Human Capital Development and Economic Growth Nexus in Zimbabwe

Sanderson Abel
https://orcid.org/0000-0002-4356-8507
Midlands State University, Zimbabwe
abels@staff.msu.ac.zw

Nyasha Mhaka
https://orcid.org/0000-0001-8647-3762
Midlands State University, Zimbabwe
mhakanyasha123@gmail.com

Pierre le Roux
https://orcid.org/0000-0002-6391-6775
Nelson Mandela University
Pierre.LeRoux@mandela.ac.za

Abstract

This study empirically examined the relationship between human capital development and economic growth in Zimbabwe for the period 1980 to 2015, using time series analysis techniques of co-integration, error correction model, and Granger causality tests. The study was motivated by changes which have characterised the financing of human capital since the country attained independence. A decade after independence, the government was able to adequately finance the social sectors; however, thereafter government financing has been declining since the adoption of the structural adjustment programme. The findings of this study indicate the existence of a short-run and long-run relationship between human capital development and economic growth in Zimbabwe. On the direction and significance of the relationship, the result is mixed. Human capital development, proxied by government expenditure on health, had a significant positive impact on economic growth—both in the short run and the long run—reaffirming that a healthy labour force will be more productive and efficient. Human capital development, proxied by government expenditure on education, was found to negatively impact economic growth in the long run. In conclusion, a positive relationship between human capital development and economic growth in Zimbabwe was found, although the relationship is weak.

Keywords: human capital development; nexus; economic growth

UNISA university of south africa PRESS

Southern African Business Review
https://upjournals.co.za/index.php/SABR
Volume 23 | 2019 | #5128 | 18 pages

https://doi.org/10.25159/1998-8125/5128
ISSN 1998-8125 (Online)
© The Author(s) 2019

Published by Unisa Press. This is an Open Access article distributed under the terms of the Creative Commons Attribution-ShareAlike 4.0 International License (https://creativecommons.org/licenses/by-sa/4.0/)

Introduction

The importance of human capital development in the sustainable economic growth discourse has long been acknowledged by economists, dating back to the 18th century. Adam Smith (1776) emphasised the importance of education, specifically the role of acquired and useful abilities of members of the society in his concept of fixed capital, which he deemed crucial for economic progress. The idea was further buttressed by Alfred Marshall (1890), by highlighting the importance of education as a national investment, and he regarded it as the most valuable of all capital invested in human beings. The concept of human capital was popularised in the mid-20th century (Becker 1964; Grossman 1972; Mincer 1958; Schultz 1961; Uzawa 1965). These studies highlighted that human capital, like physical capital, could be enhanced through education, health and training—which, in turn, raise output and contribute to economic growth. In this sense, education affects the effectiveness of labour and the level of technical progress—which, in turn, affect the economic growth of a country. On the other hand, improved health status is also vital for sustained economic growth, since healthy workers are usually productive.

The literature identifies mainly two approaches to the study of human capital development and economic growth (Laskowska and Dańska-Borsiak 2016; Okoro and Eyenubu 2014). The first approach focuses on the stock of human capital as an explanation for cross-country growth differentials. The second approach looks at human capital as an input factor in the production function and points to the accumulation of human capital as the main factor driving economic growth. Since these two approaches, there has been a proliferation of studies examining the relationship between human capital and economic growth (Alatas and Cakir 2016; Hakooma 2017; Jihene 2013; Kazmi, Ali and Ali 2017; Khembo and Tchereni 2013; Sunmoni 2015). The outcomes of numerous studies on human capital and economic growth usually confirm that the two are related to each other. The quality of the human factor is widely accepted today as a factor of considerable influence on business results (Laskowska and Dańska-Borsiak 2016).

Le, Gibson and Oxley (2005) identified three approaches for measuring the value of human capital, namely the cost-based, education-based, and earnings-based approaches. The cost-of-production method was pioneered by Engel (1883) who proposed that human capital can be measured by child-rearing costs to their parents. On the other hand, the income-based approach measures the stock of human capital by summing the total discounted values of all the future income streams that all individuals, belonging to the population in question, expect to earn throughout their lifetime. The income-based approach is a forward-looking method to the valuation of human capital (Le et al. 2005). The education-based approach estimates human capital by measuring education output indicators such as literacy rates, enrolment rates, dropout rates, repetition rates, average years of schooling in the population, and test scores (Le et al. 2005).

Despite the number of studies that have been carried out, there remains controversy on how human capital development and economic growth are related, with studies yielding conflicting results. Kazmi et al. (2017) investigated the nexus between human capital development and growth in Pakistan. The study proxied human capital with the average weighted education level, arguing that human capital is the long-run accumulation of knowledge from primary to higher level. The study established that there was a long-run relationship between human capital development and economic growth. Kakar et al. (2017) also established that similar results hold in the short run within Pakistan. In a study within Zambia, Hakooma (2017) established the presence of a long-run relationship between economic growth proxied by GDP per capita, and human capital proxied by government expenditures on health and education and secondary school enrolment, as discussed in the cost-based approach to human capital (Le et al. 2005). It was observed that human capital measured by public expenditure on health is the main contributor to real GDP per capita, followed by education. The results were consistent with endogenous growth theories, which argue that an improvement in human capital in the form of skilled and healthy workers improves productivity. In a cross-country study, Alatas and Cakir (2016) examined the relationship between human capital and economic growth for 65 developed countries from 1967 to 2011. In the study, human capital was proxied by years of schooling, returns to education, and infant mortality rate. GDP per capita was used as an estimate of economic growth. The study revealed that human capital positively influenced economic growth.

