



(online) = ISSN 2285 – 3642

ISSN-L = 2285 – 3642

*Journal of Economic Development, Environment and People*

Volume 12, Issue 2, 2023

URL: <http://jedep.spiruharet.ro>

e-mail: [office\\_jedep@spiruharet.ro](mailto:office_jedep@spiruharet.ro)

## Does primary and secondary education contribute to short and long-term economic growth in South Africa

Martha Matashu <sup>1+</sup>,

<sup>1</sup> Associate Professor . Faculty of Education. North West University

Abstract.

*The human capital school of thought considers education in primary and secondary education as the foundation for the development of human capital that promotes economic growth. Persuaded by an empiricist paradigm this study used an Autoregressive Distributed Lag (ARDL) bounds testing analysis was conducted to examine the short and long run relationship between education and economic growth in South Africa. Economic growth, primary and secondary education data from 2002 to 2018 was used. The diagnostic tests revealed that variables are integrated at order level 1. The cointegration of the examined variables is confirmed by an ARDL bound test. Error Correction Model test found that, primary school, government expenditure on primary education has a significant relationship with economic growth in the short term but has no contribution in the long term. Drawing on the insignificant contribution of both primary and secondary education in the long it can be concluded that these education phases appear not to matter for economic growth in South Africa. This study thus recommends that primary and secondary school education should be restructured to align the curriculum with potentially productive sectors to improve its potential contribution to economic growth.*

**Keywords:** Short run; Long run; Primary and Secondary education; Economic growth; South Africa; Autoregressive Distributed Lag

**JEL Codes:**A11; C01;H52; I25; J24

**How to cite:** Matashu, M. Does primary and secondary education contribute to short and long-term economic growth in South Africa. *Journal of Economic Development, Environment and People*, 12(2). <https://doi.org/10.26458/jedep.v12i2.808>

### 1. Introduction

The Human Capital Index (HCI) measures the potential productivity of child born today as a future worker if they complete education and have good healthy at the age of 18 years old (World Bank, 2020). The HCI index as a measure of the potential abilities of children from birth until 18 years, is a very important indicator because it has linkages to the potential talents and acquired skills of children within the primary

---

<sup>+</sup> Corresponding author email address: [mmatashu@hotmail.com](mailto:mmatashu@hotmail.com)



(online) = ISSN 2285 – 3642

ISSN-L = 2285 – 3642

*Journal of Economic Development, Environment and People*

Volume 12, Issue 2, 2023

URL: <http://jedep.spiruharet.ro>

e-mail: [office\\_jedep@spiruharet.ro](mailto:office_jedep@spiruharet.ro)

and secondary school stage. The HC1 report by World Bank (2020) shows that South Africa is lagging with an HCI of 43% compared to a global score of 56%. This suggests that if a child is born and raised in the present condition, if the child enjoys good health and complete education, the child will be able to use 43% of his or her potential abilities compared to a global standard ranking of 56%. The HCI for South Africa is higher than the average for Sub-Saharan Africa region but lower than the average for Upper middle-income countries (World Bank, 2020). The World Bank (2020) further reports that between 2010 and 2020, the HCI value for South Africa remained approximately the same at 0.43. The HCI is an important indicator of potential skills possessed by the human capital talents of the nation over given period. Projections about the productive capacities of the available talents can also be understood from the HCI index. The empirically observed low productive capabilities of the present school going aged children in South Africa is concerning because huge investment has been made on education as part of the national development strategy. Against this backdrop the primary objective of this study is to examine the short run and long impacts of primary and secondary school education on economic growth in South Africa. This study takes into cognisance of the nonlinear relationship between education and economic growth using the ARDL bound test.

Explicitly the notion of HCI epitomises the foundational aspirations of the South African National Curriculum Statement Grades R-12. Accordingly, the Department of Basic Education (DBE) (2022), the National Curriculum Statement Grades R-12 embodies and encapsulates the knowledge, skills, and values worth learning in South African schools. The DBE further states that “curriculum aims to ensure that children acquire and apply knowledge and skills in ways that are meaningful to their own lives”. Arguably, it is evident that tenets of the educational curriculum where education is regarded as a means for equipping citizens with the skills and knowledge that is useful for economic growth and development resonates with philosophical principles of human capital theory. Worth noting the South African school education structure is divided into primary and secondary school. The primary phase last 6 years and is divided into three phases namely foundation, intermediate and senior phase. These levels have specific educational goals that aims to develop foundational literacy, numeracy and mastery of knowledge which lie the foundation for the subsequent levels of education. In South Africa, compulsory education is of 9 years, starting at the age of 7 and goes on till the age of 15, followed by non-compulsory further education and training (FET) which is grade 10-12. Grade 12 is the exit level, so it prepares learners to enter skills and knowledge to further their studies in tertiary institution or to enter the labour market.

