than the normal random variable. It is then said to be platykurtic. Table 1 shows that the remaining variables, primary enrollment, tertiary enrollment, life expectancy, government expenditure on health and school life expectancy have a

flat (platykurtic) distribution because the kurtosis is less than 3 meaning the variables are thin-tailed relative to the normal random variable.

Like kurtosis, skewness measure of distribution measures the lack of symmetry of the distribution. When the value is greater than 3, then it has a long right tail with positive skewness. If the value is less than 3, the it has a long left tail with negative skewness. The results show all the variables have a small deviation from symmetry as seen by employment, government health expenditure and tertiary enrollment however, this still indicates that skewness is positive just as government expenditure on health while primary enrollment, school life expectancy and employment-to-population ratio skewness is negative.

The Jarque-Bera tests whether the series is distributed normally. This is measured by the difference between the difference between skewness and kurtosis. Following the null hypothesis of data is normally distributed given by;

H_0: $\rho < 0.05$ (Reject H_0 Normal distribution)

H_1: $\rho > 0.05$ (Fail to reject H_0 Non-normal distribution).

The table above shows that all variables have a probability greater than 5% significant level thus normally distributed apart from the government expenditure on education where we fail to reject the null hypothesis at the 5% level.

4.3 Stationarity Tests

ADF and PP Tests:

As stated above, the ADF test shown in table 2a and PP test shown in table 2b were conducted to perform a unit root test. Following the null hypothesis that series *I* (1) has unit root against the alternative *I* (0) given by;

H_0: δ = 0.05 (Reject $H_{0:}$ unit root)

H_1: δ < 0.05 (Fail to reject $H_{0:}$ unit root).

Table 2a: ADF Test

Variables	t-stat	Critical Value	Remark	Order
d(EMP)	-3.5874	0.0137	Stationary	I(1)
d(PENR)	-4.0887	0.0043	Stationary	I(1)
d(TENR)	-5.3531	0.0002	Stationary	I(1)
d(SCEXP)	-3.0476	0.0441	Stationary	I(1)
d(GED)	-5.0837	0.0004	Stationary	I(1)
d(GHLT)	-3.563	0.0144	Stationary	I(1)

Source: Self computation using E Views 10

The table shows unit root at first order of integration for all the variables expect life expectancy that has unit root at zero order of integration. Therefore, we fail to reject the null hypothesis for all variables expect for life expectancy where we reject the null hypothesis in favor of the alternative.

Given the PP test also tests for unit root, the null hypothesis still maintains that the series has a unit root against the alternative that there is no unit root given by;

H_0: δ = 0.05 (Reject $H_{0:}$ unit root)

H_1: δ < 0.05 (Fail to reject $H_{0:}$ unit root).

Table 2b: PP Stationarity test

Variables	t-stat	Critical Value	Remark	Order
d(EMP)	-3.6113	0.0129	Stationary	I(1)
d(PENR)	-4.0894	0.0043	Stationary	I(1)
d(TENR)	-5.3436	0.0002	Stationary	I(1)
d(SCEXP)	-3.0476	0.0441	Stationary	I(1)
d(LEXP)	-2.6919	0.0894	Stationary	I(0)
d(GED)	-5.2225	0.0003	Stationary	I(1)
d(GHLT)	-3.6073	0.0131	Stationary	I(1)

Source: Self computation using E Views 10

Table 2b: PP Test

Variables	t-stat	Critical Value	Remark	Order
d(EMP)	-3.6113	0.0129	Stationary	I(1)
d(PENR)	-4.0894	0.0043	Stationary	I(1)
d(TENR)	-5.3436	0.0002	Stationary	I(1)
d(SCEXP)	-3.0476	0.0441	Stationary	I(1)
d(GED)	-5.2225	0.0003	Stationary	I(1)
d(GHLT)	-3.6073	0.0131	Stationary	I(1)

Source: Self computation using E Views 10

The results indicate that all the variables have a unit root at the first order of integration meaning that we fail to reject the null hypothesis for all the variables except life expectancy where we fail to reject the null hypothesis in favor of the alternative.