Sunmoni (2015) did a study for Nigeria, using time series data for the period 1970 to 2012. The study adopted the human capital model of endogenous growth developed by Mankiw, Romer and Weil (1992). The study proxied human capital development with government expenditure on education and health, as well as schools' enrolment. The study established both a short-run and long-run relationship between human capital development and economic growth in Nigeria. There were mixed results on the relationships with human capital development proxied by government expenditure on education and health, being insignificant in determining economic growth, while human capital development proxied by schools' enrolment (except primary education enrolment) had a positive and significant effect on economic growth. Zerihun, Kibret and Wakiaga (2014) used the health index and the education index as proxies of human capital, while GDP per capita proxied economic growth in Ethiopia. The study established that there was a long-run relationship between investment in education and growth, as well as investment in health and growth. On the other hand, Woubet (2006) found an insignificant relationship between human capital development and growth, though the study did not consider health as a component of human capital development.

Zivengwa, Hazvina, Ndedzu and Mavesere (2013) investigated the causality between education and economic growth in Zimbabwe during the period 1980 to 2008. The findings confirmed that there is uni-directional causality between education and economic growth in the Zimbabwean economy, running from education to economic growth. Similar results were established by the Granger causality test. Jihene (2013)

studied the relationship between human capital development proxied by higher education and economic growth in Morocco, Tunisia, Japan and South Korea for the period 1960 to 2012. The study confirmed the results that human capital development in the form of higher education positively affected economic growth in the long run, however, only for the developed nations Japan and South Korea.

Khembo and Tchereni (2013) investigated the impact of human capital development on economic growth in the Southern African Development Community (SADC). The study linked GDP per capita to health and educational capital, while taking into account the role of the labour force and physical capital. The findings revealed that education capital had a positive and statistically significant effect on GDP per capita, while health capital had a positive but statistically insignificant effect. Adawo (2010) also explored the human capital-growth nexus using primary, secondary and tertiary education enrolments as a proxy for human capital. He discovered that human capital of primary school form contributes to growth, while in most cases secondary school form and that of tertiary institutions dampen growth.

Given the divergence in results, coupled with the different methodological approaches adopted for different studies, the current study contributes to the existing literature on how human capital development and economic growth correlate. The current study investigates the nexus between the two variables, with Zimbabwe being the laboratory case. The study is motivated by changes which have characterised the financing of human capital since the country attained independence. During the first two decades post-independence, the economy was characterised by good health and education status. The government was adequately financing education up to the early 1990s, when the country adopted the Economic Structural Adjustment Programme (ESAP). ESAP introduced user fees in the health and education sector, hence limiting government financing. Government expenditure on education and health dropped significantly in early 2000, crippling the quality of human capital. The economy suffered an economic crisis between 1999 and 2008, suffering negative growth and an exodus of skilled manpower (Abel 2016; Zivengwa et al. 2013). This study, therefore, seeks to investigate the nexus between human capital development and economic growth in Zimbabwe.

Background to the Study

Upon gaining independence, Zimbabwe stood out as one of the very few African countries to register impressive economic growth rates. The country recorded impressive growth in GDP of 14.4 per cent in 1980 and 12.5 per cent in 1981 (see figure 1). The country had one of the most robust economies in Africa, characterised by a functional health delivery system, education system, and other social service delivery systems (Abel 2016). During this period after independence, the government of Zimbabwe spent more than 15 per cent of GDP on social expenditure. The government vigorously pursued an education-for-all policy after the attainment of independence. The goal to achieve universal primary education and expand secondary and tertiary education was pursued with impressive results. By the early 1990s, Zimbabwe had one

of the best education systems in Africa and had already attained most of the Education for All/Education Millennium Development Goals (MDGs) when they were set in the year 2000 (Abel 2016; Zivengwa et al. 2013). Murisa (2010) notes that the success of social service delivery after independence was achieved through a partnership between the government and NGOs, who were engaged in community development across health, education, and income-generating projects.

Zimbabwe continued to perform well, registering growth rates averaging 4.85 per cent for the period 1982 to 1989 and an average growth rate of three per cent for the period 1990 to 1996. Zimbabwe's economic conditions started to decline after 1997, and the speed of deceleration increased during the period 2000 to 2008, severely impacting on social sectors of the economy. Economically, the period was marred by policy inconsistency, policy reversals, and generally poor economic management. The socio-economic crisis between 2000 and 2008 in the country manifested itself through spiralling inflation, deteriorating physical infrastructure, erosion of livelihoods, food insecurity, rising malnutrition, and the inability of the public sector to deliver basic social services such as education, health, and water amenities. The net effect of the deterioration in social service delivery was the intensification of depleted human capital value and growing poverty levels in the country (Abel 2016).

