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The Potential of Human Capital Investment in Contributing to Economic Growth: ARDL Approach in the Context of Eastern and Southern Africa

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Abstract

Despite 25 years of exceptional progress in human development, there are still significant obstacles to overcome, particularly for underdeveloped nations. Numerous African countries devote substantial support to ensuring quality employment, a skilled workforce, and the building of an inclusive labour market. Hereby, the actual paper investigates the potential of human capital investment in contributing to the economic growth of Eastern and Southern Africa from the period 2001 to 2020. The study also attempts to determine the factors that promote skilled workforces in African countries. To carry on with the examination the study used an Autoregressive Distributed Lag (ARDL) model and the Granger causality tests. The rationale behind using these models is to capture the long-run and short-run dynamic relationship among the variables and to observe the direction of these relationships. Within this framework, the results exhibited that both during the long run and short run the educational level of individuals, government expenditure in education, and labour tax contribution affect the economic growth of the region. Whereas the Granger causality test establishes a one-way causal relationship between all educational levels and economic growth. The test presented no clear connection between government expenditure on education, labour tax, and GDP. Finally, the research provides evidence about the importance of investing in human capital to promote long-term economic growth. And how the government's efforts and educational system operate in Eastern and Southern Africa, which is a geographic region that is often overlooked.

Keywords: Human Capital, Economic Growth, Education, Government Expenditure, Africa

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1. INTRODUCTION

The Sustainable Development Goals (SDGs) objectives remain far from being met in the East and Southern Africa (ESA) area, where high rates of poverty are still prevalent. Furthermore, there are several obstacles that prevent the really poor from participating in the economy. They include limited exposure to public services like medical services, schooling, transportation, and marketplaces as well as poor access to essential infrastructure like roads, water, power, sewage, and sanitation systems (UNESCO, 2018).

The elderly, those with impairments, and countryside women and youth are among the severely impoverished individuals who are particularly prone to be left behind. Approaches to end extreme poverty must take into account the unique circumstances and requirements of each of the following groups (Jaiyeoba, 2015). It is presumed that the region in its entirety as well as the circumstances of each member nation, possesses the necessary political authority and commitment to address the underlying issues that contribute to severe economic hardship, such as inequitable availability of resources, gender discrimination, and systemic racism. Income disparity, high rates of unemployment, particularly among teenage people, a high prevalence of sickness, poor health facilities, low levels of education, and other concerns are some of the major problems the region is facing. Major difficulties in the region include gender-based violence and significant gender inequalities in engagement and decision-making at all stages (Porter, 2017). Rural communities, where poverty and marginalization are pervasive, are particularly affected by these problems.

It is impossible to ignore the contribution human capital formation makes to promoting global and African economic progress. The development of human capital has been acknowledged by economists as a requirement for any country's transformative change in all sectors of the economy and other under-aligned variables (Osiobe, 2020). Without sufficient human capital generation, no nation has ever had a substantial increase in economic progress.

A well-capitalized human potential places a strong emphasis on human growth and potential, including people's information and abilities obtained through knowledge acquisition utilizing schooling as a learning aid, which mostly relies on the quality of one's fitness, nourishment, and other factors like skills. Additionally, it is involved with the efforts made to develop talents as a method of factors of production (Tsaurai, 2022).

Additionally, human potential is a powerful tool for economic growth as productivity and, consequently, revenue, are shown to be increasing. For specific countries, health and education are the main drivers of development, and the more Governments spend on individuals (i.e., their education, training, and healthcare), the more productive and innovative they may be. These indices are crucial and represent the complete end of an era. Health is largely dependent on basic well-being, and education is the foundation for knowledge (Minhaj, 2021).

The examination concerning human capital investment and economic growth has not existed without disparities. For instance, most authors focused on a specific relationship between human capital and other factors, hence neglecting the role of government and education indices. Notably, Zafar et al. (2019) concentrated only on the relationship between human capital, natural resources, and economic growth. Filippaios et al. (2019) researched the impact of political governance and human capital as a result of discarding economic growth. Also, Sulisnaningrum (2021) assessed the link between human capital and the agricultural sector. This suggests that previous studies tried to establish a link between human capital and other sectors and macroeconomic factors such as health, agriculture, environment, and politics.

Accordingly, the purpose of this paper is to examine the potential of Human capital investment in contributing to economic growth, particularly in the Eastern and Southern Africa region. Additionally, the paper contains major objectives such as determining the factors that produce a skilled workforce. An evaluation of the role of education in playing a crucial role in

shaping the labor force. An overview of how Eastern and Southern African countries allocate funds in promoting human capital. Within this scope, in order to measure the economic growth of the region, the GDP was employed. As additional indicators for assessing the development of human capital, the study considers factors including primary, secondary, and tertiary enrollment. Although government expenditure and labor tax contributions are seen as proxies for evaluating a human capital investment. What is more, the ARDL approach and granger causality test are used to observe the long-run and short-run estimates as well the direction of the relationships.

The format of this article is described in the following. The available literature is reviewed in the second part. The third section provides information on the sources and usage of the data as well as the econometric model. The fourth section interprets the empirical findings. The paper is concluded in the fifth section.

