

**THE EFFECT OF HIGHER EDUCATION ON ECONOMIC GROWTH IN
MALAWI**

MASTER OF ARTS (ECONOMICS) THESIS

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**THE EFFECT OF HIGHER EDUCATION ON ECONOMIC GROWTH IN
MALAWI**

MA (ECONOMICS) THESIS

By

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B. Soc.(Economics) - UNIMA

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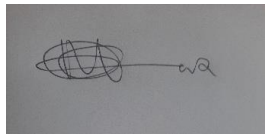
December 2024

DECLARATION

I, the undersigned, hereby declare that this Thesis is my own original work which has not been submitted to any other institution for similar purposes. Where other people's work has been used, acknowledgements have been made.

MARY ONSEWA

Full Legal Name

A handwritten signature in black ink, consisting of a stylized, circular scribble followed by a horizontal line and the letters 'M' and 'O'.

Signature

9th January 2025

Date

CERTIFICATE OF APPROVAL

The undersigned certifies that this Thesis represents the student's own work and effort and has been submitted with my approval.

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ABSTRACT

The interest in the relationship between higher education and economic growth is part of an ongoing effort to find solutions to the economic difficulties facing developing countries, and the effect of higher education on economic growth in these countries remains inconclusive. This study investigates the effect of higher education on economic growth in Malawi. Using annual time series data over the period of 1990 to 2023, the study employs an Autoregressive Distributed Lag (ARDL) model to analyse the relationship. The results from the Bounds test of cointegration confirm the existence of a long-run relationship between the variables. The results from the short-run unrestricted error correction model indicate that, in the short run, inflation negatively and significantly affects economic growth. However, in the short run, tertiary school enrolment, Gross fixed capital formation and life expectancy do not affect economic growth. The long run results indicate that inflation and population growth negatively and significantly affect economic growth. In contrast, tertiary enrolment and life expectancy are insignificant in the long run. Given the lack of evidence supporting the premise that higher education fosters economic growth in Malawi, this study finds that there is need for Malawi to prioritize higher education reforms as the means to achieving economic prosperity if it has to reap the benefits of investing in higher education. As a recommendation, it is important for Malawi to look into other education indicators (like research and development) other than increased higher education enrolment only to foster economic growth thus moving from a lower income to a middle income country and achieving the Malawi 2063 vision through human capital development thereby achieving Sustainable Development Goal 4 of quality education.

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller
ARDL	Autoregressive Distributed Lags
BLUE	Best Linear Unbiased Estimators
BPG	Breusch Pagan Godfrey
CLRM	Classical Linear Regression Model
D	Difference
ECT	Error Correction Term
EMIS	Education Management Information System
GDP	Gross Domestic Product
HCT	Human Capital Theory
IMF	International Monetary Fund
KPSS	Kwiatkowski, Phillips, Schmidt, and Shin test
L	Lag
LD	Lagged Difference
LR	Long Run
MAIC	Modified Akaike Information Criterion
MIP-1	Malawi 2063 first Implementation Plan
MW2063	Malawi 2063
NCHE	National Council for Higher Education
NESIP	National Education Sector Implementation Plan
Ramsey	RESET Ramsey's Regression Specification Error Test
SBIC	Schwarz Bayesian Information Criterion
SDGs	Sustainable Development Goals
SE	Standard Error
SR	Short Run
TEVET	Technical Entrepreneurial and Vocational Education and Training
UECM	Unrestricted Error Correction Model
UNICEF	United Nations Children's Fund
US\$	United States Dollars
VECM	Vector Error Correction Model

CHAPTER ONE

INTRODUCTION

1.1 Background

Malawi is still grappling with developing her human capacity, challenged by many factors including poor nutrition, poor health services, poor access to education and skills mismatch. There has been knowledge diffusion in the education and health sector but this has not been enough to foster productivity of the population and improve economic growth since the returns to investment in education and health is, by far, lower than the costs (MW2063 Government of Malawi, 2021). Education expenditure ranged from 14.8% to 18.2% of the total government expenditure from 2015 to 2019, and yet it still fell short to meet the education sector needs emanating from an annual enrolment growth rate ranging from 2% to 2.5%. The Government funding is supplemented by development partner funding which is mostly allocated to non-wage government expenditures and from other institutions such as Non-Governmental Organisations (Government of Malawi, Ministry of Education, Science, and Technology, 2023). For several decades, donor institutions have placed great emphasis on primary and, more recently, secondary education in their development assistance to Sub-Saharan Africa, but they have tended to neglect tertiary education as an added means to improve economic growth and mitigate poverty (Bloom, 2014). Developing human capital through education and skills of the population plays a pivotal role in transformation of the economy (MW2063 Government of Malawi, 2021). This study challenges beliefs in the international development community that tertiary education has little role in promoting economic growth. It examines the relationship that higher education has with economic growth, in Malawi.

The education sector in Malawi is composed of a formal education system comprising primary, secondary and tertiary education, and a non-formal education system comprising

early child development, out of school youth and adult literacy. With regard to higher education, the current public higher education learner population is low, estimated at 74,200 (Government of Malawi, Ministry of Education, Science, and Technology, 2023). Higher education is defined as a social structure for controlling and distributing advanced thoughts and techniques, focusing on discovering, conserving, refining, transmitting and applying advanced ideas and skills (Clark, 1978). It promotes scientific research, autonomy, and freedom, while promoting people's groundedness, enlightenment, and emancipation (Wang, 2012). There is limited research conducted by higher education institutions in Malawi. Teaching and learning resources are poor and inadequate in most higher education institutions (Government of Malawi, Ministry of Education, Science, and Technology, 2023). Malawi's higher education enrollment is among the lowest in the world and the least in the entire Southern and Eastern African Region with tertiary gross enrolment rate of 0.4 percent as compared to 8.2% of Sub-Saharan countries average enrolment. The Malawi National Council for Higher Education (NCHE) cautioned that economic growth and development is affected as a result of focus on basic education for too long at the expense of higher education (Kayange, 2021).

In Malawi, face to face learning has been in use since 1964 when the first president set up higher education institutions. It requires scholars to stay within the institutions resulting in competition as a result of the limited space, hence less than 1% of secondary school graduates gain entry into public universities each year. The rest are left out and opts for private universities as well as Technical Entrepreneurial and Vocational Education and Training (TEVET). Despite being one of the world's poorest nations, high expenses in education do not tally with the economic status of the majority. Government school loans are limited and this creates challenges for deserving students to attain education due to poverty (UNICEF, 2018). The rich send their children abroad for education thus posing a major gap between the rich and poor. The face-to-face learning model involves scholars traveling from their homes exposing them to the financial burden of Malawi's dilapidated road networks and high transport costs, food and accommodation problems. More than 80% of Malawians living in the rural areas lack both electricity and access to internet which also denies them a chance for learning using computers. The high prevalence of computer

illiteracy among Malawians limits adaptation to e-learning based on internet and computer use. Only 38% of households in urban areas have access to such facilities, emphasizing the limited availability for scholars to attain higher education in Malawi (Kayange, 2021).

Today, African countries face global economic challenges that will only be met successfully through a dynamic agile and continually calibrated secondary and post-secondary education system that align to meeting the needs of communities and produce well educated and talented citizens. Higher education has limited resources and access to meet the challenges of equipping Malawi's emerging workforce to participate in the 21st century economy. Malawi therefore must recognize and accept the strategic importance of higher education and its role in terms of the country's human resource and economic development (USAID, 2021). Given the importance of higher education, it is disappointing that in as much as there is full participation in school in a person's youth, there is less done on career development so much that people leave school without knowing what to do after graduating. There is, therefore, a need for reforms to revert Malawi schools to focusing on preparing every student for full participation in post-secondary meaningful work, career advancements and active citizenship. Career development and higher education can provide the education and training necessary to stimulate the economy and prepare Malawi's future workforce and job creators. Some government policies made continue to be largely based on intuition and folklore rather than on rigorous and reliable research-based evidence. Education research could be useful to inform decision makers in investigating options for reform and change, evaluating intended and unintended outcomes for the development of the economy (Kayange, 2021).