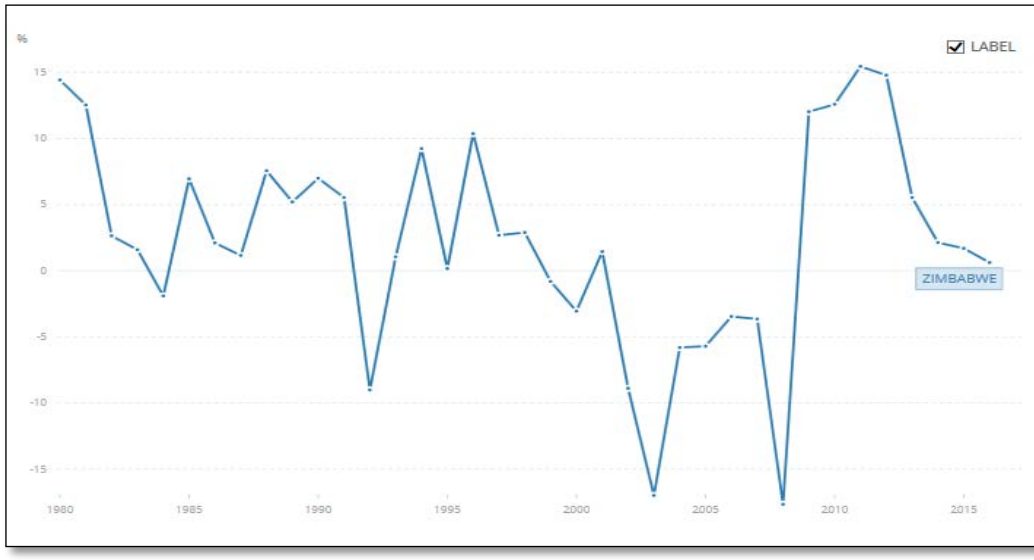

Figure 1: GDP growth rate

Source: World Bank Development Indicators (2011)

The decline in growth rates, as depicted in figure 1 above, left social sectors with limited funding from public sources. Social public expenditure accounted for only six per cent of GDP by 2009. The budgets for education and health were cut by more than half, compared with 2005 (World Bank 2011).

Abel (2016) notes that the erosion of Zimbabwe's health system during the crisis period was evident through a decline in key health indicators. Between 1990 and 2008, life expectancy at birth fell from 62 to 44 years, maternal mortality rose dramatically from 168 per 100 000 live births in 1990, to 880 per 100 000 live births in 2005 (World Bank 2010). In comparison with other countries, the country fared badly in terms of fertility. Zimbabwe has a lower fertility rate (3.43 births per woman) compared with the averages of other low-income countries (4 births per woman) and compared with countries in the region (5 births per woman) (World Bank 2010). The prevalence of undernourishment among children under five, a measure of overall nutritional status of the population, was 39 per cent in 2006 (World Bank 2010). It is noteworthy that the country saw the emergence of cholera during the crisis period, a signal of the collapse of the health system in the country.