## **2. Theoretical framework and Literature review**

The human capital theory postulates that education contributes to economic growth through generation of skills, knowledge and competences that increase productivity. Human capital theorist describes human capital as the acquired skills and expertise that improves productivity of the individual person (Mankiw, Romer, & Weil 1992; Romer, 1990; Barro, 2001; Schultz, 1961; Becker, 1964). Landmarking empirical findings from studies of Romer (1990) extended the neoclassical exogenous theories propounding human capital that is the acquired human skills major determinant of economic growth. It can be inferred from the human capital assumptions that nations with better educated and skilled force contribute to high economic performance that enables an economy to grow faster than those countries with limited skills and capacities. In other words, education is perceived as the major determinant of the short and long economic



(online) = ISSN 2285 – 3642

ISSN-L = 2285 – 3642

*Journal of Economic Development, Environment and People*

Volume 12, Issue 2, 2023

URL: <http://jedep.spiruharet.ro>

e-mail: [office\\_jedep@spiruharet.ro](mailto:office_jedep@spiruharet.ro)

growth. Education provides the foundation for the development of human capital by virtue of equipping people with capacities that increase the marginal productivity of the individual employee which in turn drives economic growth (Marginson, 2019). Ehigiamusoe (2013) elucidates that acquisition of skills enhance the mastery of expertise and efficiency for job performance which in turn increase higher job productivity resultantly stimulating economic growth. These assertion confirms the foundational thinking of the human capital theories as conceptualized in Mankiw et al, 1992 that education is a major contributing factor to economic growth. It can be inferred that education is an important instrument for unlocking the productive potential of the people for the benefit of the nation. World Bank (2020) describe education as one of the factors that contribute to the creation of human capital which enables potentials of people to become productive members of the society. Whilst health is a key element of human capital this study focuses only the education component following amongst many other studies like; Wang and Liu, 2016; Mohamed, El a-ziz, Ramadan, 2021 and Yusuf (2020). Wang and Liu (2016) analyzed data human capital and economic growth data from 55 countries from 1960- 2009 and found that primary and secondary education has insignificant contribution to economic growth. Wang and Liu (2016) further found that there is a threshold that education must reach before it can generate economic growth. Evidence from these findings suggest that the extent to which human capabilities and potentials are unlocked through education has impact on the economic performance and wellbeing of any economy.

Building on the principles of human capital many countries invested on education as part of their national economic development policy and strategy. Emphasizing the importance of government investment in education Asteriou and Agiomirgianakis (2001) classified education as the principal institution for developing human skills. Governments throughout the world thus spend huge portion of their Gross Domestic Product (GDP) on education with the intention of building human capital which may promote sustainable economic growth in their countries. Primary and secondary education for all is aimed at ensuring that all productive talents are educated (Marginson, 2019; Zeng and Zhang, 2022; Yusuf, 2020). The implication would be that countries by investing in primary and secondary education they expect to achieve economic growth. South Africa government as shown by report by the World Bank (2020) like many other countries have injected huge investment in education. Given that South African government has continued to spend huge expenditures on primary and secondary education yet it experiences continued low HCI, it is imperative to examine the short and long run relationship between education and economic growth.

There is empirical evidence that human capital leads to increased economic growth which in subsequently translated to economic development. In a case study of Singapore, Yusuf (2020) found evidence that efforts to build human capital development since 1960 to 2020 lead to improved economic performance overtime. Singapore according to Yusuf (2020) had a low income per capital of \$ 500 per capita in 1960 and has now build exponential growth to estimated \$ 40 000 per capita. Yusuf (2020) attribute the economic growth experienced in Singapore to the reforms that were implemented in different levels of education together with many years of huge government investment into education until a significant economic growth was achieved. The case of Singapore suggests that the acquisition of education unleashes the various potentials that have many benefits to both the individual and the economy. Education has long life benefits to the individual in that enables them to acquire new skills that may sustain or enhance their productivity (Yusuf,



(online) = ISSN 2285 – 3642

ISSN-L = 2285 – 3642

*Journal of Economic Development, Environment and People*

Volume 12, Issue 2, 2023

URL: <http://jedep.spiruharet.ro>

e-mail: [office\\_jedep@spiruharet.ro](mailto:office_jedep@spiruharet.ro)

2020). Zeng and Zhang (2022) elucidate that “the strength of human capital externalities depends intuitively on a threshold level of initial human capital, such as literacy, to absorb knowledge or skills. Zeng and Zhang (2022) further explain that stock of human capital contribute to expanded production when the knowledge skills set surpasses certain critical levels. Developing a threshold of skills and knowledge that may converge with productivity to create sustainable economic growth is dependent on the quality of education (Matashu, 2021). The skills set such as literacy and numeracy skills are necessary for promoting lifelong learning (Yusuf, 2022). Lifelong learning is an important attribute of human capital because an individual will develop abilities to learn new skills which they can use to improve their own productivity. Zeng and Zhang (2022) caution against investing in education that creates innate human capital that depreciates as one that is below the threshold that may converge and create economic growth. Intangible human capital can be created through scientific research, knowledge, research, and development (R&D) that individual acquires and may use to improve their job performance. Quality educated labour force can assimilate new skills and learn to use new technologies to improve productivity. The theoretical connection between education and economic growth lies in the fact that education leads to formation of human capital that increased productivity within an organization.

