An Inclusive Model of Educational Expenditure and Economic Development for Zimbabwe

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Abstract

This study sought to determine an inclusive framework for education expenditure that enhances economic development for Zimbabwe. The study used the ARDL-ECM in the determination of the relationship between the two variables, using data for the period 1980 to 2021. E-views Version 12.0 Statistical Package was used to run the regressions. Data were obtained from the International Monetary Fund and World Bank. The study found an inverse relationship between expenditure on education and economic development in Zimbabwe for both the short-run and long-run periods. Guided by the Zimbabwe Education 5.0 Model, the study recommends that a stand-alone research budget be made available for the institutions of higher education. It is also true with the industry that expects the best from graduates to fund research done by the institutions of higher education. It follows, therefore, that the industry must have constant liaison with the institutions of higher education, presenting challenges which they are facing for research to be conducted with the view of proffering solutions. In fact, facilitators from the institutions of higher education must be able to research on the needs of the economy, and impart knowledge on students, guided by the predetermined economic needs. It is from the research that the institutions would have conducted that would inform the content of teaching and community outreach. The students would then benefit from the researched teaching, thus, enabling them, and the facilitators to cause innovation and industrialisation.

Keywords: Education Expenditure; Economic Growth; ARDL

Introduction

Government expenditure on education is considered to be significant for Zimbabwe, given its share on nations' budgets. Albeit the government expenditure on education, there seem to be little evidence to suggest positive connection with economic development. The reason for the claim being increased unemployment rate amongst the educated in Zimbabwe. In fact, theory has it that improved education has a positive and significant relationship with economic development. This relationship would then suggest improved standard of living. It is, from this background, that this paper seeks to determine the relationship between government expenditure on education and economic development for Zimbabwe, with the view of coming up with an inclusive model that links education to economic development. The paper presents the background to the problem of the study, a brief orientation to the SADC and Zimbabwe's education system, before concluding with the methodology and discussion of the results.

Background of the study

A Brief analysis of the SADC education system

Studies on government expenditure on education have recently attracted much attention in emerging, and developed economies, however limited in developing economies. This emanates from the notion that higher education expenditure is a key driver of economic competitiveness and economic development. The point of departure being China, which consciously sought to foster capacities for higher level skills development, aligning them with her national economic strategy objectives. In a similar scenario with the Asian economies, Southern African Development Community (SADC) countries are spending more on education as a way to improve their human capital. Literature presented by the SADC (2017) posits that the region is spending on average, 23% their national budget on education, which is quite significant.

In fact, as if the SADC bloc had projected the shortcoming of the education system, given its implication on economic development, a number of policies were put in place to make the education system meaningful. During the year 1997, the SADC economies signed an education protocol addressing the quality and cohesion of education within the members' states. The protocol was addressing the need to develop the human resource capacity of the communities, in view of overcoming the difficulties facing individual economies in their attempt to build successful education systems. Despite the existence of this protocol, there seem to be no connection between improved education system and economic development for the SADC bloc.

A Brief analysis of Zimbabwe Education System

In the recent past, Zimbabwe migrated from the 3.0 Education framework to 5.0. The latter is an afterthought education frame that incorporates the need for innovation and industrialisation, as informed by research. This stance is meant to brand the education system in such a way that university graduates contribute to the growth of an economy. The framework is yet to stand the test of time as the Zimbabwe economy is yet to see the contribution which the education framework will bring along.

- **Economic growth**

Zimbabwe has been enjoying subdued economic growth due to myriad of factors, ranging from political to economic. According to the World Bank (2016) indicators Zimbabwe recorded an average of 0.08% by 2019, with the agricultural and mining sectors cited as the main contributor of increase in gross domestic product. It is the assertion of this paper that economic development and in particular, productivity maybe enhanced through investment in education, hence the need to come up with an inclusive model that enables education to improve economic development.

- **Employable population**

The population of Zimbabwe is youthful, with 76.4% of the population being below the age of 35 (SADC, 2011). Nonetheless, education theory is contradictory in as far as population growth is concerned for developed and developing economies. Literature shows that in developed economies, as population grow, the aging will increase political pressure to move the composition of social expenditure in favour of the elderly but sacrificing other government

expenditure such as education. The aging population demand more health rather than education, which suggest the trade-offs between education and health. Nonetheless this theory is likely not to hold in Zimbabwe since there is youth dominance. Therefore, in Zimbabwe, we can suggest that the youth will increase political pressure to move the composition of social expenditure in favour them such as education expenditure, hence the desire to determine the relationship between government expenditure on education and economic development.