2. LITERATURE REVIEW

The most precious asset in a nation is its human capital; without it, capital formation (equipment, material, and infrastructure) would not function well, which will limit economic progress (Garzarelli & Limam, 2019). The human (resource) capital elements of health and education collaborate to boost an individual's productivity. It is impossible to prioritize one element above another. The capacity to conduct a professional and economically active life is a sign of health (Pomi et al., 2021).

A healthy population will be very productive, and those with higher levels of education often use more sophisticated manufacturing techniques. In addition, as citizens of a liberal country, human capital investment equips individuals with political involvement. From a societal, political, and cultural perspective, human capital development enables people to enjoy better, more fulfilling lives with fewer restrictions imposed by custom. It is a means of empowering people, and doing so will enable them to significantly contribute to the operation of the economy's development (Prasetyo & Kistant, 2020).

Due to human capital’s fundamental influence on microeconomics via interpersonal basis, schooling, knowledge acquisition, and experience in the field, investment in human capital is essential. Additionally, there is a sizable and expanding body of research showing a beneficial relationship between HC and performance improvement at both the personal and institutional levels (Armstrong & Taylor, 2020). Economic development is characterized as a rise in output over the long term. Growth affects per capita income since it indicates a rise in production. According to the endogenous growth hypothesis in economics, the system's internal processes, which originate from the system's internal mechanisms, encourage economic development. Both creativity and growth are fostered by the human capital's quality (Diebolt & Hippe, 2022).

HC may be invested in by an individual via schooling, experience, and healthcare, much like "material means of production" like industries and machines, in Baker's view. Outputs are dependent, in part, on how blind the yield ratio on the allocated human capita; is. A nation's economic performance will increase as its economy grows (Kim, 2018). The amount of natural reserves within a nation contributes to elevated natural growth potential, which must be given access to achieve greater levels of GDP growth, supplied they are used effectively and actively. The need for natural wealth accessibility is correlated with the effectiveness of their users (Abdeldayem et al., 2021).

It should be highlighted that increasing labor levels alone will not guarantee higher economic progress rates; rather, improving the condition of the working population and improving their level of education, training, and work-related skills is necessary. Additionally, any nation requires a high-quality infrastructure to support productivity expansion. For development to occur, a structure of social, legal, and financial institutions must match aspirations of rapid economic

expansion (Lim et al., 2018).

Empirically, Becker (1995) demonstrates the link between poverty and human capital. The researcher claims that despite the lack of adequate natural resources in Japan, Taiwan, Hong Kong, and South Korea, human capital has encouraged sustained prosperity in those nations. Official figures later revealed that, despite significant advancements in the Republic of Iran and Saudi Arabia, government spending on education in OPEC nations over the past ten years has averaged less than 12 percent. The development of human capital is crucial for eradicating poverty. Every country, advanced and emerging, today prioritizes achieving a major drop in poverty.

Canpolat (2000) described research that looked at the impact of economic expansion on the development of human capital in Turkey in the 2000s. His investigation came to the conclusion that increasing human capital has a 40% positive impact on economic development. Pazarlolu (2007) used an econometric model to evaluate the association between human capital investments and the international competitiveness of nations with high levels of competitive power between 2000 and 2004. As a consequence of the investigation, it was discovered that economic variables can influence competitiveness via human capital. It has been established that the factor of schooling influences assessments of international standing.

In the instance of Malaysia, Abdullah et al. (2013) discovered an inverse association between education and economic growth. Due to a few factors, this link is not brand-new in the literature. Several elements were suggested in earlier research in relation to current issues. First, education might not raise the level of productivity. Additionally, it plays no role in the production process. Pritchett (2001) further argued that there is a good likelihood that many educated individuals may engage in criminal activities that will hinder economic progress. Another research suggested by Awan and Naseem (2018) discovered that while health spending increased economic growth, education expenditure had a considerably negative correlation with it.

Oisaozoje and Isaac (2016) looked at how human capital development affected Nigeria's economic expansion. From 1999 to 2015, time series data were gathered from public sources. The results of the Ordinary Least Squares (OLS) analysis show that Nigeria's economic growth and human capital development are inconsequential.

Innocent (2017) conducted an empirical investigation of the link between government spending and the growth of human capital. Information was gathered between 1990 and 2014. Impulse response function and Augmented Regressive Distributed Lag (ARDL) were used for the estimate. The Human Development Index (HDI) and government spending have a long-term correlation, according to the Bound Test (GOVEXP). The findings showed that while government investment has continued to be beneficial over the long and short terms, it has been mostly unimportant to Nigeria's growth of its human capital.

Awan and Kamran (2017) further identified the link between Pakistan's economic growth and human resources development by using time-arrangement data for the timeframe (1985 to 2014). The findings indicated that improving human capital is essential for economic success. The observed result offers the most convincing proof of the link between human resources and economic expansion. Moreover, Afridi (2016) examined the contribution of human capital development to increased productivity that might aid in Pakistan's economic development and drew attention to the country's declining position in the skilled labor index. The finding indicated that in order to reach the goal of productivity expansion, the domains of education and health require attention.