The role of primary and secondary school education in economic growth, has been discussed in various studies. Education contributes to economic through facilitation of the development of cognitive and non-cognitive skills that influence job productivity through the intangible capital. Education is instrumental to economic growth processes. Education has been recognised to contribute to economic growth in varied ways. Tilak (2003) opines that education does not only bring transformation in society’s knowledge, but it builds a labour force with professional, managerial, and technical skills and knowledge enhance their productivity. Tilak, (2003) further explain that education creates attitudes and behaviours necessary for the socialisation and transformation of people into the modern societies. Education enhances the abilities and capabilities for innovation, creation, and use of new technology. Early childhood cognitive skills and foundational knowledge formation is critical for building the human capital which is considered as an input for economic growth. Primary education plays an important complementary role in human capital formation between the different stages of education (Delalibera & Ferreira, 2019). Several studies on investment in primary have shown that that expenditure on cognitive development of children at this early stage of has high return in their later lives (Delalibera & Ferreira, 2019). Primary education builds foundational knowledge and skills for learner to further their education into secondary school. Keller (2005) explain that primary education might be sufficient to promote the basic production of good and services however workers with secondary education can be competent to use technology, the tertiary education are likely to have ability to adopt to advance technology as the capability to invent new technology. This suggest that each stage of education raises productivity.

In different countries education is organised in different stages or phases to allow meaningful progressive development of cognitive abilities, skills, and competences. This study focuses only on primary and secondary education. Matashu and Skhephe (2022) describe the primary education as the foundational knowledge stage that lies the foundation for development of academic knowledge. Primary education aims to equip the student with numeracy, literacy, social cognition, and other learning elementary skills that better the learner to master learning in the subsequent stages. Secondary education provides a basis for



(online) = ISSN 2285 – 3642

ISSN-L = 2285 – 3642

*Journal of Economic Development, Environment and People*

Volume 12, Issue 2, 2023

URL: <http://jedep.spiruharet.ro>

e-mail: [office\\_jedep@spiruharet.ro](mailto:office_jedep@spiruharet.ro)

developing advanced knowledge and competences that can be pursued in tertiary institution post-secondary education or be applied in the workplace should the student opt to get employment in the labour market. Umar, Chaudhry and Faheem (2021) suggest that the institutional environment such as good governance and macroeconomic environment such as foreign direct investment has influence on the impact of primary and secondary education on economic growth. This study thus includes the institutional and macroeconomic factors that may influence the impact of education on economic growth

### 3. Methodology

To determine whether primary and secondary school education plays a role in economic growth in South Africa an ARDL bound test was conducted to investigate the short and long run between education and economic growth. Data used in this study was accessed from the World Development Indicators available at the World Bank Website and the World Governance indicator freely available to the public.

*Table 1. Variables*

Variable	Proxy	Definition	Data source
GDP: Economic growth	Economic growth	Good and services produced within an economy by its citizens	World Bank
Primsenrol: Primary school enrollment	Primary education	education offered in Grade 0- Grade 6	World bank
Secsenrol: Secondary school enrollment	Secondary school education	Grade 7- 9 senior secondary. Grade 10-12	World bank
GvtEFF: Government effectiveness	Institutional environment	Good government, effectiveness in formulation and implementing policies	World Governance Indicators
regq Regulatory quality	Institutional Environment	Effective of control, monitory and evaluation of regulations.	World Governance Indicators
phycap Physical capital	Physical capital	Available infrastructure	World bank
gvtexpsc Government expenditure on primary education	Primary education	Portion of the GDP allocated to primary education through government expenditure	World bank
gvtexsecsc Government expenditure on secondary education	Secondary education	Portion of GDP spend on secondary education through government expenditure	World bank
fdi Foreign direct	Macroeconomic	Investment from foreign investors	World bank



(online) = ISSN 2285 – 3642

ISSN-L = 2285 – 3642

*Journal of Economic Development, Environment and People*

Volume 12, Issue 2, 2023

URL: <http://jedep.spiruharet.ro>

e-mail: [office\\_jedep@spiruharet.ro](mailto:office_jedep@spiruharet.ro)

investment	environment		
Exp exports	Macroeconomic environment	Goods and services	World bank
Infl inflation	Macroeconomic environment	Rate of increase in prices of good and service	World bank