1.2 Problem statement

When Malawi became independent in 1964, it had no higher education institutions but relied on federal institutions of higher learning. Since that time, Malawi has built two dozen public and private universities catering to approximately 62,000 students today. However, enrollment rates in tertiary education remain at less than 1 percent, lower than averages in Africa and the rest of the world due to economic challenges like high costs of tertiary education accompanied by poverty, leading to most households prioritising basic needs

over higher education. Further, students from marginalized and disadvantaged backgrounds are far less likely to access tertiary education. Though the government offers a progressive funding subsidy at the primary and secondary levels, it only spends 3 percent of education funding at the tertiary level (USAID, 2021).

Malawi is one of the developing countries and over the past decades, has been negatively affected by shocks leaving the country in a cycle of vulnerability. Both climate-related external shocks, and domestic political and governance shocks, have collectively contributed to economic stagnation and a low pace of poverty reduction. In the last ten years, Malawi has seen some progress in non-monetary indicators of human development, however there have been persistent challenges with respect to progress in reducing poverty in monetary terms. As a result of this, there has been progress accomplished in some health and education aspects in that Malawi partially or fully achieved 4 out of the 8 Millennium Development Goals (MDGs), the set of 2015 targets to address poverty in its many dimensions (IMF, 2017) before the establishment of the Malawi 2063 in 2020 which is linked to the current Sustainable Development Goals (SDGs).

Since there has been privatization, infrastructure development, scholarships, investments in the Information and Communication Technologies (ICT), loans and grants, the number of people enrolling for tertiary education has increased in Malawi. Student enrolment in higher education institutions was at 30,972 in 2018, an increase from 8,168 students enrolled in 2008 (Mkochi, 2020). The National Planning Commission (NPC) engaged with Higher Education Institutions (HEIs), think-tanks and research centres in the production and dissemination of various research information key to the design and operationalisation of various policies within the implementation of the MIP-1. In response to the turbulence experienced in Malawi's development space influenced by geo-spatial politics such as the conflict in Eastern Europe; natural disasters such as Cyclone Freddy; and pandemics such as Cholera which battered the country in the later part of the business year, the NPC engaged with Ministries, Departments and Agencies (MDAs) to mainstream Foresight Analysis and Planning approaches. This is an innovative way of analysing trends, events and prospects of various interventions in Malawi's development space with the aim of

responding with agility to unforeseeable events that derail progress towards set developmental milestones (Government of Malawi, 2023). NPC developed a National Research Agenda for Malawi with Universities as one of the main implementers. This shows that higher education in form of research and development is an important aspect of Malawi's growth but has been neglected over the years.

Education is considered as a long-term investment that leads to rise in productivity in future. Thus, studies have shown that education has positive long-run and short-run effect on economic growth (Afzal et al. 2010; Lin 2003; Tamang 2011, Shafuda, 2021). To add to the literature and inform policy in Malawi, this study employs time series econometrics, to find out the relationship between higher education and economic growth in Malawi (Afzal M., 2010).

1.3 Justification and relevance of the study

Higher education has been found to be extremely important for nations and individuals around the world, in a period when pricing of intellectual capital is increasing (Chaudhry, 2018). It can produce critical innovators and thinkers, as well as healthy, informed and engaged citizens who can foster research and development. The Government of Malawi launched the Malawi 2063 First 10-year Implementation Plan (MIP-1) in 2021 pursuing two key milestones: graduate Malawi to a lower middle income country; and meet most of the Sustainable Development Goals (SDGs) by 2030. Within the aspiration of an inclusively wealthy and self-reliant nation by 2063 as per the Malawi 2063 (MW2063) is the creation of a vibrant knowledge-based economy with a strong and competitive manufacturing industry that is driven by a productive and commercially vibrant agricultural and mining sector. However, Malawi's development efforts are being undertaken in a highly competitive and ever-changing global and regional socioeconomic and political context that requires innovative ways of thinking and doing things. As such, the need for operationalisation of evidence based policies, programmes, competitive technologies and innovations that are informed or validated by robust research is of utmost importance (National Research Agenda, 2023).

Economists were long unaware of the influence of knowledge upon the growth process. With theories of human capital (Schultz, 1961) ; (Becker, Investment in human capital: A theoretical analysis. , 1962) and theories of endogenous growth (Lucas, 1988; Romer, 1990; Rebelo, 1991), knowledge gained a central position in the growth process. Education appears in theories of human capital as indispensable for economic growth and in theories of endogenous growth the link between economic growth and human capital is very explicit (Jaoul, 2002). However, this has not been proved in many developing countries like Malawi. The nature of the relations between education and growth is therefore far from having been perfectly determined today since the effects are rather ambiguous as education can be an effect or a cause of economic growth (Jaoul, 2002).

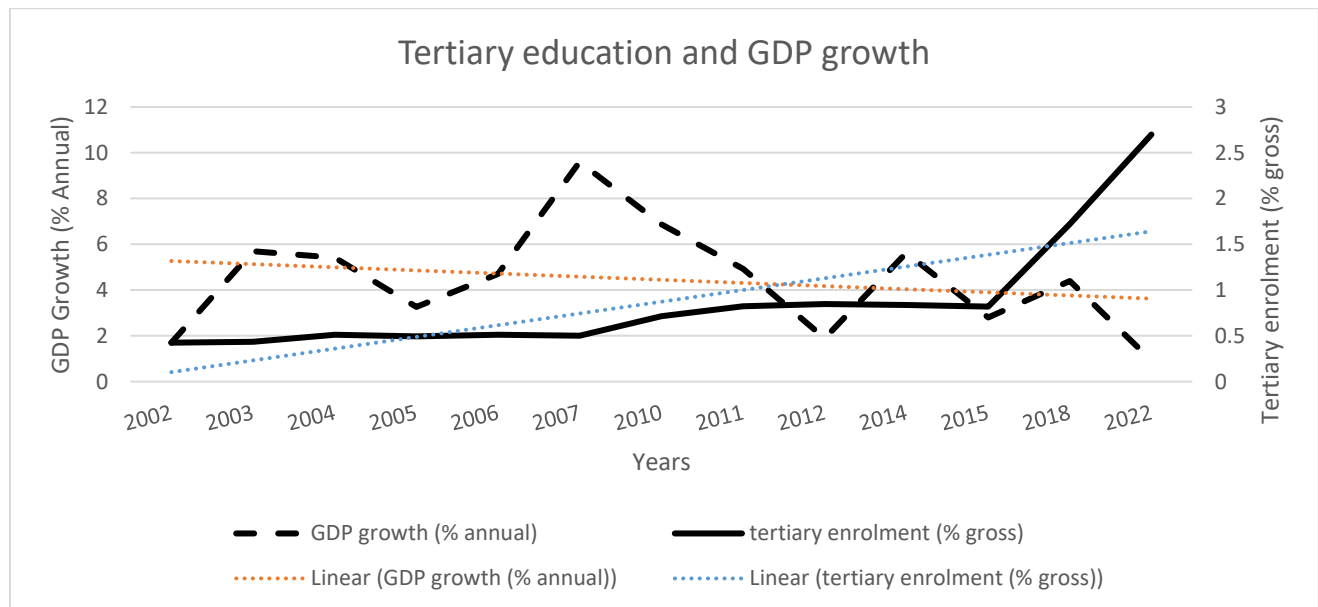


Figure 1: Tertiary education and economic growth trends in Malawi, 2002-2022

Source: Author's own construction using data obtained from the World Bank database