Methodology

The period of analysis for the two variables economic growth and education expenditure spans from 1995 to 2021. Preceding the running of the regressions, variables' data were transformed into their natural logarithmic form. Diagnostic tests were undertaken to establish the underlying data generation as to whether data are normally distributed. Stability tests were undertaken to find out as to whether the ARDL model used in the study is well-specified. All the tests were performed using Eviews 12 statistical package. The following is the ARDL model that was adopted.

$$\Delta Real\ GDP_{t} = \alpha^{1} + \sum_{k=1}^{\emptyset^{35}} \alpha^{2}\, \Delta Real\ GDP_{t-k} + \sum_{k=1}^{\emptyset^{36}} \alpha^{3}\, \Delta educ\ exp_{t-k} + \sum_{k=1}^{\emptyset^{36}} -\alpha^{4}\ \Delta infl_{t-k} + \sum_{k=1}^{\emptyset^{36}} -\alpha^{5}\ \Delta polit_{t-k} + \sum_{k=1}^{\emptyset^{36}} \alpha^{6}\ \Delta liter_{t-k} + \mu_{t}$$

Where:

Δ, is the change recorded by a variable per a given time; $_{k}$ is the lag operator; α are the coefficients to be estimated; and μ is the error term; $\emptyset$ represents the number of variables' observations and μ_{t} is the white noise. *Real GDP* is the proxy for Economic Development. Government expenditure on education is represented by *educ exp;* Inflation rate is represented by *infl.* Political Stability is represented by *polit;* and Literacy Rate is represented by *liter*. All the variables chosen for the model have economic meaning with the dependent variable. As informed by theory, the positive sign suggest a positive coefficient. The negative sign signifies a negative coefficient.

Results and discussion

Normality test

Table 1: Normality Test Results

	Real GDP	Educ Exp	Infl	Polit	Liter
Mean	124797983.7	15153009556	0.401689	59.91536	3613272.43
Median	4000000000	14976453900	0.332151	61.11235	3.91015261
Standard Deviation	175139154.4	3033880452	0.183936	25.65727	2.30488654
Kurtosis	2.057640141	-1.349018108	-0.154431	2.462666	40.9990011
Skewness	1.571545928	-0.118155154	1.045597	0.963112	6.40301028
Minimum	-30506683.75	9582735200	0.201870	12.03111	-2.40950000
Maximum	717865322.2	20114560000	0.860019	146.5215	147597576
Jacque-Bera	33.18396	4.521546	3.224618	56.76471	33.59876
P-Value	0.082868	0.902854	0.756395	0.068456	0.00018
Observations	41	41	41	41	41

Source: E-Views Statistical Packages Version 12.0

Table 1 above shows the mean, median, minimum, maximum and standard deviation valued of the variables used in the regression model. The mean values of Real GDP, Educ Exp, and Infl are greater than their medians and the data of these variables are positively skewed except for Educ Exp which is negatively skewed. The mean value of Polit is lower than its median. The coefficient of variation of Real GDP of 1.4 (standard deviation divided by the mean) is greater than 1 which means that Real GDP has high variability around its mean. The coefficient of variation of Educ Exp is 0.20 which is less than 1. This means that Educ Exp is not very volatile. The coefficient of variation of Infl is 0.45 which is less than 1. This means that Infl is not very volatile. In the same manner, the coefficient of variation of Polit is 0.43 which is less than 1. This means that Polit is not very volatile. The coefficient of variation of Liter is 6.37 which exceeds 1. This means that Liter is very volatile.

Correlation test

Table 2: Pearson correlation matrix test results

	Real GDP	Educ Exp	Infl	Polit	Liter
Real GDP	1.000000				
Educ Exp	0.71984	1.000000			
Infl	0.58749	0.24378	1.000000		
Polit	-0.45920	-0.32982	-0.18047	1.000000	
Liter	0.53874	0.14865	0.03955	0.36238	1.000000

Source: E-Views Statistical Packages Version 12.0

The above correlation matrix shows that there is no multicollinearity between the variables because all the correlation coefficients are less than the 0.8, which is the rule of thumb of multicollinearity (Gujarati, 2003). The correlation matrix also shows that Educ Exp, Infl and Liter are positively correlated, with Real GDP, whilst Polit has a negative association with Real GDP.