Source, Own Compilation

### 3.1 Econometric theoretical model

Taking into consideration the views from literature and theories, this study develops two theoretical model to examine the effect of primary and secondary education on economic growth. The first model examines the long run and short run relationship between primary education and economic growth and the equation is specified as follows:

$$GDP_t = \beta_0 + \beta_1 Primsenrol_t + \beta_2 Govexpr_t + \beta_3 Goveff_t + \beta_4 Regq_t + \beta_5 Exp_t + \beta_6 FDI_t + \beta_6 Infl_t + \mu_t \dots\dots\dots (1)$$

Where *GDP* represents the proxy for economic growth, *Primscenro*, Primary school enrolment, *Gvtexpsec*, Government expenditure on primary education, *Gvteff*, Government effectiveness, *Regq* is Regulatory quality, *phycap*, Physical capital, *Exp* is exports *FDI*, Foreign direct investment, *Infl*, Inflation,  $\mu_t$  is representing the random error and subscript *t* is representing the annual frequency of the data used in this model.

The second model examine the long run and short run relationship between secondary education and economic growth and the equation is specified as follows:

$$GDP_t = \beta_0 + \beta_1 Secscenro_t + \beta_2 Govexsec_t + \beta_3 Goveff_t + \beta_4 Regq_t + \beta_5 Exp_t + \beta_6 FDI_t + \beta_6 Infl_t + \mu_t \dots\dots\dots (2)$$



Where *GDP* is proxy for economic growth, *secscenro*, secondary school enrolment, *Gvtexsesc*, Government expenditure on secondary education, *Gvteff*, Government effectiveness, *Regq*, is Regulatory quality, *phycap*, Physical capital, *Exp* is exports FDI, Foreign direct investment, *Infl* Inflation.  $\mu_t$  is representing the random error and subscript  $t$  is representing the annual frequency of the data used in this model.

To estimate the model the stationarity of data should first be tested. To test for stationarity an Augmented Dickey Fuller (ADF) Test was performed. The stationarity of the variables is determined by the value of  $p$ , that is the probability. It is estimated using the null hypothesis that  $p = 1$ , this means that the series is non-stationary that is all the data contains a unit root. If an alternative hypothesis  $p$  is less than 1 it means that the series is stationary it means that there is order of integration zero. If any of the variables is stationary it means that the Autoregressive Distributive Lag (ARDL) would be appropriate to conduct a co-integration test to handle the non-stationarity. Therefore, to establish the stationarity an ADF test equation specified below was estimated:

$$\Delta_t^Y = \alpha_1 + \beta_1 + py_{t-1} + \sum_{j=1}^{Pj} \beta \Delta_{t-j-1}^Y = \varepsilon_t \text{-----} (3)$$

Where  $t = 1, \dots, T$

The diagnostic test for unit root is determined by the value of  $p$ , if it is equal to 1 then the series is non-stationary which mean it contain a unit root. If the value is less than 1, the series is stationary. According to Johansen (1990, 1992) if all variables are non-stationary at level but stationary at first different level, it means that they are integrated at order 1, in that case the Maximum Likelihood approach should be used to handle the non-stationary data. However, if at all one of the variables is stationary it means an Autoregressive Distributed Lag (ARDL) for co-integration test there is an order of integration zero there Pesaran and Shin (1995) is the most appropriate one to deal with non-stationary data. The results for ADF test are presented in Table 2 below.

Table 2. Augmented Dickey Fuller (ADF) Test – Unit Root Test

Variables	Tests	Levels (0)			1 <sup>st</sup> Differences 1(1)			
		Critical values			Critical values			
		0.001	0.005	0.010		0.001	0.005	0.010
	Augmented Dickey Fuller (ADF) Test				Augmented Dickey Fuller (ADF) Test			
GDP	-3.524	-4.380	-3.600	-3.240	4.433 ***	-2.650 ***	-1.771 ***	-1.350 ***
primscenrol,	-2.050	-4.380	-3.600	-3.240	-2.339 *	-2.718 *	-1.796 *	-1.363 *
Senrolpr	-2.091	-4.380	-3.600	-3.240	-3.790 *	-2.650 *	-1.771 *	-1.350 *
gvtedprim	-2.115	-4.380	-3.600	-3.240	-5.335 ***	-2.650 ***	-1.771 ***	-1.350 ***
gvteff	-2.192	-4.380	-3.600	-3.240	-5.263 ***	-2.650 ***	-1.771 ***	-1.350 ***
regq	-1.873	-4.380	-3.600	-3.240	-7.813 ***	-2.650 ***	-1.771 ***	-1.350 ***





exports	-2.869	-4.380	-	-3.240	-4.692***	-2.650***	-1.771***	-1.350***
gvtexpsec,	-2.976	-4.380	3.600	-3.240	-2.939**	-2.650**	-1.771**	-1.350**
gvtexped,	-2.389	-4.380	-3.600	-3.240	-4.468***	-2.650***	-1.771***	-1.350***
fdi,	-2.099	-4.380	-3.600	-3.240	-6.380***	-2.650***	-1.771***	-1.350***
inflation,	-3.785*	-4.380*	-3.600*	-3.240*	-3.380**	-2.650**	-1.771**	-1.350**