Looking at figure 1, it is noticed that over the period, 2002 to 2022, improved tertiary education has been accompanied by a decline in GDP growth. However, this contradicts the literature on this subject in Malawi which suggests that improved human capital through education is favourable for growth (according to the human capital theory and the endogenous growth theory). This justifies the need to re-examine this relationship

To add on that, education and skills development is under the human capital development enabler of the Government outlined in the Malawi 2063 Vision of “An Inclusively Wealthy and Self-reliant Nation” (MW2063). Through the MW2063, the Government has committed itself to improving access, equity, quality and relevance of preprimary, basic, secondary and tertiary education showing that education is key for the socio-economic development of Malawi. MW2063 first 10-year Implementation Plan (MIP1) is the national operationalisation strategy and a series of plans for implementing the Malawi 2063 vision and is linked to Agenda 2030 on Sustainable Development. Under SDG 4, world leaders, including Malawi, made a commitment to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all (NESIP for Government of Malawi, 2020). As such this study contributes to literature the factors like tertiary education that foster economic growth as there has been a research gap in this area in Malawi. The study further gives direction on the policy structure that will help Malawi to fully utilize the improvements that have been there in the higher education sector to foster economic growth.

1.4 Objectives

1.4.1 Main objective

The study investigated the effect of higher education on economic growth in Malawi.

1.4.2 Specific objective

Specifically, the study investigated the effect of tertiary enrolment on GDP growth (% annual) in Malawi.

1.5 Hypothesis

To achieve the study’s objective, the following null hypothesis was tested:

Tertiary enrolment does not positively affect annual GDP growth in Malawi.

1.6 Study outline

The rest of the study is organized as follows: Chapter Two gives a theoretical and empirical literature reviews on economic growth and primary school education. Chapter Three

accounts for the methodology the study used. Chapter Four presents the study's results and discussion. Chapter Five provides the conclusions, policy implication and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical literature

This section explains the theoretical literature of the study.

2.2 Introduction

Education is considered to be a strong tool that generates both macro and micro level economic development by increasing the stock of human capital (Nohl, 2008). This viewpoint relates to the human capital theory, which describes education and training as two of the main components of economic growth (Gedik, 2002). The human capital theory also views education as an important investment for future individual earnings (Blundell R., 1999). Becker and Tomes (1979, 1986) also initiated a large literature that emphasizes the importance of credit constraints, family income and inherited ability on the schooling and earnings thus showing that economic variables also have an impact on schooling (Fleischhauer, 2007). The literature also explains the endogenous growth model which indicates that technological progress, which is driven by investments in research and development, education, and training, is the main source of productivity improvement that leads to inventions in new systems and products that enhance growth.

2.2.1 The Human Capital Theory

Human Capital Theory lays considerable stress on the education of individuals as the key means by which both the individual accrues material advantage and by which the economy as a whole progresses. In a simple equation, the more and better education individuals possess, the better their returns in financial rewards and the better the national economy flourishes. Human Capital Theory has thus promoted education to a key instrumental role in boosting economic growth. The better the investment made by individuals in education, the better they and the economy will do. The roots of the Human Capital Theory (HCT)

can be traced to the early 1960's to the work of two key theorists, Theodore Schultz (1961) which was later supported by Gary Becker (1962), both associated with the "Chicago School" of neoliberal thought (Gillies, 2012). It is generally concluded that the theory was developed out of an assertion that the growth of physical capital only explains a small part of growth of income as compared to human capital (Patrinos, 2004). Nevertheless, in contemporary times, the idea of human capital theory has largely been used to address the question of returns to investment in education and training (Hanushek, 2011). Built on economic assumptions that are consequential of the understanding that human beings can be bestowed with ability to possess a quantity of economic worth in form of knowledge that can spur economic development, HCT broadly sees education as an important input into human capital formation (Khambhampati, 2004).

Specifically, Human Capital Theory assumes that the more educated a population is, the more productive it is. The assumption is well augmented by Bouchard (1998) who emphasises that with the recent explosion in technology and global competition, a nation's economic prospects are linked more directly than ever to the development of a knowledgeable and well trained workforce, and hence to human capital. The link between education and productivity leading to socio-economic development is derived from HCT as follows: firstly, Education and training increase human level of cognitive stock (Becker, 1993) as they are seen to be providers of basic skills as well as more technical and specialized knowledge required for development, secondly, increased cognitive stock, resultant of acquired knowledge and skills, in turn increases both productive capacities of workers, and consequently their salaries or wages; therefore thirdly, provision of education and training can be seen as an investment equal or more worthwhile than that of physical capital necessary for the development of societies (Khambhampati, 2004).

2.2.2 Endogenous growth model

The endogenous growth model, argues that the long-run growth of a country depends on internal forces rather than external forces, thus endogenous forces to the economic system. This approach gives much emphasis on the importance of technological progress, innovation, and invention for economic growth. The model, which was developed by

(Romer, Endogenous technological change. *Journal of political Economy*, 1990) indicated that technological progress, which is driven by investments in research and development, education, and training, is the main source of productivity improvement that leads to inventions in new systems and products that enhance growth. Institutional factors such as property rights, contract enforcement, and access to credit are essential determinants of innovation and technological progress (Acemoglu, 2002). It argues that productivity improvements can be tied directly to faster innovation and more investments in human capital from governments and the private sector. The model implies that, as technology advances and becomes more complex, a country is expected to allocate a larger amount of its resources to research and development activities to maintain a better rate of innovation from the outset (Beyene, 2022).

2.3 Empirical literature

The application of dynamic growth theories has made numerous researchers focus on a study of the empirical relationship between education and economic growth. In general, this approach includes the use of school enrolment as an education measure into growth equations and then running regressions against the various growth determinants. Below is a review of available literature on education and economic growth.

Chirwa and Matita (2009) estimated rates of returns on education from wage employment using both the basic and extended Mincerian earnings functions from the national household survey data collected in 2004/05. The results showed that, on average, an additional year of schooling increases life time earnings by 10 percent. Returns from various levels of education increase as the levels of education increase from 5 percent from primary level to 65 percent from university education. It also found that female workers tend to have higher rates of return on education than male workers, particularly at higher levels of education. The very high level of rates of return at higher levels of education suggest the need to expand higher education infrastructure while at the same time ensuring efficiency of education delivery at various levels (Chirwa, 2009).

Pegkas and Tsamadias (2014) employ the vector error correction model (VECM) on the cointegration relationship between education and economic growth in Greece from 1960 to 2009. The research results that were obtained point to a strong positive relation between educational attainment and economic growth. Using similar VECM modeling techniques, Oancea and Mariana (2015) also examines the education-economic growth relationship for the Romanian economy over the 1980-2013 period, with empirical results that indicate that the education has a positive impact on long run of economic growth (Pegkas, 2014).

Zivengwa (2006) studies the cointegration relationship between education and economic growth in Zimbabwe over the period 1980 to 2008 with a vector autoregression (VAR) modeling approach. The findings reveal a positive relationship between education and economic progress where physical investment being identified as channel of transferring the positive effects (Zivengwa, 2006). An illustration of the long run relationship between school attendance and economic growth is also provided by (Beskaya, 2010) in their study for Turkey from 1923 to 2007 with the help of the ARDL model (Pasara, 2020).

Afzal et al. (2010) examine the short-run as well as long-run links between school education and economic growth in Pakistan with the annual data from the year 1970–71 to 2008–09. In their research, they adopt the ARDL bounds testing approach and find co-integration between school education and economic growth showing prevailing direct positive relationship in the short run as well as long run (Afzal M., 2010).