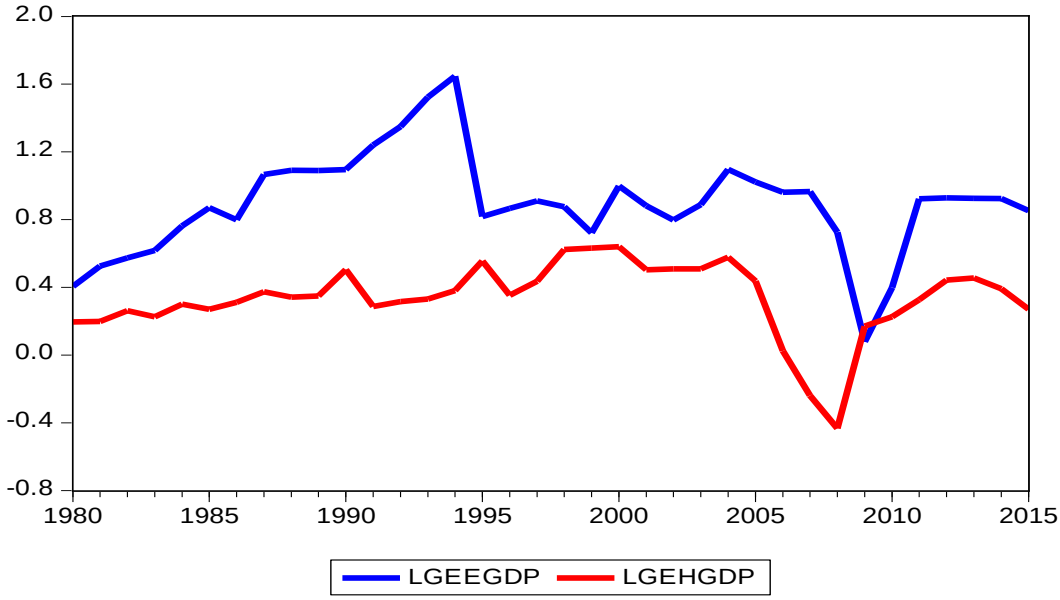

Figure 2: Education and health as a percentage of GDP

With the onset of the crisis, the educational sector suffered greatly with substantial numbers of qualified teachers leaving the workforce and unqualified temporary staff being used to fill the gap. The effects of the crisis in the educational sector included a fall in teachers' salaries below subsistence level, and low attendance and motivation, resulting in weak performance and additional parent costs, particularly in urban areas. The whole episode rendered effective education impossible and the education system almost collapsed until it was saved by the government of national unity.

The relationship between economic growth and human capital development appears to be positively related. In the years of booming economic growth, government expenditure on human capital development in the form of education and health was also

increasing; however, in the years of economic crisis, dwindling economic growth was accompanied by a fall in human capital development. Against this background, the present study seeks to investigate the impact of human capital development on economic growth in Zimbabwe for the period covering 1980 to 2015.

Theoretical Framework and Model Specification

In order to approximately capture the impact of human capital development on economic growth in Zimbabwe, the study adopted the augmented Solow Human Capital Growth model. The augmented Solow Human Capital Growth model is an improvement on the original Solow Growth model, which did not explicitly incorporate human capital. The reason behind the inclusion of human capital in the model is the fact of non-homogeneity of labour in the production process, either within a nation or across different economies, due to their possession of different levels of education and skills. This modification facilitates the suitability, and hence the adaptation of this model. The basic assumption in this approach is that an increase in workers' quality—through improved education and health—improves output. The general form of the augmented Solow model is given below as:

$$Y_{(t)} = K_{(t)}\alpha H_{(t)}\beta(A_{(t)}L_{(t)})^{1-\alpha-\beta} \quad \text{---------- (1)}$$

Where:

- Y = Level of output (GDP)
- K = Level of capital
- H = Level of human capital
- A = Level of technology/total factor productivity
- L = Level of labour force
- T = Time index
- α = Elasticity of physical capital with respect to output
- β = Elasticity of human capital with respect to output.

Most empirical studies analysing the relationship between human capital and economic growth often make use of measures of formal education as a proxy for human capital formation, but ignore the contribution of health to human capital development. However, both education and health are important for human capital development (Gundlach 1996; Karagiannis and Benos 2009). This study includes schools' enrolment and government expenditure on health as proxies of human capital development. Gross capital formation is used to proxy physical capital and GDP per capita proxies' economic growth. The inclusion of these variables aims to examine their individual impact on the economic growth process.

Empirically, the following model is specified to evaluate the effect of human capital development on economic growth in Zimbabwe.

$$\text{GDPPC} = \text{F}(\text{GCF}, \text{GEE}, \text{GEH}, \text{TEE}, \text{LE}, \text{EC}) - - - - - - - - - - - - - - - - - - - (2)$$

For estimation purposes, we can re-specify equation (2) in a log-linear functional form. This gives:

$$\text{LogGDPPC} = \alpha_0 + \alpha_1 \text{LogGCF} + \alpha_2 \text{LogGEE} + \alpha_3 \text{LogGEH} + \alpha_4 \text{LogTEE} + \alpha_5 \text{LogLE} + \alpha_6 \text{EC} + \text{U} - (3)$$

Where:

- GDPPC = Gross Domestic Product Per Capita
- GCF = Gross Capital Formation (% of GDP)
- GEE = Government Expenditure on Education (% of GDP)
- GEH = Government Expenditure on Health (% of GDP)
- TEE = Tertiary Education Enrolment
- LE = Life Expectancy Rate
- EC = Economic Crisis Dummy Variable

The study included a dummy variable, EC, in order to capture the effects of the period of economic crisis in Zimbabwe. The idea behind using logs in the model is to achieve linearity. In addition, the log of a variable represents a relative change (rate of return), whereas a change in the variable itself represents an absolute change.

Procedurally, the analysis starts by describing all the variables used in the study. Secondly, a stationarity test was conducted on all variables used in the study, using the Augmented Dickey-Fuller test (Dickey and Fuller 1981). This was followed by a Johansen co-integration test (Johansen 1988; Johansen and Juselius 1990) in examining the presence of a long-run equilibrium relationship between human capital development and economic growth. To tie the long-run and short-run relationships, the study employed an error correction model between human capital development and economic growth. The study further employed a Granger causality test to investigate the causal relationship between the two macroeconomic variables and the direction of the causality.

The study employed annual time series data covering the period between 1980 and 2015 (36 years). The data were gathered mainly from secondary sources: Zimbabwe Statistical Agency (Zimstats) and World Bank Development indicators.

Results Presentation and Interpretation

This section presents, interprets and discusses empirical results of the study. Validation of results is done through diagnostic tests such as normality and heteroscedasticity tests.