Table 2 shows the results of the Augmented Dickey Fuller (ADF) Test – Unit Root Test. The ADF results show that all variables except for inflation contain a unit root, this means that only inflation is stationary, and all the other variables are non-stationary. The ADF test results shows that the series is stationary at order 1. Therefore, a Phillips Perron test was conducted to handle the non-stationarity.

*Table 3. Phillips Perron Test*

Variables	Tests	Levels (0)			1 <sup>st</sup> Differences 1(1)			
		Critical values			Phillips Perron Test	Critical values		
	Phillips Perron Test	0.001	0.005	0.010		0.001	0.005	0.010
GDP	-3.054	-4.380	-3.600	-3.240	-4.433***	-3.750***	-3.000***	-2.630***
primscenrol	-1.856	-4.380	-3.600	-3.240	-3.790**	-3.750**	-3.000**	-2.630**
Senrolpr	-2.082	-4.380	-3.600	-3.240	-2.939*	-3.750*	-3.000*	-2.630*
gvtedprim	-2.897	-4.380	-3.600	-3.240	-5.335***	-3.750***	-3.000***	-2.630***
gvtEFF	-4.056	-4.380	-3.600	-3.240	-5.263***	-3.750***	-3.000***	-2.630***
regq	-2.145	-4.380	-3.600	-3.240	-7.813***	-3.750***	-3.000***	-2.630***
exports	-3.340	-4.380	-3.600	-3.240	-4.692***	-3.750***	-3.000***	-2.630***
gvtexpsec,	-2.145	-	-3.600	-3.240	-2.939*	-3.750*	-3.000*	-2.630*
gvtexped	-2.834	-4.380	-3.600	-	-4.468***	-3.750***	-3.000***	-2.630***
fdi,	-2.745	-4.380	-3.600	-3.240	-6.380***	-3.750***	-3.000***	-2.630***
inflation,	-3.053	-4.380	-3.600	-3.240	-3.380*	-3.750*	-3.000*	-2.630*

Table 3 shows the results of the Phillips-Perron test. The Phillip Perron test for unit root was conducted to test for unit root and the findings showed that, the variables are not stationary at order 0 but stationary at order level 1. This leads the study to conduct DF–GLS unit root tests.

*Table. 4 DF–GLS Unit roots*

Variables	Tests	Levels (0)			1 <sup>st</sup> Differences 1(1)			
		Critical values				Critical values		





	DF–GLS	0.001	0.005	0.010	DF–GLS	0.001	0.005	0.010
GDP	-3.588	-3.770	-3.517	-3.091	-4.629	-3.770	-3.641	-3.205
primscenrol,	-2.587	-3.770	-3.517	-3.091	-3.315	-3.770	-3.641	-3.205
Senrolpr					-4.212	-3.770	-3.641	-3.205
gvtedprim	-2.310	-3.770	-3.517	-3.091	-5.455	-3.770	-3.641	-3.205
gvteff	-2.616	-3.770	-3.517	-3.091	-5.837	-3.770	-3.641	-3.205
regq	-2.091	-3.770	-3.517	-3.091	-6.987	-3.770	-3.641	-3.205
exports	-3.123	-3.770	-3.517	-3.091	-4.622	-3.770	-3.641	-3.205
gvtexpsec,	-3.290	-3.770	-3.517	-3.091	-3.144	-3.770	-3.641	-3.205
gvtexped	-2.579	-3.770	-3.517	-3.091	-4.666	-3.770	-3.641	-3.205
fdi,	-3.123	-3.770	-3.517	-3.091	-6.584	-3.770	-3.641	-3.205
inflation,	-3.727	-3.770	-3.517	-3.091	-3.394	-3.770	-3.641	-3.205

Table 4 shows the DF-GLS results. The results show that the variables are non-stationary at order 0 and stationary at order 1. This mixed stationarity confirms that an ARDL bound test can be performed. As such the Pesaran/Shin/Smith (2001) ARDL Bounds Test was conducted to determine whether there is long run relationship amongst the integrated variables. The equation for ARDL bound test is specified as follows:

Upon the estimation of the results if  $\phi = \phi_1 = \phi_2 = \phi_3 = 0$  it means a long run relationship among these variables does not exist. On the contrary a long run relationship exists, and it can be estimated using an Error Correction Model (ECM) equation that follows:

$$\nabla_t^Y = \alpha_0 + W_{t-1} + \sum_{j=1}^{p-1} \phi_{y1} \nabla_{t-j}^Y + \sum_{j=1}^{q-1} \phi_{x1} \Delta_{t-j}^Y + \pi_t \text{-----} (4)$$

#### 4. Results and discussion

The value of the F-statistics determines whether a long run relationship exists. Should the calculated value of the test statistics be less than critical values of the lower bound that indicates that no long run relationship exists. If the calculated F- statistic is greater than that of the critical values of the upper bound which implies that there is a long-run relationship between the dependent and independent variables.

Table 5. Bound test for cointegration Pesaran/Shin/Smith (2001) ARDL Bounds Test for primary school education



(online) = ISSN 2285 – 3642

ISSN-L = 2285 – 3642

*Journal of Economic Development, Environment and People*

Volume 12, Issue 2, 2023

URL: <http://jedep.spiruharet.ro>

e-mail: [office\\_jedep@spiruharet.ro](mailto:office_jedep@spiruharet.ro)

Dependent variable		F- statistics =32, 77
Primary school education	Lower Bound Value	Upper Bound value
Critical value		
1%	1.81	2.93
5%	2.14	4.83

Table 5 shows the results of the Bounds Test for the variable primary education in equation 1. The results indicate shows that the calculated value of F-statistic is greater than values of the upper bound at 1% and 5% significant level. It means that variables of the model are in long run relationship. Following the ARDL results the ECM model specified in equation 4 above was estimated and the results for the long run and short relationship between primary school education and economic growth are presented in table 7.

*Table 6. Bound test for cointegration Pesaran/Shin/Smith (2001) ARDL Bounds Test  
Secondary school education*

Dependent variable		F- statistics =22, 764
Secondary school education	Lower Bound Value	Upper Bound value
Critical value		
1%	1.75	2.87
5%	2.04	3.24

Table 6 shows the results of the Bounds Test for the variable primary education in equation 2. The results shows that the calculated value of F-statistic is greater than values of the upper bound. It means variables of the model are in a long run relationship. Now we can present and interpret the results related to long-run equilibrium and short-run dynamics. Following the confirmation that there is long run relationship between the variables an ECM model was estimated to examine whether there is a long run and short relationship between primary education and economic growth. Similarly, an ECM model was estimated to determine whether a long run and short run relationship existed between secondary education and economic growth. Table 7 below shows the long run and short run relationship between primary, secondary education and economic growth.

*Table 7: Long and short run relationship between primary, secondary education and economic growth*

Dependent variable GDP	Model 1: Primary education		Model 2 Secondary education		
	Coefficient	Std. Error	Variables	Coefficient	Std. Error
Long Term Coefficient			Long Term Coefficient		
primscenrol	-0.0728	0.101	Sescenrol	0.343	0.057
gvtedprim	-0.006	0.1494	gvtedsesc	0.098	0.143
gvteff	-12.062*	4.913	gvteff	8.313	4.528



(online) = ISSN 2285 – 3642

ISSN-L = 2285 – 3642

*Journal of Economic Development, Environment and People*

Volume 12, Issue 2, 2023

URL: <http://jedep.spiruharet.ro>

e-mail: [office\\_jedep@spiruharet.ro](mailto:office_jedep@spiruharet.ro)

regq	15.347*	3.936	regq	15.347*	4.070
exports	-0.249*	0.101	exports	-0.077	0.163
fdi	-0.086	0.310	fdi	-0.086	0.310
infl	-0.056	0.689	infl	-0.067	0.689
Error Correction ( $\Phi$ )	-1.172**	0.116	Error Correction ( $\Phi$ )	1.167**	0.1667
$\Delta$ _ primscenrol	0.478 *	0.143	$\Delta$ _ secscenrol	- 0.334	
$\Delta$ _ gvtedprim	0.455*	0.175	$\Delta$ _ gvtedsec	0.227	0.160
$\Delta$ _ gvteff	15.18392*	4.664	$\Delta$ _ gvteff	0.456	0.667
$\Delta$ _ regq	-5.742709*	2.372	$\Delta$ _ fdi	-0.505	0.248
$\Delta$ _ exports	0.527**	0.060	$\Delta$ _ exports	0.505	0.450*
C (Constant)	-1.984	0.238	C (Constant)	-1.209	12.487
Number of observations	16		Number of observations		16
Adj R-squared	0.954		Adj R-squared		0.917
Durbin – Watson D statistic	1.965		Durbin – Watson D statistic		1.965
LM test	0.523(0.470)		LM test		0.903 (0.3421)
Breusch Godfrey LM	0.056(0.816)		Breusch Godfrey LM		4.829 (0.028)
Breusch-Pagan/ Cook-Weisberg tes	0.02(0.899)		Breusch-Pagan / Cook-Weisberg tes		0.01(0.028)
Ramsey RESET test	0.76(0.665)		Ramsey RESET test		0.78(0.665)