On the other hand, focusing on Pakistan, Reza and Valeecha (2012) undertake an empirical analysis of the education-growth interaction through simple OLS regression analysis by using data collected between 1981 and 2010. Their findings failed to support any short-term relationship but argued in favor of a significant long-term nexus.

Ali and Abdulla (2016) in their study to study the relationship between higher education and economic growth in Pakistan in which they used the Granger causality test and the Johansen co-integration test for the period of 1982-2014, found a unidirectional relationship (granger causality) running from gross domestic product to higher education

enrolment. There was no other causal relationship which was found running from higher education enrolment to gross domestic product in Pakistan.

Basing on this information, this study is inspired to analyse the relationship between higher education and economic growth in Malawi since studies done in Malawi and elsewhere are agreeing with the assertion that there is indeed a relationship between these two variables. Additionally, literature on this subject appears to contradict each other on the impact tertiary education has on economic growth especially in developing countries and this signify the need for more research in this area (Charowe, 2021)Therefore, this study seeks to reconcile the two opposing views on the effect of tertiary education on economic growth by focusing on Malawi.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter lays out the methodology used by the study to achieve its objectives. It outlines the econometric model, the estimation strategy, description of key variables, data sources and frequency. Lastly, the chapter outlines the diagnostic tests conducted in the study. The Autoregressive Distributed lags (ARDL) technique was used to estimate the model and the results were obtained using Stata17 statistical software package. In time series data, the ARDL technique is used based on the assumption that all the variables used in the model are stationary, that is, the mean, the variance, and covariance are time invariant. A structural time series model in which at least one variable is non-stationary is called a spurious or nonsense regression unless otherwise stated. If the model is spurious, all diagnostic procedures based on the use of ARDL technique are unreliable.

3.2 Model Specification

The section below explains how the model was specified.

3.2.1 Theoretical framework

Following Romer, (1986), Mankiw, (1992) and Islam, (1995) in line with the endogenous growth, we assume a Cobb-Douglas production function for the economy such that production at time t is given by

$$Y_t = A_t K_t^\alpha L_t^\beta H_t^\varphi \quad \dots(1)$$

Where output elasticities $\alpha, \beta, \varphi > 0$ and $\alpha + \beta + \varphi \geq 1$. In Equation 1, Y_t is the output, A_t total factor productivity (TFP) which includes the level of technology and other institutional factors, K_t and H_t are the stocks of physical and human capital, and L_t is labour, at time t respectively.

Recent literature suggests that tertiary education affects the economy via changes in its human capital. Education is presumed to foster human capital development . Taking natural logs we get:

$$\ln Y_t = \ln A_t + \alpha \ln K_t + \beta \ln L_t + \varphi \ln H_t \dots (2)$$

3.2.3 Empirical model specification

From the theoretical framework, the following empirical growth regression equation with a specification that is common in the education and growth literature is estimated. the simplest estimation regression found in the literature involves estimating a multivariate empirical regression between the time series. Such regression obtained from Malangeni and Phiri (Malangeni L., 2018) with a few modifications¹ assume the following functional form:

$$GDP_t = \alpha + \beta_1 EDU_t + \beta_2 PPLN_t + \beta_3 CAPINV_t + \beta_4 INF_t + \beta_5 LE_t + \mu_t \dots (3)$$

Where abbreviation GDP is a measure of economic growth, EDU is a measure of tertiary education, PPLN is the population growth , CAPINV is gross fixed capital investment, INF is inflation, LE is Life expectancy , and μ is a normally distributed disturbance term.

The study included, population growth, Gross fixed capital investment and inflation as plausible control variables which are all considered relevant variables in the Malawian context. For instance, inflation is an important variable since it is representative of monetary policy ensuring price stability in the interest of promoting economic growth. Similarly, gross fixed capital investment has been considered the engine of growth and is hence representing a standardized growth determinant in the literature. Life expectancy is included as a control for health citing the human capital theory and finally, labor force, proxied by population growth, is assumed to be positively related with economic growth.

3.3 Data

The study used annual times series data from 1990 to 2023 to investigate the relationship between tertiary education and economic growth in Malawi². Data was sourced from the

¹ Changed most of the variables to suit the objectives of this study

² The data from the EMIS are from 1990 to 2023 thus determining the time period used in this study.

Education Management Information System (EMIS) and the World Development Indicators (WDI) of the World Bank (World Bank, 2024).

3.4 Estimation strategy

This section explains the estimation strategy used in the study.

3.4.1 Unit root tests

Most macroeconomic time-series data display non-stationarity and can be classified as integrated or near integrated (Olusoji, 2003). Regressing with these variables leads to obtaining spurious results hence making forecasts and predictions unreliable and invalid (Gujarati, 2004). Therefore, it is crucial to test for stationarity to guide with model selection. This study applied two unit root tests, namely the standard augmented Dickey - Fuller (ADF) test, the ERS Dickey-Fuller test with generalized least squares de-trending and the Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) test.

The study conducted the stationarity tests sequentially by starting with ERS test. The ERS test, developed by Elliot, Rothenberg and Stock, J. (1996), use the generalised least squares (GLS) method to remove the intercept and/or trend terms from the series prior to the estimation of the unit root test equation (Elliott G., 1996). The test then substitutes the GLS de-trended series for the original series, and proceeds to estimate the DF/ADF tests. The resultant test is called the Dickey-Fuller test with GLS De-trending (DFGLS), or the ERS test. The ERS test is run first strategically since its output offers three different methods for choosing an appropriate number of lags: NgPerron sequential t, minimum Schwarz information criteria, and Ng-Perron modified Akaike information criteria (MAIC). The MAIC is more recently developed, and Monte Carlo experiments support its advantages over other criteria (Perron, 2001). The study therefore uses the lag length produced by the MAIC in the tests of stationarity. The test equation for the ADF test is written as follows:

$$\Delta Y_t = \alpha_1 + \alpha_2 t + \delta y_{t-1} + \sum_{j=1}^m \phi_j y_{t-1} + \eta_t \dots (4)$$

The hypothesis of a unit root is resolved using the tau-statistic for testing the null hypothesis that $\delta = 0$, using appropriate critical values. The number of lagged difference terms is determined empirically such as to yield an error term that is serially independent

using the Modified Akaike information criterion (MAIC). The problem with ADF and DF-GLS tests is that they have low power under serially correlation.

The tests discussed thus far, however do not perform well under trend stationary series let alone fractional stationary series. This test differs from the “unit root” tests in common by having a null hypothesis of trend stationarity. To be certain that the series are not trend stationary, we augment the “unit root” tests with the KPSS test.

3.4.1 ARDL Modelling

This study employs an Autoregressive Distributed Lag (ARDL) model developed by Pesaran and Shin (2001) to estimate the long run and short effects between tertiary education and economic growth (Pesaran M., 2001). The choice of this model is justified by the numerous advantages which it has over other cointegration approaches such as Johansen (1988) and Johansen-Juselius (1990). This approach can be utilized irrespective of whether variables are integrated of $I(0)$ or $I(1)$ or mutually integrated. The ARDL procedure will, however, be inefficient in the existence of $I(2)$ or higher order series. Not only that, reliable and consistent results can be acquired even in the estimations obtained with small samples (Pesaran M., 2001). Furthermore, the model can eradicate the problems that may arise due to the presence of autocorrelation and endogeneity as it is able to distinguish between dependent and explanatory variables. Finally, ARDL approach estimates short and long run relationship simultaneously using single equation framework and provide unbiased and efficient estimates.