KPSS Test

As mentioned, KPSS tests for stationarity using the Lagrange multiplier for the null hypothesis that the series is stationary against the alternative that the series is not stationary given by;

H_0: $\delta\varepsilon > 0.05$ (Reject $H_{0:}$ stationary)

H_1: $\delta\varepsilon \leq 0.05$ (Fail to reject $H_{0:}$ non-stationary).

Table 2c: KPSS Test

Variables	t-stat	Remark	Order
d(EMP)	0.1373	Stationary	I(1)
d(PENR)	0.2875	Stationary	I(1)
d(TENR)	0.1489	Stationary	I(1)
d(SCEXP)	0.2203	Stationary	I(1)
d(GED)	0.1761	Stationary	I(1)
d(GHLT)	0.3922	Stationary	I(1)
Critical Values	1%	5%	10%
	0.739	0.463	0.347

Source: Self computation using E Views 10

The results indicate the LM statistic for all the variables is less than the 5% significant level which means at first order of integration, the data was stationary therefore we fail to reject the null hypothesis that the data is stationary.

The stationarity tests prove the trend in the data was removed by first differencing thus proceeding to cointegration tests in order to identify the existence of a long run relationship.

4.4 Cointegration Test

Given that the variables are stationary and integrated at first order, the Johansen cointegration test is conducted to establish a long run relationship between the variables. The results in table 3a showing the trace test and 3b showing the maximum eigenvalue test which will identify the cointegrating equation that will result in identifying the equations of non-stationary variables that yield a stationary process. Following the null hypothesis test that there is no cointegration against the alternative that there is cointegration given by;

The trace statistic test rank:

H_0: $r \leq r0$ (Reject H_0: no cointegration)

H_1: $r > r0$ (Fail to reject H_0: no cointegration)

The maximum eigenvalue statistic test rank:

H_0: rank $\leq r0$ (Reject H_0: no cointegration)

H_1: rank = $r0 + 1$ (Fail to reject H_0: no cointegration)

Table 3a: Trace Test

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**

None *	0.9192	153.376	95.7537	0
At most 1 *	0.76149	90.4816	69.8189	0.0005
At most 2 *	0.58357	54.6475	47.8561	0.0101
At most 3 *	0.51591	32.7465	29.7971	0.0222
At most 4	0.4391	14.6096	15.4947	0.0677
At most 5	0.00615	0.1542	3.84147	0.6946

Source: Self computation using E Views 10

Table 3b: Maximum Eigenvalue Test

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.9192	62.8946	40.0776	0
At most 1 *	0.76149	35.834	33.8769	0.0288
At most 2	0.58357	21.901	27.5843	0.2255
At most 3	0.51591	18.1369	21.1316	0.1248
At most 4 *	0.4391	14.4554	14.2646	0.0466
At most 5	0.00615	0.1542	3.84147	0.6946

Source: Self computation using E Views 10

The results indicated that we reject the null hypothesis of no cointegration based on the probability values which are higher than the 5% significant level which tells us that there exist at most 4 cointegrating equations presented by the trace test in table 3a and the maximum eigenvalue test in table 3b respectively.

These results tell us that any shocks to the independent variable, the cointegrating equations show that it is temporary and the variable will return to equilibrium in the long run.

4.5 Error Correction Model (ECM)

Since the data is stationary at first difference and indicates the existence of a long run relationship, the ECM estimates a short run and a long run relationship to further provide meaningful results to the relationship.

Based on the equation,

$$\Delta y_t = \alpha_0 + \alpha_1 \Delta y_{t-1} + \gamma_1 \Delta x_{t-1} + \delta s_{t-1} + u_t$$

This is used for estimating the long run relationship, the equation of error correction term $\delta(y_{t-1} - \beta x_{t-1})$ identifies the short run relationship.