The results for the long run and short run results are presented in Table 7 above. The coefficient of (primscenrol) is negative and insignificant showing that primary education has negative and insignificant contribution on economic growth in the long run. This indicates that primary education has negative and negligible effect on economic growth. The observed inverse relationship between primary school enrolment and economic growth indicates that a mere increase in access to education does not necessarily lead to an increase in economic growth. These findings are like those found by Wang and Liu (2016) in 50 countries. The coefficient of the error correlation term (ECT) in model 1 is negative and have a significance coefficient of error term ( $\Phi$ ) confirming that there is cointegration between the dependent and other variables. This means that there is a long run relationship between the variables. This means that should there be some disequilibrium there is a rate at which they will converge again in the next period. The value of the ECT term in the model represents the speed with which short run dynamics may converge towards the long run equilibrium. In this case primary education is converging towards equilibrium by 117% each year through the ECT. In addition, the results show that a 1% increase in primary school enrolment will lead to an estimated positive increase of 0.45% on economic growth in the short run, whilst it has a negative and insignificant impact on long term economic growth. All the other variables have significant impact on economic growth both in the short and long apart from primary education and government



(online) = ISSN 2285 – 3642

ISSN-L = 2285 – 3642

*Journal of Economic Development, Environment and People*

Volume 12, Issue 2, 2023

URL: <http://jedep.spiruharet.ro>

e-mail: [office\\_jedep@spiruharet.ro](mailto:office_jedep@spiruharet.ro)

expenditure on primary education that only have significant effect on economic growth in the short run. An adjusted  $R^2$  indicates that the model explain 95% of the observed results suggesting that the variables provide a good explanation of the observed pattern.

The results for model 2 shows that secondary school education has no significant contribution to economic growth. Likewise, except for regulatory effectiveness, all other variables have no effect on economic growth. The previous years' deviations from long-run equilibrium are corrected at an adjustment speed of 117%. This reveals the adjustment speed rate at which the short term dynamics in secondary education is converging towards equilibrium each year through the error correction term. The short-run coefficient estimates for *primscenrol*, and *gvtesec* are not statistically significant. This indicates that an increase in secondary education enrolment and government expenditure on secondary education has insignificant effect on economic growth in the short run. Only exports have significant effect on economic growth whilst all the other variables have an insignificant effect in the short run. The observed findings are in contradiction to human capital theory which assumes that the knowledge acquired from the education systems enhance productivity of individuals and enable them to contribute to economic growth. The implications of these findings could be that although many learners are acquiring education due to the government effectiveness and regulatory quality in promoting access to primary and secondary education, the skilled acquired in these levels of education are mismatching those demanded in the labour market. There is possibility that there is a misalignment between the skills provided through the education systems and those required to promote economic growth.

Post diagnostic tests of the model estimated in this study was conducted using the Lagrange Multiplier Test and Durbin-Watson Test. The diagnostic results show there is no serial correlation and autocorrelation of order one in both models because the probability value is rejecting the null hypothesis. These results ensure the efficiency of the results of the model 1 and 2. In addition, no serial correlation was detected through all the diagnostic tests that is, the ARCH effect; omitted variable bias; Heteroscedasticity; and Multicollinearity are showing desirable results. The results of the diagnostic tests are presented in Table 7. Similarly, Ramsey's reset test is rejecting the possibility of omitted variable biased-ness. It implies that both models estimated are appropriate and free from biased-ness. In the same way, the probability values of Breusch-Pagan and LM Test are rejecting the presence of Heteroscedasticity and ARCH effect in both models. Overall, the efficiency of the results of the model is ensured by results of these both tests.

## 5. Conclusion

Whilst the human capital theory considers education as instrumental for building the functional substantial capabilities and abilities that contribute to economic growth, the evidence was found in this study were paradoxical. Primary education and government expenditure on education have only a short run contribution to economic growth with an insignificant contribution to economic growth. Secondary education and government expenditure on secondary education have an insignificant effect on economic growth both in the short run and long run. Therefore, it is important to guard against providing education at diminishing returns rate that may potentially be harmful the citizens' wellbeing in terms creating declining national economic growth and economic development. Taking all matters discussed into



(online) = ISSN 2285 – 3642

ISSN-L = 2285 – 3642

*Journal of Economic Development, Environment and People*

Volume 12, Issue 2, 2023

URL: <http://jedep.spiruharet.ro>

e-mail: [office\\_jedep@spiruharet.ro](mailto:office_jedep@spiruharet.ro)

consideration, this study concludes that government should continuously monitor and evaluate the contribution of primary and secondary education to long and short run economic growth.