Githaiga (2021) analyzed the importance of Human capital and bank performance in East African banks. The study discovers that human capital and income diversity have a considerable impact on bank performance; however, the causation of the relationship differs. Diversification of income has a negative impact but human capital has a beneficial impact. Additionally, the

interaction term has a negative and substantial impact on bank performance, suggesting that income diversification has a negative impact on the link between human capital and bank performance.

Gebrehiwot (2016) examined the impact of Human Capital Development on Economic Growth in Ethiopia. The study used an ARDL model from the period 1974 until 2011. The projected long-run model shows that education and health are the two human capitals that have the greatest impact on the growth of real GDP per capita. However, the short-run model's estimated coefficients show that government spending and gross capital formation are the next-largest drivers of real GDP per capita change. Health does not, however, have a substantial short-term influence on the economy, unlike its long-term considerable impact. Another study conducted in Ethiopia by Borojo and Yushi (2015) revealed that public spending on health and education, as well as enrollment in elementary and secondary schools, have a positive and statistically significant impact on economic growth in both the long- and short-term. Furthermore, the impact of physical capital on economic growth is positive, compared to the impact of inflation. But both in the long run and the short run, enrollment in tertiary education has little impact on economic growth.

Goca (2014) investigated the long-run relationship between human capital and economic growth in Mozambique over the period from 1975 to 2006. According to the results, there is a long-term link between economic development and human capital. And the paper concludes that in terms of achieving a production function, a skilled labor force appears to have a considerable impact on economic growth.

Shafuda and De (2020) observed the government expenditure on human capital and growth in Namibia. Their study presented a significant long-run inverse link between government healthcare spending and the rates of fertility, new-born mortality, and under-five mortality. Government healthcare spending, however, does not appear to be correlated with either the adult mortality rate or life expectancy. Additionally, the findings indicate a significant long-term beneficial association between government spending on education and the rates of literacy, net primary enrollment, and gross tertiary enrollment. The gross enrolment rate at the elementary and secondary levels does not, however, co-integrate with government spending on education. The long-term effects of spending on healthcare and education, which increase human resources, on GDP development were significantly highlighted by the vector auto-regression study.

Cyesa et al. (2019) assessed the effect of human capital development on economic growth in Rwanda from th period 2004 to 2018. The study's findings support the notion that Rwanda's economic growth benefits from the development of its human capital. Public spending on health and education has a positive and significant impact on the country's GDP growth, while tertiary education has a positive rather than a negative impact on it.

Abel (2019) analyed the human capital development and economic growth Nexus in Zimbabwe for the period 1980 to 2015. The results of this study suggest that economic growth and human capital development have both a short- and long-term link in Zimbabwe. The outcome is divided about the nature and importance of the relationship. Government health spending as a proxy for human capital development has a considerable beneficial influence on economic growth—both in the short and long terms—confirming that a healthier labor force will be more effective and productive. Government spending on education as a proxy for human capital development has been demonstrated to have a long-term detrimental influence on economic growth. In conclusion, although the connection is tenuous, it was discovered that Zimbabwe's economic growth and the development of its human capital are positively correlated.

3. METHODOLOGY

3.1 Data source and Description

The present study looks at how investing in human capital could help the economy thrive. With relation to Africa Eastern and Southern as a pivotal region, the research uses yearly time series data ranging from 2000 to 2021. This region was carefully selected because it is geographically, culturally, and economically diverse and is a hub for about 60% of Africa's population. In 2021, the region's economic growth was projected to be $1,917,904 million, with South Africa leading the way, followed by Angola, Kenya, and Ethiopia. The only high-income economies in the region are Seychelles and Mauritius. Based on this information, the paper used the region's GDP as an index of economic growth. Additionally, the research takes into account variables like primary, secondary, and tertiary enrolment as indices for gauging the growth of human capital. While the labor tax contribution and government spending are considered proxies for measuring human capital investment. Within this scope, to carry on with the examination Autoregressive Distributed Lag (ARDL) model and Granger causality test are performed to capture the long-run and short-run dynamic relationship among the variables. As well as to determine the direction of these relationships. All the information was extracted from the World Bank Indicators. Table 1 presents description of variables.

TABLE 1. Description of Variables

Variable	Abbreviation	Description	Measurement
Dependent	GDP	Economic Growth	The logarithm of GDP (current US$)
Independent	P	Reaching Primary Education	School enrollment, primary (% gross)
	S	Reaching Secondary Education	School enrollment, secondary (% gross)
	T	Reaching Tertiary Education	School enrollment, tertiary (% gross)
	GV	Government investment in human capital	Government expenditure on education, total (% of government expenditure)
	LT	Human capital	Labor tax and contributions (% of commercial profits)
Note: Compiled by authors			

3.2 Econometric Model

The study applies the ARDL method for an empirical investigation of cointegration developed by (Pesaran & Shin, 1999). The ARDL approach has the benefit of not requiring the same degree of integration for each variable, which is a benefit. It is not particularly important if a factor has order zero, order one, or a variable order of integration. ARDL is preferable to traditional cointegration methods because of this property. Since the traditional cointegration techniques become unstable because the test's ability to detect cointegration is reduced when there is a mixed order of integration (Laurenceson & Chai, 2003). Accordingly, the empirical model for this study is presented below by formula (1):

$$GDP = \int (P, S, T, GV, LT) \quad (1)$$

In this research, we observed GDP which expresses the indicator employed for economic growth in this study. And P, S, T, GV, and LT which denote the regressors. Once the above equations are log-linearized, the below equation is generated by formula (2):

$$GDP_t = \beta_0 + \beta_1 P_t + \beta_2 S_t + \beta_3 T_t + \beta_4 GV_t + \beta_5 LT_t + \varepsilon_t \quad (2)$$