Table 4a: ECM Short Run

	Coefficient	Std. Error	t-Statistic	P values
ECT (1)	-0.1853	0.08121	[-2.28224]	0.0356
D(EMP(-1))	0.0947	0.20559	[0.46061]	0.6509
D(PENR(-1))	0.01489	0.0114	[1.30632]	0.2088
D(TENR(-1))	-0.6016	0.21345	[-2.81867]	0.0118
D(SCHEXP(-1))	-0.3322	0.21068	[-1.57694]	0.1332
D(GED(-1))	-0.0033	0.01026	[-0.32396]	0.7499
D(GHL(-1))	-0.0342	0.0626	[-0.54573]	0.5923
C	0.15142	0.08067	[1.87708]	0.0778
R-squared	0.44464			
Adj. R-squared	0.21596			
Sum sq. resids	1.44314			
S.E. equation	0.29136			
F-statistic	1.94438			
Log likelihood	0.17726			
Akaike AIC	0.62582			
Schwarz SC	1.01586			
Mean dependent	-0.0068			
S.D. dependent	0.32905			

Source: Self computation using E Views 10

The key factor represented in the model is the error correction term which explains the existence of a long run relationship between the variables based on the coefficient. The coefficient must be a negative figure ranging of 0 and 1 because it means any deviations are temporary and the model will converge back to the mean equilibrium. This is given by the equation;

$$\Delta emp_t = -0.18534 ECT_{t-1} + 0.0947 \Delta emp_{t-1} + 0.014887 \Delta penr_{t-1} - 0.60164 \Delta tenr_{t-1} - 0.33222 \Delta schexp_{t-1} - 0.00332 \Delta ged_{t-1} - 0.03416 \Delta ghl_{t-1} + 0.151542.$$

This model shows that in short run, when other variables remain constant, an increase in primary enrollment by 1 more student increases the employment population ration by an average of 0.014887. An increase in *TENR* by 1 one more student decreases *EMP* by an average of 0.60164 ceteris paribus. An increase in *SCHEXP* by 1 more additional year of studying, *EMP* decreases by an average of 0.33222 ceteris paribus. If *GED* increases by 1 dollar then *EMP* decreases by an average of 0.00332 ceteris paribus. If *GHL* increases by 1 dollar then *EMP* decreases by an average of 0.03416 ceteris paribus. These estimations are as result of arbitrary shocks in the long run affecting the relationship. The coefficient of the error correction term, ECT_{t-1}, -0.018534 shows that any deviations from the mean equilibrium in the long run has a 18.5% speed of adjustment.

Table 4b: ECM Long Run

	Coefficient	Std. Error	t-Statistic
D(EMP(-1))	1		
D(PENR(-1))	0.17645	-0.0182	[9.67404]
D(TENR(-1))	1.41366	-0.2359	[5.99356]
D(SCHEXP(-1))	-2.7162	-0.2967	[-9.15379]
D(GED(-1))	-0.0646	-0.0164	[-3.94269]
D(GHL(-1))	0.26696	-0.0406	[6.56965]
C	-68.265		
R-squared	0.44464		
Adj. R-squared	0.21596		
Sum sq. resids	1.44314		
S.E. equation	0.29136		
F-statistic	1.94438		
Log likelihood	0.17726		
Akaike AIC	0.62582		
Schwarz SC	1.01586		
Mean dependent	-0.0068		
S.D. dependent	0.32905		

Source: Self computation using E Views 10

Results from table 4b illustrate the estimated cointegrating equation from which we identified from the cointegration test. The equation as given by the E-Views computation also signifies the long run relationship given by the equation;

$$ECT_{t-1} = 1.000emp_{t-1} + 0.17645penr_{t-1} + 1.41366tenr_{t-1} - 2.71616schexp_{t-1} - 0.06696ged_{t-1} + 0.26696ghl_{t-1} - 68.2655.$$

In the long run, an increase in primary enrollment, tertiary enrollment and government expenditure on health leads to an increase in the employment-to-population ratio as seen by the positive sign in front of the coefficients while school life expectancy, government expenditure on education have a negative sign in front of the coefficient meaning an increase in these variables leads to a decrease in the employment-to-population ratio. In further detail, an increase in *TENR* by 1 student increases the *EMP* by an average of 1.41366 in the long run which is different from the short run relationship. An increase in *GED* by a dollar decreases *EMP* by an average of 0.06464 in the long run which is similar to *GED* in the short run relationship. An increase *PENR* by 1 more student increases *EMP* by an average of 0.17645 in the long run which is the same as the relationship in the short run. An increase in *GHL* by one dollar, increases *EMP* by an average of 0.26696 in the long run which is different from the short run relationship. An increase in *SCHEXP* by 1 more year studying to decreases *EMP* by an average of 2.71616 in the long run which is similar to the short run relationship.