## 7 References

- Akwei, K., Mutize, M., & Alhassan, A. L. (2022). Education and economic growth in a developing country. *Int. J. Education Economics and Development*, 13(2), 171.
- Asteriou, D. and Agiomirgianakis, G.M. (2001). Human capital and economic growth: time series evidence from Greece. *Journal of Policy Modeling*, 23(5), 481-489
- Barro, R.J. (2001). Education and economic growth. *The contribution of human and social capital to sustained economic growth and well-being*, 79.13-41.
- Becker, G.S. (1992). 'Human capital and the economy', *Proceedings of the American Philosophical Society* 136(1), 85–92.
- Delalibera, B. R., & Ferreira, P. C. (2019). Early childhood education and economic growth. *Journal of Economic Dynamics and Control*, 98, 82-104.
- Department of Basic Education Republic of South Africa. ( 2022). The National Curriculum Statement Grades R- available on <https://www.education.gov.za/Curriculum/NationalCurriculumStatementsGradesR-12.aspx> accessed on 30 November 2022
- Ehigiamusoe, E. (2013). Education, Economic Growth & Poverty Rate in Nigeria: Any Nexus?. *Journal of Social and Development Sciences*, 4(12), 544-553.
- Keller, K. R. (2006). Investment in primary, secondary, and higher education and the effects on economic growth. *Contemporary Economic Policy*, 24(1), 18-34.
- Johansen, S. (1990). The full information maximum likelihood procedure for inference on cointegration- with application to the demand for money. *Oxford Bulletin of Econometrics and Statistics*, 52, 169-210.
- Johansen, S. (1992). Cointegration in partial systems and the efficiency of single-equation analysis. *Journal of econometrics*, 52(3), 389-402. doi:[https://doi.org/10.1016/0304-4076\(92\)90019-N](https://doi.org/10.1016/0304-4076(92)90019-N)



(online) = ISSN 2285 – 3642

ISSN-L = 2285 – 3642

*Journal of Economic Development, Environment and People*

Volume 12, Issue 2, 2023

URL: <http://jedep.spiruharet.ro>

e-mail: [office\\_jedep@spiruharet.ro](mailto:office_jedep@spiruharet.ro)

Mankiw, N.G., Romer, D. & Weil, D.N. (1992). A contribution to the empirics of economic growth, *The Quarterly Journal of Economics* 107(2), 407–437. <https://doi.org/10.2307/2118477>

Marginson, S. (2019). Limitations of human capital theory', *Studies in Higher Education* 44(2), 287–301. <https://doi.org/10.1080/03075079.2017.1359823>

Matashu, M. (2021). 'Quality education: The nexus between human capital development, economic growth and social justice in the South African context', in M.L. Hove & M. Matashu (eds.), *Quality education: The nexus of human capital development, economic growth and social justice in a South African context*, 9–33, AOSIS, Cape Town. <https://doi.org/10.4102/aosis.2021.BK287.01>

Matashu, M., & Skhephe, M. (2022). Human Capital and Economic Growth in Sub Saharan Africa Countries: ARDL and ECM Analysis. *Journal of Economics Education and Entrepreneurship*, 3(1), 49-64.

Romer, P.M. (1989) Human capital and growth: Theory and evidence, National Bureau of Economic Research, Cambridge.

Schultz, T. (1961) 'Investment in human capital', *The American Economic Review* 51(1), 1–17.

Tilak, J. B. (2003). Vocational education and training in Asia. In *International handbook of educational research in the Asia-Pacific Region* (pp. 673-686). Springer, Dordrecht.

Umar, M., Chaudhry, I. S., Faheem, M., & Farooq, F. (2021). Do Governance, Foreign Direct Investment and Human Capital Matter to Bolster Trade Liberalization? Fresh Insight from Developing Countries. *Review of Economics and Development Studies*, 7(3), 325-341.

Wang, Y. and Liu, S. (2016). Education, human capital and economic growth: Empirical research on 55 countries and regions (1960-2009). *Theoretical Economics Letters*, 6(02), 347.

World Bank. (2020). The Human Capital Index 2020 Update: Human Capital in the Time of COVID-19. Washington, DC: World Bank. doi:10.1596/978-1-4648-1552-2. License: Creative Commons Attribution CC BY 3.0 IGO.

Yusuf, S (2020). Building Human capital lesson from country experiences. How Singapore does it. International Bank for Reconstruction and Development/ The World Bank . Washington DC.

Zeng, J., & Zhang, J. (2022). Education policies and development with threshold human capital externalities. *Economic Modelling*, 108, 105744.