In these equations, β_0 is the constant, and ε_t is regarded as the equation's error term. The parameters of β_1 through β_5 are the coefficients that are utilized to calculate the economic growth. Additionally, it is possible to compute both the short-run and long-run coefficients simultaneously. The preceding model was developed in order to establish ARDL bounds (3):

$$\begin{aligned}\Delta \mathrm{GDP_t} = {} & \propto_0 + \sum_{i=t}^{p} \propto_1 \Delta GDP_{t-1} + \sum_{i=t}^{p} \propto_2 \Delta P_{t-1} + \sum_{i=t}^{p} \propto_3 \Delta S_{t-1} + \sum_{i=t}^{p} \propto_4 \Delta T_{t-1} \\ & + \sum_{i=t}^{p} \propto_5 \Delta GV_{t-1} + \sum_{i=t}^{p} \propto_6 \Delta LT_{t-1} + \lambda_1 GDP_{t-1} + \lambda_2 P_{t-1} + \lambda_3 S_{t-1} \\ & + \lambda_4 T_{t-1} + \lambda_5 GV_{t-1} + \lambda_6 LT_{t-1} + \varepsilon\end{aligned} \quad (3)$$

The $\propto$ parameters in the equation denote the short-term relationship. On the other hand, the λ symbol represents long-term relationships. Consequently, this approach tests the null hypothesis of no cointegration ($\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = \lambda_6 = 0$) or the alternative hypothesis of cointegration ($\lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq \lambda_5 \neq \lambda_6 \neq 0$) based on the F-test. Additionally, this F-test was developed based on the relevance of the lower and upper bound values, which were primarily expressed by (Pesaran et al., 2001). As a result, this method aids in providing pertinent information regarding whether the elements are cointegrated. Thus, if over a long period of time, the variables are cointegrated, an error correction model is used to estimate each variable's coefficient. The formula is shown below by formula (4):

$$\begin{aligned}\Delta \mathrm{GDP_t} = {} & \gamma_0 + \sum_{i=t}^{p} \delta_i \Delta GDP_{t-1} + \sum_{i=t}^{p} \phi_i \Delta P_{t-1} + \sum_{i=t}^{p} \phi_i \Delta S_{t-1} + \sum_{i=t}^{p} \phi_i \Delta T_{t-1} \\ & + \sum_{i=t}^{p} \phi_i \Delta GV_{t-1} + \sum_{i=t}^{p} \phi_i \Delta LT_{t-1} + \mu ECT_{t-1} + \upsilon_t\end{aligned} \quad (4)$$

According to the overall models above, the parameters μ, reflect the speed of adjustment, and ECT stands for the error correction term.

Granger Causality test

Additionally, it was intended to record how the different variables related to one another causally. The Granger causality test, recommended by (Granger, 1969), was performed to ascertain whether there is a causal link between the variables. Below a more comprehensive explanation of the model is provided (5) and (6):

$$X_t = \sum_{l=1}^{p} \left(a_{11,1} \mathrm{X}_{t-1} + a_{12,1} \mathrm{Y}_{t-1} \right) + \mu_t \quad (5)$$

$$Y_t = \sum_{l=1}^{p} \left(a_{21,1}\mathrm{X}_{t-1} + a_{22,1}\mathrm{Y}_{t-1}\right) + \epsilon_t \quad (6)$$

As presented in equation (5) and (6) is the model order, $a_{ij,1}(i,j = 1,2)$ are the coefficients of the model, and μ_t and ϵ_t denotes the residuals. Ordinary least squares can be used to estimate the coefficients, and F tests can identify the Causality relationship between X and Y.

Unit root test

To ensure the stability and reliability of the data the study performed stationarity tests that consist of the Augmented Dickey-Fuller test (ADF) and the Phillips-Perron test (PP). Starting with the augmented Dickey-Fuller test, it assumes that u is a white noise error term. However, if u is autocorrelated we would need a drift version of the test which allows for higher-order lags. Accordingly, the test is augmented using p lags of the original series (Dickey & Fuller, 1979). Furthermore, the Phillips-Perron test corrects for any serial correlation and heteroskedasticity in the errors by some direct modification to the test statistics (Phillips & Perron, 1988). Below the equations for both tests are presented (7) and (8).

$$\Delta y_t = \psi y_{t-1} + \mu + \alpha t + \sum_{i=1}^{p} \beta \Delta y_{t-1} + u_t \quad (7)$$

$$\Delta y_t = \psi y_{t-1} + \mu^* + \delta t + u_t, \qquad u_t \backsim I(0), ARMA(p,q) \quad (8)$$

As per equation (7) p is used to augment the past autoregressive lags of the difference term. While μ and αt denotes the time trend parameter and also the intercept. In equation (8) ψy consist of the initial term of the data while the term u_t implies the stationarity at level I(0). Additionally, μ^* expresses the intercept while δt denotes the time trend.