3.4.2 ARDL Bounds Test for Cointegration

The first stage in ARDL modelling is to examine the long-term interaction among the variables with the cointegration test, in this case, the Bounds Test. Bounds Test is estimated based on the Unrestricted Error Correction Model (UECM) shown in equation (5) below. In the model, Δ represents the first difference of the series, while. ρ , q_1 , q_2 indicate the optimum lag of variables. In our study, UECM is estimated with the optimum lag length to specify according to the Modified Akaike information criteria (MAIC). The F or Wald test statistic is compared with the critical values from Pesaran/Shin/Smith (Pesaran M., 2001), and it is decided whether there is a cointegration relationship. Bounds (Wald) F-test for

cointegration is conducted under the null hypothesis of no cointegration; $H_0 : \beta = \theta_i' = \gamma' j = 0$ against the alternative of cointegration; $H_1: \beta \neq \theta_i' \neq \gamma' j \neq 0$. If the F-statistic is greater than the upper bound critical value, then we reject the null hypothesis hence confirming the presence of long-run relationship between the variables. If there is cointegration between the variables, the coefficients showing the correlation between the variables are estimated in the long and short run.

The ARDL unrestricted error correction model to be estimated is expressed as;

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^p \alpha_i \Delta Y_{t-i} + \sum_{i=0}^{q1} \phi_i' \Delta E_{t-i} + \sum_{j=0}^{q2} \delta_j' \Delta X_{t-j} + \beta Y_{t-1} + \theta_i' E_{t-1} + \gamma_j' X_{t-1} + \mu_t \dots (5)$$

Where Y_t is real GDP growth rate, X is a vector of control variables (which include, gross fixed capital investment, Life expectancy, Population growth and inflation) and E is school enrolment (tertiary).

Δ represents change, α_i , ϕ_i' , δ_j' Represent short run effects, while β , θ_i' , γ_j' represent long run effects.

3.5 Variables Definitions and Measurements

3.5.1 Dependent variable

Gross Domestic Product (GDP) is a dependent variable which is being measured by GDP growth (annual %) (to capture economic growth, development and household income and also because GDP growth rate is in percentages, making it easy to use in the model). GDP growth (annual %) is an annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2015 prices, expressed in U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources (World Bank, 2024).

3.5.2 Independent variable

Higher education is being measured as tertiary School enrollment, capturing enrolment in both private and public universities. Tertiary enrolment is defined as the total enrollment,

regardless of age, to the population of the age group that officially corresponds to tertiary level in public and private schools. Tertiary education, whether or not to an advanced research qualification, normally requires, as a minimum condition of admission, the successful completion of education at the secondary level (Government of Malawi, 2023). *A priori*, higher education should positively affect economic growth.

3.5.3 Control Variables

Capital is being measured by gross fixed capital formation (% of GDP). Gross fixed capital formation (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. According to the 1993 SNA, net acquisitions of valuables are also considered capital formation (World Bank, 2024). *A priori* capital should be positive because the neoclassical growth model emphasized the importance of saving and capital formation as sources of growth (Solow, 1956).

Labor is being proxied by Population growth (annual %)-Annual population growth rate. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship. Annual population growth rate for year t is the exponential rate of growth of midyear population from year $t-1$ to t , expressed as a percentage. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship. Total Labor Force which comprises people ages 15 and older who supply labor for the production of goods and services during a specified period (World Bank, 2024). *A priori* labor should be positive because the Neoclassical Growth Model of economic growth by Robert Solow (Solow, 1956) contended that steady state economic growth rate mainly depends on labor and capital inputs. Therefore, *a priori*, population growth as a proxy of labour should also be positive. Inflation is being measured by Inflation, GDP deflator (annual %). Inflation as measured by the annual growth rate of the GDP implicit deflator shows the rate of price change in the economy as a whole. The GDP implicit deflator is the ratio of GDP in current local

currency to GDP in constant local currency (World Bank, 2024). Inflation is defined as the rate a price rises, and essentially how much the dollar is worth at a given moment with regards to purchasing. The idea behind inflation being a force for good in the economy is that a manageable enough rate can spur economic growth without devaluing the currency so much that it becomes nearly worthless (Ihugba O., 2019).

Life Expectancy is being measured as Life expectancy at birth indicating the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life (World Bank, 2024). *A priori*, life expectancy should be positive.

3.6 Residual diagnostic tests

The model is subjected to various diagnostic test to ensure that time series and the econometric model is met. This is because the Classical Linear Regression Model (CLRM) assumptions need to hold, if they are violated then regression results will be invalid. Test for heteroscedasticity, autocorrelation, model specification and omitted variables, normality, and model or parameter stability were performed.

3.6.1 Test for multicollinearity

Multicollinearity means linear relationship among the regressors in the model. The Classical Linear Regression Model (CLRM) assumes no multicollinearity because in the presence of perfect or high but imperfect multicollinearity the estimators tend to be indeterminate and have high standard errors respectively (Gujarati, 2004). However, multicollinearity is not a serious problem because the coefficients still maintain their BLUE property. The Variance Inflation Factor (VIF) has been used to detect the presence of multicollinearity in the model.

3.6.2 Test for heteroscedasticity

The CLRM also assumes that the variance of the disturbance error term is constant (homoscedastic). If a model is estimated in a situation where the variance of the error term

is heteroscedastic (non-constant) the estimates tend to be inefficient (Gujarati, 2004). The Breusch-Pagan-Godfrey test was used to detect the presence of heteroscedasticity.

3.6.3 Test for autocorrelation

The other assumption of CLRM is that there is no relationship between members of a series of observations ordered in time or space (no autocorrelation) (Gujarati, 2004). In this study the Breusch Godfrey test has been used to test for the presence of autocorrelation.

3.6.4 Test for model specification and omitted variables

To test whether the respective model is properly specified, Ramsey's Regression Specification Error Test (RESET) has been used. The test provides a general test for misspecification and does not require the specification of an alternative model (Gujarati, 2004). The Ramsey RESET test has been used to test for the presence of omitted variables too.

3.6.5 Test for normality

With normality, probability and sampling distributions of estimators can be easily computed. It also allows for the construction of Confidence Intervals and hypothesis tests for statistical inference (Gujarati, 2004). Jarque-Bera tests have been applied in testing for normality. The test entails testing whether the residuals from regression conform to characteristics of a normal distribution. That is whether the distribution is symmetric (Gujarati, 2004).

CHAPTER 4

EMPIRICAL RESULTS AND INTERPRETATION

4.1 Introduction

After specifying the model in Chapter Three, this chapter presents the findings as well as the interpretations of those findings.

4.2 Descriptive statistics

Table 1 below provides summary statistics; the mean, standard deviation and range of all the variables used in the study.

Table 1: Descriptive statistics

Variable	Obs	Mean	Std. dev.	Min	Max
GDP growth (annual %)	33	4.02	4.90	-10.24	16.73
log_Schoolenrolment , tertiary	34	9.18	1.06	7.90	11.30
Gross Fixed capital formation(%GDP)	30	14.56	4.50	9.32	26.77
Inflation	33	22.54	21.68	4.10	112.69
Population growth (annual %)	33	2.42	0.92	-1.23	3.90
log_Life Expectancy	33	2.58	0.86	0	3.50

Within the period 1990 to 2023³, GDP growth rate ranges from -10.24 percent to 16.73 percent averaging around 4.02 percent. The log of Tertiary enrollment ranges from 7.9 percent to 11.30 percent clustering around the mean value of 9.18 percent. Gross fixed capital ranges from 9.32 percent to 26.77 percent clustering around the mean value of 14.56 percent. Population growth rate ranges from -1.23 percent to 3.90 percent with an average

³ Some variables have more observations than others due to gaps in data and interpolation was not done to avoid inaccuracies.

value of 2.42 percent. The log of Life expectancy ranges from 0 percent to 3.50 percent averaging around 2.58 percent. Lastly, inflation rate ranges from 4.10 percent to 112.69 percent averaging around 22.54 percent describing Malawi as a high inflationary country.