The long run relationship shows that any changes in occurred in the short run are temporary and eventually revert to the estimations stated in the long run relationship. This means that while TENR and GHL are inversely related to EMP, there is a direct relationship in the long run.

4.6 Causality Test

As stated above, the causality test indicates short run causality relationship between variables. The purpose is to identify which variable has a useful forecast over another variable. Following the null hypothesis *x* does not granger cause *y* against the alternative *x* granger cause *y*, given by;

H_0: $\beta_1 = \beta_2 = \cdots = \beta_p \leq 0.1$= Reject H_0 (no Granger-causality)

H_1: $\beta_1 > \beta_2 > \cdots > \beta_p > 0.1$= Fail to reject H_0 (Granger-causality).

Table 5: Short Run Causality

Dependent variable: D(EMP)			
Excluded	Chi-sq	df	Prob.
D(PENR)	1.70647	1	0.1914
D(TENR)	7.9449	1	0.0048
D(SCHEXP)	2.48673	1	0.1148
D(GED)	0.10495	1	0.746
D(GHL)	0.29782	1	0.5853

Source: Self computation using E Views 10

At the 10% significant level, the variables granger cause EMP meaning we reject the null hypothesis. This means that the variables are statistically significant in forecasting employment.

4.7 Conclusion

The findings in the study indicated a long run relationship between the variables given the cointegration test results. From this, the error correction term coefficient showed that deviations in previous periods from the long run equilibrium is corrected by a speed adjustment of 18.5% (t= -2.28224, p < 0.0356). In addition, the probability shows that it is statistically significant at the 10% level meaning that the independent variables granger cause employment. Specifically, tertiary enrollment. In the short

run, an increase in primary enrollment by one student on average leads to a 0.014887 (t = -0.130632, p < 0.2088) increase in employment-to-population ratio ceteris paribus which persists in the long run with to an average of 0.17645 (t = 9.67404) increase in employment-to-population ratio. The short run analysis indicates deviations which adjust in the long run as seen by the error correction term. Due to the benefit of Primary universal education increasing the ability and access to education, explains the direct relationship to employment. long run estimations show the increase in research and knowledge is unavoidable for the growth and development in an economy as seen from literature thus a direct relationship to improve productivity.

An increase in tertiary enrollment by an additional student in the short run leads to an average of 0.60164 (t = 1.30632, p < 0.6502) decrease in employment-to-population ratio, ceteris paribus. This persists in the long run whereby an increase in tertiary enrollment by one more student to an average of 1.441366 (t = 5.99356) increase in employment-to-population ratio. Changes in the short run and long run relationship between education and employment show that shocks to the education system are temporary and eventually long equilibrium is restored.

An increase in school life expectancy by an additional year of studying in the short run leads to an average of -0.33222 (t = -1.57694, p < 0.1332) decrease in employment-to-population ratio ceteris paribus which remains unchanged in the long run at an average of 2.71616 (t = -9.15379) decrease in employment-to-population ratio. The inverse relationship of school life expectancy shows that small private owned business will for the purpose of having more than one source of income will decline in number when people opt to increase their years of education.

An increase in government expenditure on education by 1 dollar in the short run leads to an average of 0.00332 (t = -0.32396, p < 0.7499) decrease in employment-to-population ratio ceteris paribus and remains unchanged in the long run by an average of 0.06464 (t = -3.94269).

An increase in government expenditure by 1 dollar on health in the short run leads to an average of 0.03416 (t = -0.54573, p < 0.5923) decrease in employment-to-population ratio ceteris paribus and changes in the long run by an average of 0.26696(t = -3.94269) increase in employment-to-population ratio. With an increase of government expenditure on health, health will improve thus improving labour productivity.