4. FINDINGS AND DISCUSSION

The descriptive statistics enabled researchers to undertake an extensive analysis of the variables that affected the dependent variables in addition to guiding their trend analysis over the course of the period. Table 2 displays the descriptive statistics for the variables.

TABLE 2. Descriptive Statistics

	GDP	P	S	T	GV	LT
Median	11.94024	2.012730	40.01425	7.791885	17.17479	7.291667
Maximum	12.03371	2.022686	42.93962	9.553100	18.14314	8.084000
Minimum	11.41300	1.908796	27.82991	4.064090	13.65829	7.029167
Std. Dev.	0.208861	0.034092	5.326696	1.899384	1.213933	0.380474
Skewness	-0.967235	-1.393715	-0.673073	-0.305078	-0.981403	0.502842
Kurtosis	2.498054	3.604021	1.921129	1.547910	3.333270	1.549066
Jarque-Bera	3.661278	7.456718	2.728068	2.274118	3.633372	2.856892
Observations	22	22	22	22	22	22
Note: Compiled by authors						

Based on the results we observe that GDP ranges from 11.41 to 12.03, with an average of 11.90. Next, all the variables have a low standard deviation which implies the absence of volatility

among the variables. More importantly, all the variables are negatively skewed except for LT. Another crucial method for getting assumptions between variables before they are approached is the correlation matrix. In Table 3 the results for GDP display a strong positive correlation with P, S, T, and LT. Whereas, we observe a weak negative association between the GDP and GV. This implies an increase in primary, secondary, and tertiary school enrollment, as well as labor tax contributions, rises economic growth, and vice versa.

TABLE 3. Matrix of Correlation

	GDP	P	S	T	GV	LT
GDP	1.000000	-	-	-	-	-
P	0.950740	1.000000	-	-	-	-
S	0.976739	0.917103	1.000000	-	-	-
T	0.936254	0.845124	0.976769	1.000000	-	-
GV	-0.045598	-0.019215	-0.124789	-.246236	1.000000	-
LT	0.541957	0.418500	0.641450	0.749405	-0.372406	1.000000
Note: Compiled by authors						

In order to ascertain whether the random walk assumption is present in the long-term fluctuated period information, the ADF and Phillip perron test unit root tests are used. Consequently, in accordance with Table 4, the outcome for both tests reveals that all the variables are stationary at first difference except for P, and S which displayed stationarity both at the level and first difference.

TABLE 4. Unit Root Test

Variables	Augmented dickey fuller test				Decision
	At level		At first difference		
	Constant	Note	Constant	Note	
GDP	-1.853	Not stationary	-3.194***	Stationary	I (1)
P	-3.097***	Stationary	-1.970	Not Stationary	I (0)
S	-2.135	Not stationary	-4.266***	Stationary	I (1)
T	-1.853	Not stationary	-2.904*	Stationary	I (1)
GV	-0.862	Not stationary	-4.259***	Stationary	I (1)
LT	-0.206	Not stationary	-3.740***	Stationary	I (1)
Variables	**Phillip perron test**				**Decision**
	At level		At first difference		
	Constant	Note	Constant	Note	
GDP	-1.904	Not stationary	-3.194***	Stationary	I (1)
P	-4.896***	Stationary	-1.834	Not stationary	I (0)
S	-2.888*	Stationary	-1.000	Not stationary	I (0)
T	-1.569	Not stationary	-3.142***	Stationary	I (1)
GV	-0.975	Not stationary	-4.252***	Stationary	I (1)
LT	-0.382	Not stationary	-4.921***	Stationary	I (1)
Note: *, ** and*** denotes 1%, 5%, and 10% level of significance.					

Hence, we can proceed with the cointegration approach since the panel unit root test results indicate that certain variables are stationary at a level while others are stationary after the first difference and the variables did not reach the second difference.

Table 5 presents the lag length selection for the ARDL model.

TABLE 5. Lag Length Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	26.43761	NA	5.22e-09	-2.043761	-1.745042	-1.985448
1	183.7167	204.462	3.40e-14	-14.17167	-12.08063	-13.76347
2	259.1835	52.8268	2.45e-15	-18.11835	-14.23500	-17.36028
Note: Compiled by authors						

The purpose of choosing optimal lag is to reduce the residual correlation since the correlation matrix of table 3 is indicating a high level of association which may cause multicollinearity issue. Based on the results we perceive that the optimal lag for the model is 2.

Figure 1 provides an overview of the different models that can be performed with the ARDL bounds test.