4.3 Diagnostic tests results

Following the diagnostic tests, below are the results for each test conducted.

4.3.1 Multicollinearity test results

To detect the presence of multicollinearity, the study carried out a variance inflation factor (VIF) test. If the VIF of a variable is greater than 10 then the variable is highly collinear. The results from Table 2 below shows that multicollinearity among the variables is not severe, giving a mean VIF of 3.31.

Table 2: The Variance Inflation Factor Test Results

Variable	VIF	1/VIF
log_Life_E~_	4.51	0.221625
log_School~_	4.32	0.231571
Gross_Fixe~l		
D1.	4.11	0.243163
population~l		
L1.	3.18	0.314097
Gross_Fixe~l		
L1.	3.03	0.329745
population~l		
D1.	3	0.333437
LD.	2.9	0.344351
Gross_Dome~t		
L1.	2.4	0.417377
Inflation_	2.32	0.430391
	Mean VIF =3.31	

4.3.2 The Breusch-Pagan-Godfrey (BPG) Test for Heteroskedasticity

The following are the BPG heteroskedasticity test results:

Table 3: BPG Test Results

H0: Constant variance
chi2(1) = 0.00
Probability > chi2 = 0.9820

The results in Table 3 indicate that we fail to reject the null hypothesis of constant variance (homoskedasticity) of the residuals of the model since the p-value is greater than the 1%, 5% and 10% levels of significance. Therefore, heteroskedasticity is not present in the model.

4.3.3 The Ramsey RESET results for Model Specification

The following test results for model specification were obtained.

Table 4: Ramsey Reset test results

H0: Model has no omitted variables
F (3, 15) = 1.43
Probability > F = 0.2742

The results from Table 4 show that the model has no omitted variables. Using the p-value approach it can be observed that the probability 0.2742 is greater than the 5% level of significance. Therefore, we fail to reject the null hypothesis at 5% level of significance, hence the model is correctly specified.

4.3.4 The Breusch-Godfrey test for serial autocorrelation

The following are the test results for serial correlation.

Table 5: Breusch-Godfrey test results

Ho: no serial correlation
chi2 = 0.250
Probability > chi2 = 0.6172

Using the p-value from Table 5 above, we fail to reject the null hypothesis at 1%, 5% and 10% levels of significance. Therefore, there is no serial autocorrelation among the residuals of the model.

4.3.5 Jarque-Bera test for normality

The following results for normality were obtained.

Table 6: Jarque-Bera normality test

Ho: normality
Chi (2) = 17.16
Probability > Chi(2) = 0.000019

The results show that the residuals of the model are not normally distributed since we have to reject the null hypothesis of normality at 1%, 5% and 10% levels of significance using the p value obtained in the results. This can be attributed to the presence of outliers in the data. However, the study evokes the central limit theory that as the sample size increases the distribution becomes normal eventually (Gujarati, 2004).

4.4 Matrix of correlations

Table 7 reports correlations between each pair of variables. The results indicate that all variables except gross fixed capital are positively correlated with the GDP growth rate. The study went further to examine the correlation between the rest of the variables because literature suggests that some of the variables tend to be correlated, and including them in a single regression model may result in obtaining spurious results due to possible problems of endogeneity and multicollinearity. The results show that Tertiary school enrolment is positively and highly correlated with life expectancy, with a coefficient of 0.79. Population

growth (-0.41) is negatively and moderately correlated with Inflation. However, it should be noted that correlations do not imply causality.

Table 7: Matrix of correlations

Variables	GDP					
	growth	log_Sch	Gross_Fi	Inflation	populati	log_Life
	(annual	oolenrol	xed_Cap	_	on_grow	_Expect
	%)	ment_	ital		th	ancy_
GDP growth (annual %)	1.000					
log_Schoolenrolment	0.066	1.000				
Gross_Fixed_Capital	-0.110	-0.254	1.000			
Inflation_	0.076	-0.308	-0.271	1.000		
Population_growth	0.150	0.305	-0.170	-0.405	1.000	
log_Life_Expectancy	0.057	0.794	-0.012	-0.145	0.254	1.000

4.5 Stationarity test results

Unit root tests were carried out on the variables to determine their order of integration. This study used the Augmented Dickey Fuller (ADF) and KPSS stationarity tests. ADF is computed under the null hypotheses of unit root and the alternative hypotheses of stationarity.

Table 8 presents the results of the ADF and KPSS stationarity tests. The results of all stationarity tests presented in Table 8 reveal that the variables are mixed order integrated, with integration not exceeding the first order. That means some of the variables are integrated on order zero, $I(0)$ while others are integrated of order one, $I(1)$. Engle and Granger (1987) pointed out that a linear combination of two or more nonstationary time series may be stationary (Granger, 1987). If such a stationary linear combination exists, the nonstationary time series is said to be cointegrated. The stationary linear combination may be interpreted as a long run equilibrium relationship between the variables. In light of this finding, the search for a long-run relationship amongst the series is triggered, which is

done, in this case, using the Autoregressive Distributed Lag (ARDL) approach to cointegration or bound testing.

Table 8: ADF and KPSS unit root tests results

Variable	ADF Tau statistic		Decision	KPSS statistic		Decision
	Level	First difference		Level	First Difference	
Gross Domestic Product	-7.481(0)**		I(0)	0.0823(0)**		I(0)
lnSchool enrolment	1.913(1)	-3.734 (1)**	I(1)	0.232(1)	0.594(1)**	I(1)
Gross fixed capita;	-2.436(1)**		I(0)	0.0951(1)	0.063(1)**	I(1)
Inflation	-4.492(0)**		I(0)	0.0784(0)**		I(0)
Population growth	-7.878(4)**		I(0)	0.0749(4)**		I(0)
lnLife expectancy	-1.998(1)**		I(0)	0.147(1)	0.126(1)**	I(1)

Note; ** denotes significance at 5% level of significance and values in the parentheses represent optimal lags specified by Akaike Information Criterion (AIC) and SBIC.

4.6 ARDL bounds Test for Cointegration.

The cointegration relationship between the variables has been investigated using the Bounds test. In the framework of the bound test, the model in equation (3) is estimated by using the UECM model shown in equation (5). Empirical results of the Bounds test related to the model is presented in Table 9. Findings show that there is cointegration relationship in the model since the Wald or F-statistics is greater than the upper bound of the critical values at the 5% significance level.

Table 9: Bounds test for cointegration

Null hypothesis $H_0 : \beta = 0 \text{ or } \gamma = 0$	F-statistic = 15.64				
1% critical Values		5% critical values		10% critical values	
CVL	CVU	CVL	CVU	CVL	CVU
3.41	4.68	2.62	3.79	2.26	3.35

4.7 Estimation Results

Below are discussions of the short-run and long-run ARDL results showing the ARDL error correction (short run) results, normalized joint short run estimation results and the normalized long run estimation results.

4.7.1 Discussion of the Short-run and Long-run ARDL results

Engle and Granger (1987) argued that when variables are cointegrated, their dynamic relationship can be specified by an error-correction representation in which an error correction term (ECT) computed from the long-run equation must be incorporated in order to capture both the short-run and long-run relationships (Granger, 1987). Having established the cointegrating relationship between the variables as shown in Table 9, the ARDL Unrestricted Error Correction Model was estimated with optimal lags specified by the Modified Akaike Information Criterion (MAIC).