Unit root test

Table 3: ADF unit root test results

Variable	ADF test statistic	Critical value 1%	Critical value 5%	Critical value 10%	Probability	Comment
Real GDP	-2.4693	-3.4051	-2.7363	-2.7066	0.0007	I(1)
Educ Exp	-3.3771	-3.4103	-2.7384	-2.7076	0.0004	I(1)
Infl	-2.4767	-3.4325	-2.7485	-2.7124	0.0015	I(1)
Polit	-4.2034	-3.4054	-2.7362	-2.7064	0.0000	I(0)
Liter	-6.2693	-3.4102	-2.7387	-2.7078	0.0000	I(1)

Source: E-Views Statistical Packages Version 12.0

The ADF test results above shows that Real GDP, Educ Exp, Infl and Liter are stationary after first differencing. Polit is stationary at levels. Table 4.4 depicts the results for Lag length for the purposes of cointegration and running of the actual model.

Lag length selection criteria

The Akaike information criteria was used to select the lag length of the variables in the ARDL specification. Table 4 below shows the results of the lag length selection.

Table 4: LR Lag Length Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-636.0787	0.734925	1.43	40.05833	40.27602*	40.13503*
1	-635.6346	0.544061*	1.50	40.08835	40.34963	40.18046
2	-635.4913	0.233141	1.57	40.13467*	40.43945	40.24215
3	-634.3827	1.837873	1,54	40.12875	40.47701	40.25156
4	-634.3815	0.001575	1.63	40.18274	40.57466	40.32097

Source: E-Views Statistical Packages Version 12.0

The result for the study shows different lag lengths. This study opted for the LR, hence a lag length of one (1) informed the study. Justification being that the study is using 36 observations, hence a lag of one (1) is not enough to lead the study into data numerosity.

Cointegration test

Table 5: Cointegration Test Results

Significance level	I0	I1
10%	2.67	3.44
5%	3.15	4.07
2.5%	3.21	4.23
1%	4.13	5.09

F-Statistic 4.143615

Source: E-Views Statistical Packages Version 12.0

The results for the study confirm the existence of cointegration amongst variables, as supported by an F-statistic value of 4.143615, which is above the upper bound critical value at 5% levels. These results are enough to motivate the study to adopt the ARDL for the long-run results, and an unrestricted Error Correction Model (ECM) to determine the short-run relationships.

ARDL-ECModel

Table 4.6: ARDL-ECM model test results

Dependent Variable: Real GDP

Variable	Short-Run Co-efficient	Probability	Decision
Ln EDUC EXP	-0.0715	0.005	Significant
Ln INFL	0.0354	0.021	Significant
Ln POLIT	0.2109	0.136	Insignificant
Ln LITER	0.0638	0.337	Significant
ECT	-0.2319	0.000	Significant
Variable	**Long-Run Co-efficient**	**Probability**	**Decision**
Ln EDUC EXP	-0.0353	0.043	Significant
Ln INFL	0.1504	0.017	Significant

Ln POLIT	-0.0774	0.010	Significant
Ln LITER	0.0528	0.003	Significant

Source: E-views statistical packages version 9.0

In the short-run, as informed by the ECM, the result shows that there is a negative and significant relationship between Real GDP and Education Expenditure The study entail that a 1% increase in Educational Expenditure result in 7% decrease in Real GDP for Zimbabwe. The error correction term (ECT) of -0.2319 is measure of the speed of adjustment towards long-run equilibrium. The result implies that the system corrects the previous period disequilibrium at the speed of 23% which is not effective for policy responsiveness. In the long-run as informed by the ARDL there is again a negative significant relationship between Education Expenditure and Real GDP and, where a 1% increase in Education Expenditure results in 4% decrease in Real GDP for Zimbabwe. The results confirm the reason why there is high unemployment in Zimbabwe. Also, the results are in sync with the current drive that the government of Zimbabwe has undertaking in revamping the dated Education Framework of 3.0 to that of 5.0 which has an emphasis on innovation and industrialization. The low coefficient of the ECT requires policy makers to come up with robust policies that seeks to revamp the education system so that the system talks to the economy needs. Only then can positive coefficient for the two variables of interest be realised in the long-run as desired by economics theory.