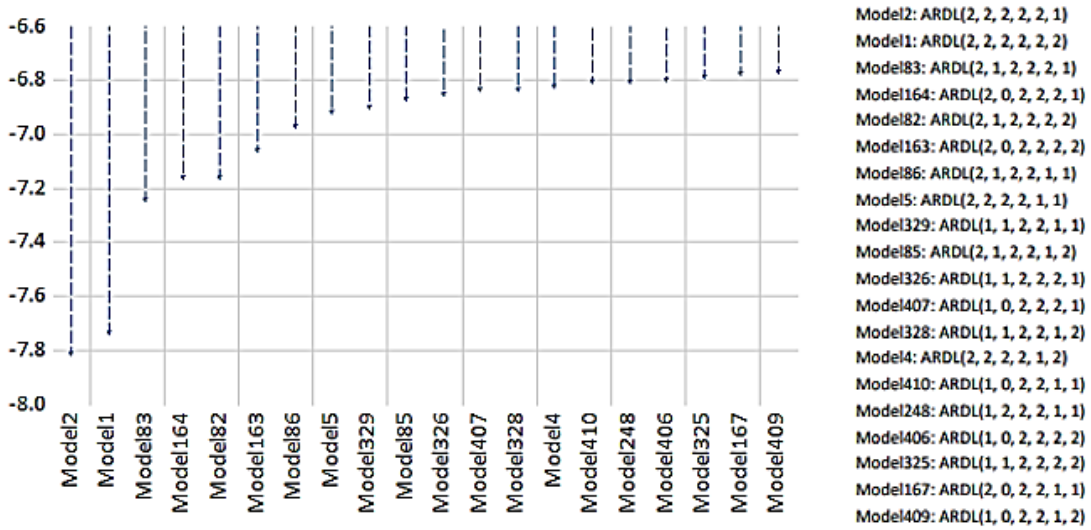

FIGURE 1. Akaike Information Criteria

Note: Compiled by authors

Nevertheless, there is a degree of fitness and reliability for instance model 1 and model 2 display the best results among other models. Based on this figure the study selected model 2 to carry on with the ARDL model.

In order to create an effective analysis, the Autoregressive distributed lag test method will assist us to assesses the short- and long-run elasticities between variables. With that in mind, the ARDL bounds prediction of Table 6 demonstrates that all the models contain factors that are serially correlated and exhibit long-run relationships.

TABLE 6. ARDL Bounds Testing Estimates

Test Statistic	Value	K
F-Statistic	41.06962	5
Critical Value Bounds		
Significance	**I (0) Bound**	**I (1) Bound**
10%	2.08	3
5%	2.39	3.38
2.5%	2.7	3.73

1%	3.06	4.15
Note: Compiled by authors		

Accounting for causality and partial equilibrium correlations seen between variables, the F-statistics is noteworthy for the model at the 1% level with 41.06 value that is underneath the I (1) upper limit. As a result, we will proceed with the error correction and long-run estimation.

Table 7 expresses both the long-run and short-run cointegration for the role of human capital investment in economic growth.

TABLE 7. ARDL Short-run and Long-run estimates

Dependent Variable: ln (GDP)				
Selected Model: ARDL (2, 2, 2, 2, 2, 1)				
Short-run cointegrating Form				
Variables	Coefficients	St. Error	t-Statistics	Prob
ECT	-1.144***	0.186	-6.140	0.009
ΔGDP (-2)	-0.316*	0.123	-2.560	0.083
ΔP (-1)	0.657	1.049	0.630	0.576
ΔP (-2)	1.556	0.917	1.700	0.188
ΔS (-1)	0.015	0.007	2.060	0.131
ΔS (-2)	0.036**	0.008	4.780	0.017
ΔT (-1)	-0.054	0.028	-1.940	0.148
ΔT (-2)	0.094**	0.029	3.280	0.046
ΔGV (-1)	-0.027**	0.007	-3.760	0.033
ΔGV (-2)	0.012	0.005	2.270	0.108
ΔLT (-1)	0.086**	0.020	4.300	0.023
Constant	2.844	1.782	1.600	0.209
Long-run coefficients				
Variables	Coefficients	St. Error	t-Statistics	Prob
P	4.508***	0.651	6.920	0.006
S	-0.029*	0.010	-3.030	0.056
T	0.149***	0.024	6.230	0.008
GV	0.037**	0.006	5.780	0.010
LT	-0.043*	0.015	-2.980	0.059
Constant	2.843	1.781	1.596	0.208
Note: *, ** and*** denotes 1%, 5%, and 10% level of significance				

Additionally, the model shows that the error correction term (called Adjustment) is statistically significant and negative (-1.14). This statement demonstrates the rate at which equilibrium is restored following a shock to the long-run causal relation. Based on the short-run results, we observe that GV is negatively affecting economic growth. This implies that the amount allocated for education is decreasing a 0.027% in the economic growth of Eastern and Southern Africa. On the other hand, an increase of 1% in secondary and tertiary school enrollment and labor tax contribution rises economic growth by 0.036%, 0.09%, and 0.08% respectively. Further, the long-run estimates reveal that a 1% increase in government expenditure in education and primary and tertiary school enrollment increases the economic growth of the region by 0.03%, 4.5%, and 0.14% respectively. Nevertheless, secondary school enrollment and labor tax contribution show unfavorable impacts on the economic growth of Eastern and Southern Africa

during the long run. Based on these outcomes, we perceive that the results differ across the model during the long run and short run.

The Granger causality test uncovers a sequence of associations among factors, resulting in long-term economic remedies. The Granger causality estimates in Table 8 reveal one-way causality between all the educational levels and economic growth.