Table 10: ARDL error correction (short run) results

Variable	Coefficient	P-value	SE
Error correction term (ECT)	-1.744***	0.000	(0.183)
D.log_Schoolenrolment_	1.892	0.221	(1.492)
D.Gross_Fixed_Capital	0.216	0.446	(0.277)
D.Inflation_	-0.084*	0.055	(0.041)
D.Population growth	2.696*	0.080	(1.451)
LD.Population growth	3.795**	0.014	(1.394)
D.log_Life_Expectancy_	-0.238	0.902	(1.906)
_cons	-12.964	0.316	(12.572)

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Normalized Joint short run estimation results

Population growth	F-statistic	P-value
	7.87	0.0035

The short run estimation results from the unrestricted error correction model presented in Table 10, estimation results of ECT indicate the speed of adjustment to restore equilibrium in the dynamic model following a disturbance. The ECT is expected to be statistically significant with a negative sign ranging between 0 and 1. However, literature has confirmed that, the ECT can be greater than one but less than two (Kordalska, 2016). The negative sign implies that any shock that occurs in the short run will be corrected in the long run. The larger the ECT in absolute value, the faster the convergence to equilibrium. The results from Table 10 show that the coefficient of ECT is negative and statistically significant.

The results also show that, tertiary school enrolment, gross fixed capital and life expectancy have no impact on economic growth in the short run. However, Inflation, in the short run, is detrimental to economic growth. The result on inflation is puzzling and also surprising. However, without ruling out all possible explanations, the short run negative effect of inflation on economic growth can be attributed to the reality of Malawi currently in that, despite the country experiencing continuous inflation there is still no growth in the short run hence showing negative results of reduction in growth. Population growth is also seen to be positively affecting growth as seen using the joint short run effect in Table 11, this can be because growth in the population is leading to a higher labour force thereby boosting productivity and economic output. High population growth may also mean high demand for goods and services encouraging businesses to expand investment and production. Table 12 presents the normalized long run regression results. The adjusted R-squared shows that the independent variables explain 86% of the variation in the dependent variable, therefore making the model a good fit. The results of the diagnostic tests presented above also indicate that the model is economically meaningful.

Table 12: Normalized long run estimation results

Variable	Coefficient	P-value	SE
LnSchoolenrolment	0.622133	0.2069	(0.85)
Gross fixed capital	0.258176***	0.0007	(0.126)
Inflation	-0.027699**	0.031	(0.022)
Population growth	-0.748444*	0.0487	(0.65)
LnLife expectancy	-0.078285	0.9005	(1.093)
Diagnostics			
n=28			
Adjusted R-Squared = 0.8572			

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The normalized long run results are presented in Table 12 findings show that, in the long run, Inflation and population growth are growth reducing in Malawi, that is, a 1 percentage increase in inflation leads to a 0.028 percentage decrease in economic growth (which can be attributed to low international competitiveness, uncertainty leading to reduced investment and reduced purchasing power thus reducing economic activities to spur growth). A 1 percentage increase in population growth also leads to a 0.75 decrease in economic growth (this can be attributed to Unemployment where the increasing population is outpacing the availability of jobs, high dependency on the working population especially the young and old and there is also pressure on infrastructure like transport, health care and education to keep pace with the growing population thus reducing the growth of the country). Gross fixed capital is seen to be favourable for economic growth in the country. In particular, in the long run, 1 percentage increase in Gross fixed capital formation would result in a 0.258 percentage increase in real GDP growth, ceteris paribus. This result supports the Endogenous growth theory which argues that Capital is functional for economic development.

On the contrary, Human capital in form of tertiary enrolment (LnSchoolenrolment) is seen to be insignificant. The results show that Tertiary enrollment has no significant relationship

with GDP growth rate at all levels of significance. These results are different from the *a priori* expectation that there is a positive significant relationship between tertiary enrollment and economic growth in Malawi. This can be attributed to issues of quality of education in terms of infrastructure and the curriculum whereby there is a skills and needs of the labour market mismatch from skills gained after higher education, the labour market cannot also absorb all graduates. This is leading to low productivity as people are job oriented since start up capitals for businesses have also been a challenge in Malawi, thus leading to low productivity. These results are in agreement with other studies which give the possible reasons for the insignificance of higher education on economic growth in Malawi.

Insignificant effect of tertiary education on economic growth may mean that the Malawi has not invested enough in tertiary education to the extent where it can be growth enhancing. The result may also mean that the syllabus being used are not relevant to the needs of Malawi as a country that is, there might be a mismatch between tertiary education and the labour market. Human capital tends to be more difficult to adjust than physical capital. Therefore, a country that starts with a high ratio of human to physical capital, such as in the aftermath of a war that destroys primarily physical capital, tends to grow rapidly by adjusting upward the quantity of physical capital. Education transforms the raw human beings into productive 'human capital' by inculcating the skills required by both the traditional sector and the modern sector of the economy, and makes the individuals more productive not only in the market place but also in the household. Education, including both technical training and general education, contributes to economic growth through its ability to increase the productivity of the population or the labor force in particular, which leads to increase in individuals' earnings. The core of the human capital theory lies in this thesis that education increases productivity of the labor force leading to increase in economic growth (Barro, 2013), which is not the case for Malawi.

Peasle (1967; and 1969) correlated school enrollments and GNP per capita in 34 richest countries of the world since 1850 and found that no country has ever achieved significant economic growth within 100 years without first attaining an enrollment ratio of at least 10

percent, which in other words, was absolutely essential for any economy to 'take off' (Peasle, 1969). Thus, it is important to note that the role of education as an instrument of economic growth varies over time. Education may yield substantial rewards at some stages of development, while at other stages, the impact may be negligible (Peasle, 1967). There may be not only a threshold level of literacy/education for it to influence economic development, but also a threshold level of economic development for literacy/education to grow, and for it to influence significantly the education development. For example, literacy may be a pre-requisite for sustained growth, but demand for literacy and schooling itself may depend upon the level of socio-economic development (AERC 1971; Shortlidge 1973; and Wolfe and Behrman 1984). As a result, in sum, the influence of education on economic development varies by the stage of development of the economy. This has been repeatedly highlighted in the research on education and economic growth (World Bank, 1986).

Cross-section comparisons, without introducing a time lag, also led Tilak (1986) to arrive at more or less similar conclusions. Tilak classified 75 countries into four categories, that is; very poor, poor, rich and very rich countries. Tilak finds that while on the whole, there is a significant positive relationship between education development and economic growth of the nations, the relationship is strong in the poor countries, and rich countries, but is not significant in very rich countries and very poor countries (like Malawi). Further, in very poor countries, primary and secondary education have relatively more significant role in inducing growth than tertiary education (World Bank, 1986). This therefore shows that the insignificant relationship between Tertiary enrolment and economic growth in Malawi is not at all surprising.

4.8 A comparison of significance of primary, secondary and higher education on economic growth in Malawi

For comparison, the study also conducted an analysis using EMIS data for primary and secondary education to see their impact on economic growth in Malawi. The study conducted a separate analysis of each level of education using the same control variables that were used with higher education. The results were summarized in the Table 14 and Table 15 in the Appendix.