Stability tests

The model was diagnosed to determine if it is well specified.

Table 7: Stability test results

Test	P-value	Comment
Ramsey RESET Test	0.5687	The model is correctly specified
Serial-Correlation Test	0.6421	There is no serial correlation
Heteroskedasticity Test	0.8007	There is no Heteroskedasticity

Source: E-views statistical packages version 12.0

The inverse relationship obtained between education expenditure and economic development suggest that a lot has to be done to ensure the education system for Zimbabwe speaks to economic growth. The results expresses the fact that data that the study used were that which are informed by the Education 3.0 Framework, which did not have the elements of Innovation and Industrialization. This, therefore, could be the reason why the Zimbabwe government transformed the Education System to 5.0 Framework which has slant towards Innovation and Industrialization. It, follows, therefore, that the recommendation of the study has been informed by the results obtained.

Conclusion and recommendations

The study found that the expenditure on education has an inverse relationship with economic development. Taking into consideration the existence of Education 5.0 Framework currently used in Zimbabwe, the following model is recommended:

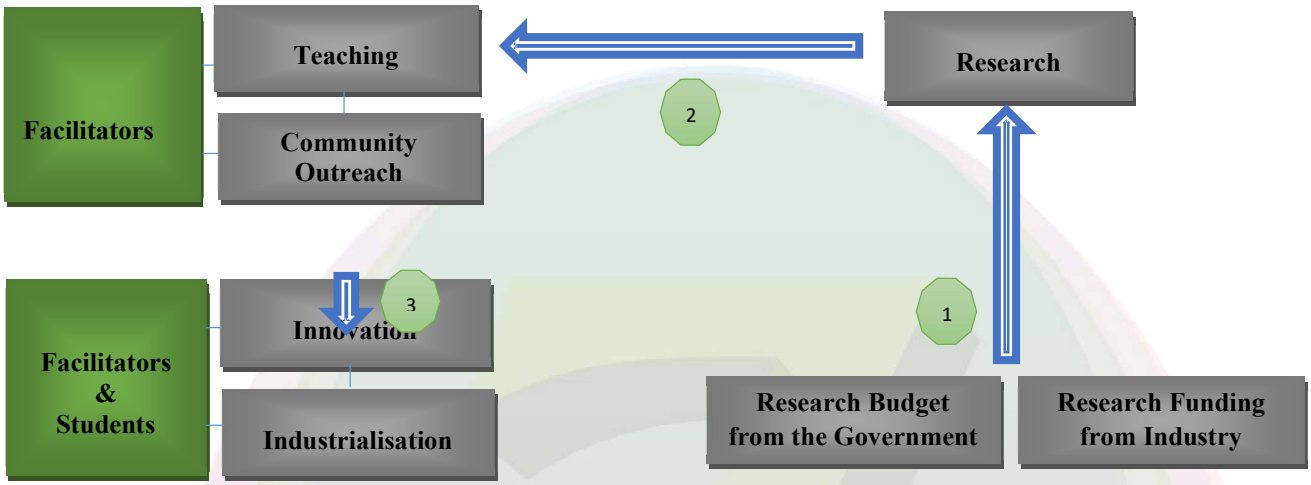

Figure 1: Inclusive Education Expenditure and Economic Development Framework

Informed by the Zimbabwe Education 5.0 Model, the study recommends that a stand-alone research budget be made available for the institutions of higher education. It is, also true with the industry who expect the best from graduates to fund research done by the institutions of higher education. It follows, therefore, that the industry must have constant liaison with the institutions of higher education, presenting challenges which they are facing for research to be conducted with the view of proffering solutions. In fact, facilitators from the institutions of higher education must be able to research on the needs of the economy, and impart knowledge on students, guided by the predetermined economic needs. It is, from the research that the institutions would have conducted that would inform the content of teaching and community outreach. The students would then benefit from the researched teaching, thus, enabling them, and the facilitators to innovate and industrialise.

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