Descriptive Statistics

Table 1 presents summary statistics for the variables used in the study. All the series display a high level of consistency as their mean and median values are within the range of maximum and minimum values of the series. Deviations of actual data from their mean value are very small, shown by low standard deviations for all variables.

Table 1: Descriptive Statistics

	LGDPPC	LGCF	LGEE	LGEH	LTEE	LLE	EC
Mean	2.832773	1.101215	0.894928	0.335060	4.699064	1.724419	0.250000
Median	2.848922	1.203013	0.899672	0.345627	4.752637	1.734746	0.000000
Maximum	3.043739	1.375280	1.646737	0.640194	5.071090	1.785131	1.000000
Minimum	2.512789	0.183320	0.078215	-0.433649	3.955062	1.644051	0.000000
Std. Dev.	0.136498	0.291430	0.296954	0.218179	0.276104	0.051728	0.439155
Skewness	-0.338956	-1.891198	-0.063135	-1.554418	-0.905026	-0.290212	1.154701
Obs.	36	36	36	36	36	36	36

Source: Researchers' own calculation

Unit Root Test

All the variables of interest are non-stationary at level. To achieve stationarity, the variables were differenced once. At first difference, all the variables became stationary, meaning they are integrated of order 1. Table 2 and figure 3 below show the result of the *ADF and the Philip Peron unit* root test. Since all the variables are integrated of the same order (save for LTEE), this justifies co-integration analysis.

Table 2: Results of ADF Unit Root Test

Variable	ADF Statistic Level of Integration	Philip Peron statistic Level of Integration
LGDPPC	I(1)	I(1)
LGCF	I(1)	I(1)
LGEE	I(1)	I(1)
LGEH	I(1)	I(1)
LTEE	I(1)	I(0)
LLE	I(1)	I(1)

Source: Researchers' own calculation

Johansen Co-integration Test

In a strictly economic sense, two variables are said to be co-integrated if they have a long-run or an equilibrium relationship between them (Gujarati 2004, 822). The Johansen (1988) likelihood ratio test statistics, the trace and maximal eigenvalue test

statistics, were employed to determine the number of co-integrating vectors. The decision rule is to reject the null hypothesis if the probability (P-value) is less than five per cent. The test results are summarised in table 3 below.

Table 3: Co-integration Test Result

Hypothesised No. of CE(s)	**Eigen-Value**	**Trace Statistics**	**0.05 Critical Value**	**Prob.****	**Max-Eigen Statistics**	**0.05 Critical Value**	**Prob.****
None	0.995984	369.2366	125.6154	0.0000*	187.5923	46.23142	0.0000*
At most 1	0.847286	181.6443	95.75366	0.0000*	63.89240	40.07757	0.0000*
At most 2	0.751009	117.7519	69.81889	0.0000*	47.27152	33.87687	0.0007*
At most 3	0.574431	70.48040	47.85613	0.0001*	29.04718	27.58434	0.0322*
At most 4	0.501287	41.43322	29.79707	0.0015*	23.65465	21.13162	0.0216*
At most 5	0.288958	17.77857	15.49471	0.0223*	11.59483	14.26460	0.1268
At most 6	0.166294	6.183748	3.841466	0.0129*	6.183748	3.841466	0.0129*

Source: Researchers' own calculation

It is revealed that there is co-integration among the variables. This is because the null hypothesis of none of the hypothesised number of co-integrating equations is rejected at a five per cent level of significance. In the same vein, we reject the null hypothesis of at most 1, 2, 3, 4, 5 and 6 of the hypothesised number of co-integrating equations. This is because the associated p-values are lower than the critical value at five per cent level of significance. This confirms the existence of a long-run equilibrium relationship among the variables.

The trace test statistic indicates seven co-integrating equations at the five per cent level of significance. Similarly, the max-eigen-value test shows that we have five co-integrating equations at the five per cent level of significance. The central conclusion is that a long-run equilibrium relationship among the variables exists. That is, the linear combination of these variables cancels out the stochastic trend in the series. The variables may wander away from themselves, but in the long run, there is the existence of a relationship amongst them. This implies that there is a co-integrating relationship between *LGDPPC* and the different measures of human capital development.

Long-run Regression Estimates

This result points out the existence of a long-run relationship between human capital development and economic growth. After confirming the existence of a long-run co-

integrating relationship among the variables, the relationship was estimated using the ordinary least squares (OLS) method and the coefficients are reported in table 4.

Table 4 reveals that all the variables in the model, except government expenditure on education, satisfy the a priori expectations with respect to their signs. The variables gross capital formation, government expenditure on health, tertiary education enrolment, and life expectancy, all have a positive relationship with economic growth in the long run, while the economic crisis dummy variable has a negative relationship with economic growth. The results further show that government expenditure on education, government expenditure on health and life expectancy are statistically significant at a five per cent level; while gross capital formation, tertiary education enrolment and the economic crisis dummy variable are statistically insignificant at a five per cent level.