From the results it was seen that primary education was not significantly affecting economic growth but secondary education was significantly affecting economic growth in the long run. To begin with, these results are in agreement with studies which give the possible reasons for the insignificance of primary school education on economic growth in Malawi. (Kadzamira P. R., 2003) found that the relatively high proportion spent by poorest households was likely to be at the expense of other basic needs of the household. This suggests that, although the vast majority of the school-aged population has access to primary schooling, many households are not able to sustain their initial demand for education for a variety of reasons, often related to poverty. After children have been enrolled in school, households can find the costs associated with schooling prohibitive. Although the government is supposed to provide exercise books and writing materials, these are often insufficient so that households have to supplement the supply from the government. In addition, the study indicated that, despite the abolition of fees, schools continue to request contributions for sports, water bills as well as labour and materials for school construction and maintenance. These additional costs can be prohibitive for poorer households (Kadzamira C. M., 2000). This high dependency on government makes education expenditure on primary schools to be high so much so that the costs outweigh the benefits and returns to the expenditures on basic education. This is similar to the case of higher education being insignificant to affecting economic growth since the cost of attaining higher education outweighs the benefits.

On Secondary school education significantly affecting economic growth, it can be attributed to different factors for instance the particular importance of schooling at the secondary and higher levels supports the idea that education affects growth by facilitating the absorption of new technologies which are likely to be complementary with labor educated to these higher levels. This is because after secondary school, a Malawian who is not enrolled in the university can venture into business and others venture into different vocational trainings which can contribute to their productivity thus inducing the growth of the country. This significant result also suggests that secondary school enrolment positively affects an economy because female secondary education promotes growth indirectly by

encouraging lower fertility since girls who spend more time in school are less likely to get married early and start bearing children (Barro, 2013).

4.9 Conclusion

The chapter set out to present the empirical findings and interpretation of the model results. The results show that Tertiary enrollment has no direct and significant relationship with economic growth. Inflation and population growth have a positive and significant relationship with economic growth enrollment at 5% and 10% significance levels respectively, while gross fixed capital formation has a positive significant relationship with economic growth. The results from the bounds test for co-integration shows that the residuals are stationary, therefore showing that the regression is a co-integrating regression and the regression is not a spurious one even though there is a combination of stationary and nonstationary results.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Chapter Introduction

This study sought to investigate the effect of higher education on economic growth in Malawi. The study employed an autoregressive distributed lag (ARDL) approach to cointegration to analyse this relationship using time series data over the period 1990 to 2023. In this study, the results from the Bounds test for cointegration indicate the existence of a cointegrating (long-run) relationship between the variables in the model.

5.2 Conclusion

The study has established that there is no significant effect of higher education on economic growth in Malawi (the study therefore fails to reject the null hypothesis). It is relatively harder, however, to explain the lack of causal relationship running from enrollment in higher education to GDP growth. This result may be explained by the quality of higher education graduates and their impact on the country's economic growth. Increases in the enrollment rate in tertiary education enrolment capacity doubling to 64,500 from the early 2000s to date were mostly caused by new universities and programs, installation of free broadband internet service to public universities and other selected public spaces; and expanding existing infrastructure in existing public universities to provide fit-for-purpose offices and spaces, more learning space, and accommodation for students (Government of Malawi, 2023). In this regard, it can be argued that these new universities and programs may not necessarily produce high-quality graduates who can positively influence economic growth. In addition, increases in higher education loans and quotas in the last three decades may not cover the programs that are primarily related to economic development in today's world. The analysis however, did not find out if there are certain kinds of higher education programs that do influence economic growth.

5.3 Implication and Policy recommendation

A general implication of the results is that, given the lack of evidence supporting the premise that higher education fosters economic growth in Malawi, this study finds that there is need for Malawi to prioritize higher education reforms as the means to achieving economic prosperity if it has to reap the benefits of investing in higher education. As a recommendation, it is important for Malawi to look into other education indicators (like research and development) other than increased higher education enrolment only to foster economic growth thus moving from a lower income to a middle income country and achieving the Malawi 2063 vision through human capital development thereby achieving SDG goal 4 of quality education. There is also a need to invest in more infrastructure and revise the curricula to suit the needs of the labour market thus improving the quality of higher education

5.4 Limitations and areas of further study

The sample size (30) used in the study is relatively small and this may affect the distribution of the residuals (normality) since the central limit theorem does not hold in small samples. Regressing with small samples may render the estimates inconsistent and unreliable. Therefore, the results need to be interpreted with caution. The analysis as discussed, did not find out if there are certain kinds of higher education programs that do influence economic growth. Thus there is need for further investigation about the relationship between higher education (graduation) rates in different programs and economic growth. There is also a need to investigate the factors that affect higher education causing it to not significantly affect economic growth. This is because Malawi has undergone some significant policy changes in both the educational and economic sectors, particularly during the last decade transitioning from the Vision 2020 to Malawi 2063. These policy changes, as well as international economic trends, may have impacted both economic growth and higher education patterns over this period. The data used in this study, however, does not make it possible to take these factors into account.

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APPENDIX

Appendix 1: Tertiary enrolment ARDL short run and non-normalized Long run results

Table 13: Tertiary enrolment ARDL short run and non-normalized Long run results

	ARDL	SE
ADJ		
L.Gross_Domestic_Product	-1.744***	(0.183)
LR		
L.log_Schoolenrolment_	1.085	(0.850)
L.Gross_Fixed_Capital	0.450***	(0.126)
L.Inflation_	-0.048**	(0.022)
L.population_growthannual	-1.305*	(0.650)
L.log_Life_Expectancy_	-0.137	(1.093)
SR		
D.log_Schoolenrolment_	1.892	(1.492)
D.Gross_Fixed_Capital	0.216	(0.277)
D.Inflation_	-0.084*	(0.041)
D.population_growthannual	2.696*	(1.451)
LD.population_growthannual	3.795**	(1.394)
D.log_Life_Expectancy_	-0.238	(1.906)
_cons	-12.964	(12.572)
N	28	
Adj R-Squared	0.857	

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix 2: Secondary school enrolment ARDL short run and non-normalized Long run results

Table 14: Secondary school enrolment ARDL short run and non-normalized Long run results

	ARDL	SE
ADJ		
L.Gross_Domestic_Product	-2.553***	(0.278)
LR		
L.log_secondary_enrolment	4.514***	(0.885)
—		
L.Gross_Fixed_Capital	0.470***	(0.058)
L.Inflation_	0.035	(0.027)
L.population_growthannual	0.077	(0.401)
L.log_Life_Expectancy_	-4.595***	(1.038)
SR		
LD.Gross_Domestic_Product	0.422**	(0.142)
D.log_secondary_enrolment	14.985***	(3.126)
—		
LD.log_secondary_enrolment_	3.300*	(1.654)
D.Gross_Fixed_Capital	0.180	(0.172)
LD.Gross_Fixed_Capital	-0.344*	(0.169)
D.Inflation_	-0.007	(0.037)
D.population_growthannual	2.464**	(0.950)
LD.population_growthannual	2.045	(1.311)
D.log_Life_Expectancy_	-7.045**	(2.299)
LD.log_Life_Expectancy_	4.845**	(1.832)
_cons	-115.169***	(22.780)
N	28	
Adjusted R-Squared	0.947	

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix 3: Primary school enrolment ARDL short run and non-normalized Long run results

Table 15: Primary school enrolment ARDL short run and non-normalized Long run results

	(1)	
	ARDL	
ADJ		
L.Gross_Domestic_Product	-1.675***	(0.184)
LR		
L.log_primary_enrolment_	2.594	(2.609)
L.Gross_Fixed_Capital	0.444***	(0.127)
L.Inflation_	-0.063**	(0.022)
L.population_growthannual	-1.419*	(0.696)
L.log_Life_Expectancy_	-0.421	(1.078)
SR		
D.log_primary_enrolment_	-30.066*	(16.551)
D.Gross_Fixed_Capital	-0.064	(0.250)
D.Inflation_	-0.105**	(0.042)
D.population_growthannual	2.713*	(1.397)
D.log_Life_Expectancy_	-0.705	(1.796)
_cons	-57.532	(62.537)
N	28	
Adjusted R-Squared	0.854	

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$