TABLE 8. Granger Causality Estimation

Variables	F-Statistic	Prob.	Note
P granger cause GDP	3.95**	0.041	One way causality
GDP granger cause P	0.42	0.660	
S granger cause GDP	0.66	0.527	One way causality
GDP granger cause S	7.71***	0.005	
T granger cause GDP	5.02**	0.021	One way causality
GDP granger cause T	2.61	0.105	
GV granger cause GDP	1.97	0.173	No causality
GDP granger cause GV	1.43	0.268	
LT granger cause GDP	0.03	0.962	No causality
GDP granger cause LT	4.60	0.128	
Note: *, ** and*** denotes 1%, 5%, and 10% level of significance			

This suggests primary, secondary, and tertiary school enrollment have a prominent association with the economic growth of Africa Eastern and Southern. Nevertheless, the test uncovered that government expenditure on education and labor tax have no causality with the GDP.

The final problem we discuss has to do with how well our ARDL model fit. A number of stability and diagnostic tests were run for this purpose. Heteroscedasticity, conditional heteroscedasticity, Ramsey's RESET test, and normality are all examined using diagnostic tests. Therefore, in accordance with Table 9, the provided model has no evidence of heteroskedasticity based on the Breusch-Godfrey and Harvey tests.

TABLE 9. Diagnostic results

Heteroskedasticity Test: ARCH			
F-Statistic	0.1440	Prob. F (1,17)	0.7090
Observation × R-squared	0.1596	Prob. Chi-Square (1)	0.6895
Heteroskedasticity Test: Harvey			
F-Statistic	5.5798	Prob. F (16,3)	0.3711
Observation × R-squared	19.34	Prob. Chi-Square (16)	0.2509
Ramsey RESET Test			
Statistics	Value	df	Probability
t-Statistic	0.6239	2	0.5963
F-Statistic	0.3893	(1,2)	0.5963
Jarque–Bera (normality)	1.1847/0.5530	The model is normally distributed	
Note: Compiled by authors			

Also, the Ramsey RESET test's results demonstrate that the proposed model is free of misspecification errors. While the Jarque-Bera for normality confirms the model is normally distributed. Hereby, the ARDL bounds test yield objective and reliable estimates. Additionally, the CUSUM and CUSUMSQ plot demonstrates that the model is stable because the graph is contained inside the 5% level of significance limits. See Figure 2 and Figure 3.

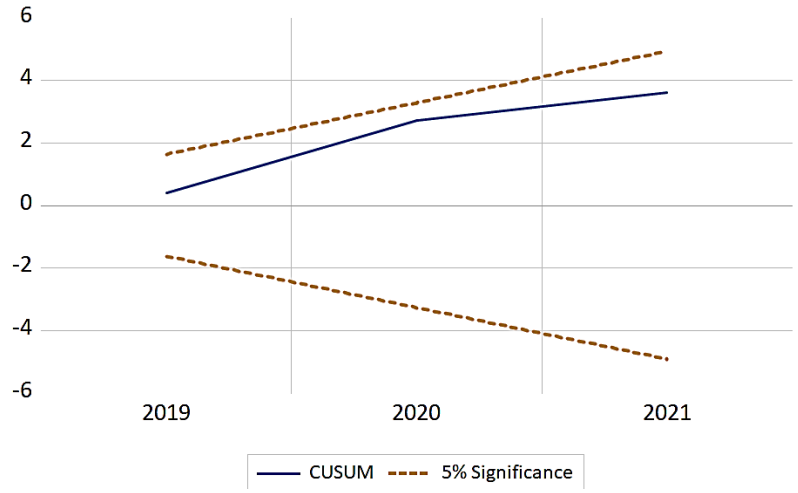

FIGURE 2. Cusum

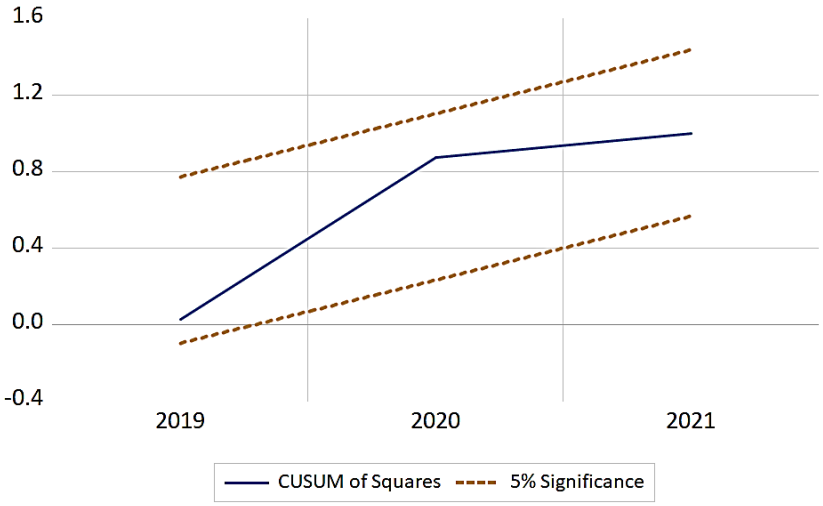

FIGURE 3. CusumQ

Note: Compiled by authors

5. CONCLUSIONS

One of the key building blocks of progress and among the basic rights that all people are entitled to be an investment in human capital. It is seen as being at the center of sustainability. This expenditure is crucial for attaining all three aspects of continuous advancement: economic, social, and environmental since it is connected to a number of primary and secondary benefits for individuals and society. People who are fit and active and who possess direct exposure to high learning are better capable of giving back to their societies because they are more prepared to work, generate, reinvent, deal with disasters, or fix or make adjustments to problems than those who are less productive and did not have direct exposure to high-quality education. They also recognize the need for viable output and consumption habits to solve environmental and climatic concerns, and they are more likely to adopt these patterns. Additionally, they are able to raise

their earnings, which helps them escape the vicious pattern of poverty and raise their quality of life. As a result, investing in human capital has been a top priority for decision-makers worldwide and is also on the list of national spending objectives in industrialized nations.