Table 4: Long-run Regression Results

Independent Variables	Coefficients
C	-0.757770 (0.3810)
LGCF	0.016116 (0.8153)
LGEE	-0.091280** (0.0287)
LGEH	0.225536*** (0.0009)
LTEE	0.030894 (0.5530)
LLE	1.997659*** (0.0000)
EC	-0.044232 (0.4539)
R2	0.804962
Adj. R2	0.764610
F-Statistic	19.94819
Durbin-Watson	0.954852
Probability	0.000000

Source: Researchers' own estimations

Since the growth model was specified in a log-linear form, the estimated significant coefficients can be interpreted as elasticity with respect to economic growth. On average and *ceteris paribus*, a percentage change in government expenditure on health brings about a 0.23 per cent change in gross domestic product per capita, and a percentage change in the life expectancy rate brings about two per cent change in gross domestic product per capita. This is not surprising, because a healthy labour force will be more

productive and efficient than an unhealthy one. Conversely, a percentage change in government expenditure on education reduces gross domestic product per capita by 0.09 per cent on average, and holding other factors constant.

This is not surprising, because funds allocated for the development of the education sector may not have been properly utilised, and in most cases may have been embezzled. Government expenditure on education in Zimbabwe is mostly on unproductive and inefficient ventures such as wages and salaries, rent, debt servicing, transfer payment, and so forth. It could also be as a result of large-scale corruption prevalent in Zimbabwe, i.e. mismanagement and diversion of public funds by government officials and political appointees. This empirical result was also found by Torruam and Abur (2014). It also supports the theory that over-consumption by the government can "crowd-out" private involvement in economic activity which can, in turn, bring about a drag on economic growth.

To verify the validity/robustness of the estimated long-run model, some diagnostic tests were undertaken. The result reported in table 5 below indicates that there is no error autocorrelation, heteroscedasticity, and the errors are normally distributed.

Table 5: Result of Long-run Diagnostic Test

Test Statistics	F-value	LM Version	Decision
Serial Correlation LM test	F (2,27) 0.0037	Chi-square (2) 0.0022	Fail to reject
Histogram Normality test	N/A	0.436870	Fail to reject
Heteroscedasticity test	F (6,29) 0.2743	Chi-square (6) 0.2542	Fail to reject

Source: Own calculation
NB: * indicates 1% level of significance and ** indicates 5% level

Table 5 shows the result of some diagnostic tests carried out on the residual of the long-run regression model. The LM serial correlation test checks for serial autocorrelation between the residual in the explanatory variables. The null hypothesis of no serial autocorrelation was not rejected at a five per cent level of significance. The histogram normality test checks the distribution of the error term. The null hypothesis is that the error term is normally distributed. From the test carried out, we failed to reject the null hypothesis at a five per cent level of significance. Finally, the heteroscedasticity test was carried out using the Breusch-Pagan Godfrey technique. The null hypothesis of homoscedasticity was not rejected at a five per cent level of significance.

Error Correction Model

Though a long-run equilibrium relationship may occur among variables in the regression model, a short-run equilibrium may not occur. An error correction

mechanism is, therefore, used to correct the discrepancy that may occur in the short run. The coefficient of error-correction variable gives the percentage of the discrepancy between the variables that can be eliminated in the next time period. The coefficients of the explanatory variables in the error correction model measure the short-run relationship. Table 6 presents the result of the ECM.

Table 6: Short-run Regression Estimates (ECM)

Variable	Coefficient
C	0.014043 (0.3157)
DLGCF	0.010708 (0.8365)
DLGEE	-0.055039 (0.1915)
DLGEH	0.131710 (0.0521)
DLTEE	-0.172801 (0.4107)
DLLE	2.867803** (0.0081)
EC	-0.031623 (0.2170)
ECT(-1)	-0.473531*** (0.0049)
R-squared 0.55088 Adjusted R-squared 0.550887 F-statistic 4.73122 Prob. 0.00143	

Source: Researchers' own estimation

It can be observed from the result above that the coefficient of the error correction term (ECT) is significant and has the expected negative sign. The coefficient lies between zero and one. The significance of the error correction mechanism provides further evidence that there exists a long-run, steady-state equilibrium between the level of gross domestic product per capita and the explanatory variables. The error correction variable estimate of 0.47 indicates that the system corrects its previous period dis-equilibrium at a speed of 47 per cent in the current period, with immediate adjustments captured by the different terms. The result also shows that all the explanatory variables (apart from life expectancy) are insignificant at a five per cent level. This implies that all the variables have no significant impact on economic growth in the short run. This is not surprising, however, because there is a time lag between when investment in human capital actually becomes an addition to the stock of human capital. Similarly, there is a

time lag between when education enrolments become an addition to the stock of human capital. This relationship is evidenced in the long run.

Pair-wise Granger Causality Test

Granger (1988) pointed out that the existence of co-integrating relation means that there is at least one direction of causation for maintaining the presence of a long-run relationship. As discussed in the methodology section, this study tests for the presence of causality between economic growth and human capital development. The direction of causation assists policymakers in formulating effective policies. The result of the Granger causality test is presented in table 7.