Recalling that the aim of the thesis is to show how much human capital investment indicators can explain the employment-to-population ration in Uganda, that is to say how important human capital investment is to employment, we check the R^2 which is 0.44464. The R^2 shows that 44% of the changes in the employment-to-population ratio are explained by the changes in the human capital investment indicators used in the model. This is the similar to the adjusted R^2, 0.216 showing 21% of the changes in the employment-to-the population ration explained by the human capital investment model used in the model.

Chapter 5

CONCLUSION

5.1 Introduction

The aim and purpose of conducting this research was to analyze and investigate the relationship between human capital investment and employment in Uganda with the objective of showing that human capital investment is important for improving and growing the employment status of Uganda. Not limited to the effects of micro economic quality of life but the macro-economic quality of life as well. To achieve this, the study sought to answer the purpose of higher education and improved health in employment and the relevance of human capital development for the economy.

Based on the literature review and empirical evidence, the expectation was to find human capital making a positive contribution towards employment however, estimated results showed a minimum contribution of education and health investments (private and public) to employment. Other literature studies mentioned above, based on human capital theory showed that economic growth and development was induced by human capital through investing in education and health. Other studies showed that investing in education increased wages and income which filled accountability gaps in growing economies.

The structure of this chapter is outlined as follows, the introduction, to recap the aim of the study, research questions and the literature review. Followed by the limitations

of the study and the key findings, to highlight important findings and the conclusion drawn based on these findings and finally the recommendations derived from the study.

5.2 Key Findings

The literature review showed that human capital theory is key in growth and development for the wealth of a nation. Although it was not well received in early literature, human capital was then seen as vital for human being to still be served by capital when abilities in knowledge and skills accumulates therefore being productive when contributing to society. Empirical studies showed evidence of human capital development improving economic growth in India and Tanzania as well as improving wages and income in the United States and Britain. These studies also showed that education is a main contributing factor towards human capital accumulation together with health in the working field.

Applying this theory to the study showed that the variables used, tertiary enrollment is statistically significant at 5% however, there was also little contribution from education, towards job creation, employment opportunities and growth in the long run. school life expectancy and government expenditure on education had an inverse relationship yet tertiary enrollment had a causal relationship running to employment. Literature reviews shows that an increase in human capital investment through education and government expenditure indicators such as the ones used in this study increase labour productivity and economic growth and development however, the World Bank Human Capital Index shows Uganda's low ranking in human capital development among its neighboring countries and among the lowest on the continent. According to World Bank, this is mainly contributed by the poor education system

from which an individual only benefits from after turning 30. Contrary to this, literature points out that above the age of 20, an individual should begin receiving the returns made from investment in education and health. With an improvement in the quality of education from the colonial form of education and an improvement in health delivery services, Uganda's human capital development can greatly improve.

Literature also showed limitations that human capital investment models lacked precision in the quality of these measures such as the physical state of health and education environment however, other limitations in this study emerged in data collection. Poor accountability of data in Uganda led to missing data that required interpolating which also prolonged data compilation. Despite the challenges, the findings showed state on human capital development in Uganda which served the objective of this study. The results from this research, based on the human capital investment model does not eliminate the representation of the low human capital development in Uganda currently. This is because the error correction term showed that in the long run, economic disturbances in the short run period correct and are restored. Education and government expenditure are related to deviations in periods but due to the restoration, an improvement in education quality, political structures can improve the employment-to-population ratio in Uganda in the long run.

5.3 Recommendations

Conducting this study has served the purpose and objective however, however, numerical data only prolonged the research which can be avoided when conducted directly on the field in addition to internet sources. In addition, this study created a unique learning experience in understanding challenges facing Uganda's employment structures and growth. Literature shows that high populated countries like Uganda and

many other developing countries, can benefit directly from the population which key to be a measure for government intervention.

5.4 Conclusion

Based on the research findings, it is evident that the Ugandan government has increased an improved to the primary education level with the universal education, which continues to have a positive effect at higher education at tertiary level. Despite this, disturbances in the short run from the model speak to the little efforts done by the government in transitioning an individual from school life into the working life. Government expenditures on education and health show a negative relationship with employment which is unsurprising given corruption climate that has been in the country for a number of years. However, with improved and increased investment in human capital both privately and publically, improved labour productivity will lead to a stronger employment status.

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