A variety of advantages or rewards for the individual and society result from spending on human capital. Human gains are a collection of advantages that people get from gaining significant education levels and health, including increased revenue and output levels. The capacity of communities to emphasize investing in human capital to accomplish the high-quality and long-term economic expansion and distribution of wealth, helping to reduce inequality and obtaining the economic, social, and environmental objectives of the long-term development process, is a key factor in determining social returns. Working to develop human capacities is an investment because the rewards of doing so will only become apparent in the future.

Due to shortages of both people and physical resources, nations with relatively low development indices typically fall far behind progress and innovation potential. Africa's human capital shortages are also a result of brain drain, which refers to the emigration of highly trained workers and experts from poor to wealthy nations. Nevertheless, theoretical arguments and empirical data suggest that latecomer nations have a better chance of reaching elevated incidences of innovation development because of their ability to catch up thanks to reduced effective education costs.

Significantly, African nations are currently expanding at the fastest rates in the course of their evolution. The systemic change that would include a large transfer of skilled workforce from the reduced farming sector to sectors with better productivity promise is not there, notwithstanding this strong growth rate. Surges in resource prices and gains from a resource-focused foreign direct investment are major drivers of Africa's prosperity. A disadvantage of efficiency- and cost-seeking FDI is that it offers a limited chance for local capacity creation due to its investment nature. But given the scope of internationalization and the growth of the information economy, Africa could be able to overtake border economies by utilizing key conduits for commerce, capital, and information flows. Nonetheless, the amount of training and advancement that may occur depends on a country's absorptive potential, as measured by its human capital and innovation capacity.

Within this scope, the present paper investigated the potential of human capital investment in achieving economic growth in Eastern and Southern Africa’s region from the period 2000 to 2021. The paper used the region's GDP as an index of economic growth. Additionally, to carry on with the examination Autoregressive Distributed Lag (ARDL) model and Granger causality test are performed to capture the long-run and short-run dynamic relationship among the variables. As well as to determine the direction of these relationships. According to this, the results demonstrated that the amount allocated for education is negatively affecting the economic growth of the region. This implies that government expenditure during the short run is not sufficient enough to generate economic growth. The theory behind this is spending funds on education in the hope of producing skilled human capital is a long-term plan thus the results are indicating a negative value during the short run. Next, reaching secondary and tertiary education levels as well as the labor tax contribution revealed to rise in the economic growth of the region. In terms of education, the results are different from the findings of Badwan (2022). In his study, the author discovered that primary and tertiary education enrollment in Arab countries is negatively influencing economic growth. Whereas, the current study discovered the opposite. The reason behind this divergent outcome may be explained by the fact that the number of people enrolled in schools in Arab countries is higher than the Eastern and Southern African countries. Hence, education cannot be considered a determinant of economic growth in certain countries because they already reached the threshold in comparison to underdeveloped countries such as Africa education is still an important determinant component of measuring economic

development. Notwithstanding, the results are in line with Maneejuk and Yamaka (2021) findings. Their study revealed that secondary and higher education enrollment rates can contribute to the ASEAN-5's economic growth (both at the individual and regional levels).

On the other hand, the long-run estimate displayed that government expenditure in education and primary and tertiary school enrollment increases the economic growth of the region. This support the previous theory that indicates that expenditure on education is a long-term plan. Nevertheless, secondary school enrollment and labor tax contribution show unfavorable impacts on the economic growth of Eastern and Southern Africa during the long run. Further, the Granger causality test establishes a one-way causal relationship between all educational levels and economic growth. This implies a strong correlation between primary, secondary, and tertiary enrolment and the economic development of Eastern and Southern Africa. Nonetheless, the test revealed that there is no clear connection between government spending on education and labor taxation and GDP. These results are in compliance with the Krokeyi and Niyekpemi (2021) paper which investigated the human capital and economic growth in Nigeria. Their findings also indicates that government expenditure on education statistically and significantly affects real GDP.

Policymakers and nations looking to accomplish economic growth can benefit from the study's findings. The research also provides information on the importance of human capital investment in order to achieve sustainable economic growth. It also analyzes the role of educational system and government initiatives in an overlooked region which is Eastern and Southern Africa. As a limitation of the study, the exclusive focus on only the potential of human capital investment in generating economic progress excluded the possibility of investigating the role natural resources and physical capital in proportion to economic. Therefore, it is recommended that enlarging the scope of new research that involves macroeconomic factors and governance indicators that affect economic progress as well as a particular focus on the R&D of Low-income countries needs to be addressed since the current paper only considers African countries.

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