Table 7: Granger Causality Test Result

Null Hypothesis	F-Stat	Prob.	Decision
LGCF does not Granger Cause LGDPPC	1.63246	0.2129	Fail to reject
LGDPPC does not Granger Cause LGCF	0.18033	0.8359	Fail to reject
LGEE does not Granger Cause LGDPPC	0.35199	0.7062	Fail to reject
LGDPPC does not Granger Cause LGEE	1.14126	0.3333	Fail to reject
LGEE does not Granger Cause LGDPPC	3.00284	0.0653*	Reject
LGDPPC does not Granger Cause LGEH	0.60848	0.5510	Fail to reject
LTEE does not Granger Cause LGDPPC	0.15574	0.8565	Fail to reject
LGDPPC does not Granger Cause LTEE	0.65673	0.5261	Fail to reject
LLE does not Granger Cause LGDPPC	3.74510	0.0357*	Reject
LGDPPC does not Granger Cause LLE	1.51670	0.2363	Fail to reject
EC does not Granger Cause LGDPPC	1.19094	0.3184	Fail to reject
LGDPPC does not Granger Cause EC	0.67354	0.5177	Fail to reject

Source: Own estimation. NB: * indicates 10% level of significance

The result presented above indicates the existence of a uni-directional causality between government expenditure on education and economic growth. This is consistent with the theory (Solow Growth model) and other empirical studies. Omojimite (2010) observed a uni-directional causal relationship between economic growth and government expenditure on education. The absence of causality between government expenditure on health and economic growth is not surprising because, over the years, the Zimbabwean government's commitment to building new hospitals and other infrastructural facilities that enhance human capital, has been diminishing. This can be evidenced in the declining budgetary allocation to the sectors. Furthermore, the table above reveals that there is a uni-directional causality relationship between life expectancy and economic growth, reflecting the fact that an increase in growth enhances the life expectancy of the citizenry, while an increase in life expectancy improves the growth trajectory of the country.

Conclusion

This study investigated the relationship between human capital development and economic growth in Zimbabwe, using time series data from 1980 to 2015. The study established the existence of a short-run and a long-run relationship between human capital development and economic growth in Zimbabwe. There is mixed significance of the relationship. Human capital development proxied by government expenditure on health is significant in determining economic growth, both in the short run and the long run. The positive relationship between government expenditure and economic growth, both in the short run and the long run, shows that human health capital is crucial to economic growth in Zimbabwe. A healthy labour force will be more productive and efficient than an unhealthy one. This is also supported by the positive relationship that exists between life expectancy, which proxies' quality of health and economic growth.

However, human capital development proxied by government expenditure on education was found to negatively impact economic growth in the long run. This might be due to the fact that that over-consumption by the government in the form of too much recurrent unproductive expenditure can "crowd-out" private involvement in economic activity which can, in turn, bring about a drag on economic growth. In the short run, government expenditure on education was found to be insignificant in determining economic growth. This might be due to the time lag between when investment in human capital becomes an addition to the stock of human capital. Tertiary education enrolment was found to have no significant impact on economic growth, either in the short run or the long run. This might be due to the fact that most graduates are finding themselves redundant as there are no jobs and their skills are not being utilised for the betterment of the economy. Most of the graduates are also looking for greener pastures abroad.

In conclusion, there is a positive relationship between human capital development and economic growth in Zimbabwe, although the relationship is weak.

References

Abel, S. 2016. "The Social Dimension of the Zimbabwean Crisis: Case of Health and Education." In *Economic Management in a Hyperinflationary Environment. The Political Economy of Zimbabwe, 1980–2008*, edited by G. Kararach and O. R. Otieno. Oxford University Press.

Adawo, M. A. 2010. "Poverty in Uyo: Characteristics, Causes and Consequences." *Journal of Economics Theory* (4): 31-36. http://doi.org/10.3923/jeth.2010.31.36.

Alatas, S., and Cakir, M. 2016. "The Effect of Human Capital on Economic Growth: A Panel Data Analysis." *Journal of Administrative Sciences* (14) 27: 539–555.

Becker, G. 1964. *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*, 3rd edition. Chicago and London: University Of Chicago Press.

Dickey, D. A., and Fuller, W. A. 1981. “Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root.” *Econometrica: Journal of the Econometric Society*, 1057–1072. https://doi.org/10.2307/1912517.

Engel, E. 1883. *Der Werth des Menschen.* Berlin: Verlag von Leonhard Simion.

Granger, C. W. 1988. “Some Recent Development in a Concept of Causality.” *Journal of Econometrics* 39 (1): 199–211. https://doi.org/10.1016/0304-4076(88)90045-0.

Grossman. M. 1972. “On the Concept of Health Capital and the Demand for Health.” *Journal of Political Economy* 80 (2): 223–255. https://doi.org/10.1086/259880.

Gujarati, D. 2004. *Basic Econometrics.* United States Military Academy, West Point.

Gundlach, E. 1996. *Human Capital and Economic Development: A Macroeconomic Assessment.* Kieler Arbeitspapiere Working paper No 778.

Hakooma, M. R. 2017. “The Impact of Human Capital Development on Economic Growth in Zambia: An Econometric Analysis.” *International Journal of Economics, Commerce and Management United Kingdom* V (4).

Jihene, B. 2013. “The Impact of Human Capital on Economic growth: Case of Tunisia, Morocco, Japan and South Korea.” *Economic, Finance and Management Outlook, Conscientia Beam* (1): 1–2.

Johansen, S. 1988. “Statistical Analysis of Co-integration Vectors.” *Journal of Economic Dynamics and Control* 12 (2): 231–254. https://doi.org/10.1016/0165-1889(88)90041-3.

Johansen, S., and Juselius, K. 1990. “Maximum Likelihood Estimation and Inference on Co-integration with Applications to the Demand for Money.” *Oxford Bulletin of Economics and Statistics* 52 (2): 169–210. https://doi.org/10.1111/j.1468-0084.1990.mp52002003.x.

Karagiannis, S., and Benos, K. 2009. *The Role of Human Capital in Economic Growth: Evidence from Greek Regions*. Centre for Planning and Economic Research, 105.

Kazmi, M., Ali, K. and Ali, G. 2017. *Impact of Human Capital on Economic Growth: Evidence from Pakistan*. Sustainable Development Policy Institute, Working Paper, 162.

Khembo, F., and Tchereni, B. H. M. 2013. “The Impact of Human Capital on Economic Growth in the SADC Region.” *Developing Country Studies* 3 (4): 144–152.

Laskowska, I., and Dańska-Borsiak, B. 2016. “The Importance of Human Capital for the Economic Development of EU Regions.” *Comparative Economic Research* 19 (5): 63–79. https://doi.org/10.1515/cer-2016-0038.

Le, T., Gibson, J., and Oxley, L. 2005. *Measures of Human Capital: A Review of Literature*. New Zealand Treasury, Working Paper 05/10.

Mankiw, N. G., Romer, D., and Weil, D. N. 1992. “A Contribution to the Empirics of Economic Growth.” *Quarterly Journal of Economics* 107 (2): 407–437. https://doi.org/10.2307/2118477.

Marshall, A. 1890. *Principles of Economics*. London: Macmillan and Company.

Mincer, J. 1958. “Investment in Human Capital and Personal Income Distribution.” Journal of Political Economy 66 (4): 281–302. https://doi.org/10.1086/258055.

Murisa, T. 2010. “Emerging Forms of Social Organisation and Agency in the Newly Resettled Areas of Zimbabwe: The Cases of Goromonzi and Zvimba Districts.” PhD thesis, Rhodes University.

Okoro, G. E., and Eyenubu, E. S. 2014. “The Effect of Human Capital Development on Economic Growth in Nigeria (An Empirical Analysis during 1970–2011).” *Research Journal of Finance and Accounting* 5 (17): 122–126.

Omojimite, B. U. 2010. “Education and Economic Growth in Nigeria: A Granger Causality Analysis.” *African Research Review*, 4 (3). https://doi.org/10.4314/afrrev.v4i3.60158.

Schultz, T. W. 1961. “Investment in Human Capital.” *The American Economic Review* 51 (1): 1–17.

Smith, A. 1776[1979]. *An Enquiry into the Nature and Causes of the Wealth of Nations*. Oxford: Clarendon Press.

Sunmoni, A. 2015. *Human Capital Development and Economic Growth in Nigeria: An Empirical Analysis.* University of Surrey, 1–50.

Torruam, J. T., and Abur, C. C. 2014. “Public Expenditure on Human Capital Development as a Strategy for Economic Growth in Nigeria: An Application of Co-integration and Causality Test Analysis.” *International Journal of Research in Humanities and Social Studies* (1): 14–23.

Uzawa, H. 1965. “Optimal Technical Change in an Aggregate Model of Economic Growth.” *International Economic Review* (6): 18–31. https://doi.org/10.2307/2525621.

World Bank. 2010. *East Asia Update: 10 Years after the Crisis*. Washington DC: World Bank.

World Bank. 2011. *Zimbabwe Public Expenditure Notes: Challenges in Financing Education, Health, and Social Protection Expenditures in Zimbabwe*. Poverty Reduction and Economic Management Unit Africa Region.

Woubet, K. 2006. “Human Capital and Economic Growth in Ethiopia.” Unpublished Master’s thesis, Addis Ababa University, Ethiopia.

Zerihun, W., Kibret, H., and Wakiaga, J. 2014. “Ethiopia. African Economic Outlook.” Accessed March 22, 2016. http://www.africaneconomicoutlook.org/.

Zivengwa, T., Hazvina, F., Ndedzu, D., and Mavesere, I. M. 2013. “Investigating the Causal Relationship between Education and Economic Growth in Zimbabwe.” *Asian Journal of Humanities and Social Studies* 1 (5): 399–410.