

The Impact of Government Educational Expenditure Policy and School Enrolment on Economic Growth in Ghana (1970-2017)

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Abstract: *This study examines the impact of government educational expenditure and school enrolment on economic growth in Ghana over the period 1970-2017. The research employs the autoregressive distributed lag (ARDL) technique based on the results of the Phillips-Perron unit root test. The findings show that government educational expenditure within the period (1970-2017) has an insignificant effect on economic growth in both the long-run and short-term. It is also revealed that while primary and secondary school enrolment rates positively and significantly drive growth in both time periods, the effect of tertiary education on economic growth is negative and significant in the long-run. The article recommends that proper mechanisms should be put in place to deal with embezzlement of funds in the educational sector. It also recommends construction of policies that will promote free equitable access to quality secondary education that will ensure education for all in Ghana including individuals from low-income families and involvement of tertiary students in practical programmes that will ensure the acquisition of innovative skills hence appropriate optimisation of human capital trained from the Ghanaian education system. This will enhance proper economic returns from the education system.*

Keywords: Educational expenditure, School enrolment, Economic growth, Ghana

1. Introduction

Education has generally been recognized as a crucial driver of a country's long-term development (Devine, et al., 2021; Gebre-Egziabher, 2016). Education not only improves the quality of life of people but also provides the necessary workforce to boost productivity (Gebre-Egziabher, 2016; Fehring, & Herring, 2013). This is an indication that economic development may be hampered if the human capital necessary to drive constructive changes in the economy is lacking (Kenneth et al., 2020). Accordingly, investing in human capital leads to greater human and economic development and global competitiveness (Odior, 2014; Okafor et al., 2016).

Human resource development, which is a mark of good educational system, is noted to contribute significantly to household poverty alleviation (see Mundy, & Menashy, 2014; Wang, 2019). Most developing countries have increased their investment in education in recent years, clinging to the belief that education is critical to solving many of the challenges that they are facing.

The critical role of government expenditure on education in the process of human development is universally acknowledged. Adequate expenditure on education and school enrolment at all levels is critical to producing the skilled labour force necessary to support national growth and development. The quality and efficiency of education are dependent on the level of spending on education. A sufficient expenditure on education ensures infrastructure quality, satisfactory remuneration for teachers, sufficient continuous professional development for teachers, general improvement in school environment and a well-planned curriculum, which are imperative to birthing the needed human capital to augment growth and development.

Notwithstanding the strong interest in the link between education and economic growth and development, the evidence is still sketchy, particularly in developing countries. As a consequence, this study seeks to investigate how educational expenditure and school enrolment influence economic growth in Ghana.

Over the years, Ghana has adopted educational policies and also implemented several programmes within the period under review to support the country's economic growth agenda. Such initiatives include the Dzobo Report of 1973 (which recommended the JSS Concept), The New Structure and Content of Education 1974, The Education Commission Report on Basic and Secondary Education 1987/1988, The Free and Compulsory Universal Basic Education (FCUBE) programme in 1995 (established by the 1992 Constitution), Education Strategic Plan (ESP) for 2003–2005. In line with this, this study seeks to investigate how government expenditure on education and school enrolment in the period 1970-2017 stimulates growth in Ghana.

Despite these policy interventions, the potential effect of education on economic growth in Ghana remains unclear as scanty evidence is documented. Even though there are vast empirical studies in other jurisdictions on the impact of education on economic growth, there is little literature on the impact of demand for formal education in terms of primary, secondary and tertiary school enrolment rates on economic growth in Ghana.

This study thus aims to fill this gap in the literature on the education-growth relationship in Ghana and provide support for the most recent education policy initiatives to be successful. More interestingly, the research examines the short- and long-term effect of government expenditure on education and demand for formal education on economic growth using the autoregressive distributed lag (ARDL) technique.

The remainder of this paper is structured as follows: research question, review of relevant literature, research methodology, presentation and discussion of empirical results and conclusion with policy recommendations.

2. Research Question

What is the impact of government expenditure and school enrolment on economic growth?

3. Literature Review

Theoretical Model

Schultz's (1961) modern human capital theory gives crucial evidence for examining the role of education on economic growth. Schultz emphasized that education and training are investments that can increase productivity. Human capital refers to an individual's talents, knowledge, and

experience as measured by their economic value. The human capital theory postulates that higher education and skill training helps individuals boost their productive capacity.

The augmented Solow growth model is also one of the most commonly used approaches to understanding the link between human capital and economic growth. This model considers labour, physical capital, and human capital as inputs augmented by the total factor productivity known as the Solow residual, which influences the productivity of inputs. Although some economists believe that human capital directly enhances productivity, not all agree with this. Freeman (1976) claimed that human capital just serves as an indicator for skill and aptitude, but that training, incentive, and capital equipment are the means by which actual productivity is attained.

Empirical Literature

Empirically, numerous studies have examined the effect of different education factors on economic growth. Given the objectives of this study, the review of the literature focuses on the impact of government expenditure and school enrolment on economic growth.

On government expenditure on education and growth nexus, Riasat et al. (2011) for instance established a positive significant long-term impact of educational expenditure on economic growth in Pakistan. In the case of Turkey, Mercan and Sezer (2014) and the work of Alper (2017) found that increasing the expenditure on education positively enhances economic growth. By invoking the logarithmic multiple regression model, Bexheti and Mustafi (2015) established that public funding of education negatively influences economic growth in Macedonia. In a comparative study, Churchill et al. (2017) posited that while government expenditure on education positively enhances growth in developed economies, the impact is negative in less developed countries. Using the Keynesian model, Jeyhoon Tabar et al. (2017) revealed that in the long-run, government educational expenditure has a negative effect on economic growth in Iran. Applying the ARDL method, Ayeni and Omobude (2018) analyzed the effect of educational expenditure on growth in Nigeria over the period 1987-2016. The findings of the study showed that whereas capital expenditure has no significant effect on growth, recurrent expenditure on education significantly drives economic growth. Liao et al. (2019) examined the impact of investment in education on economic growth in China using 21 cities in Guangdong province. The authors reported that although economic growth is positively correlated with investment in education, the impact varies across cities. In a panel analysis involving 45 countries over the period 2000-2019, Gokkaya et al. (2021) documented that economic growth improves with rising government expenditure on education. Relying on the Cobb-Douglas production function, Suwandaru et al. (2021) noted that public expenditure on education has an insignificant effect on economic growth in Indonesia. In the case of Ghana, research on the effect of government educational expenditure on growth is limited as most of the studies have focused on assessing the overall government expenditure on economic growth. Among the limited attempts, the work of Owusu-Nantwi (2015) showed that educational expenditure has a positive significant influence on economic growth in Ghana.

Turning to the impact of school enrolment on growth, the evidence documented in the literature is also inconclusive. That is, whereas some studies note that school enrolment enhances growth, others argued otherwise. For instance, in a global evidence, Keller (2006) established that an increase in enrolment rates in terms of primary, secondary, and higher education significantly improve growth. Similarly, Omondi (2014) found that increasing enrolment in primary, secondary, and university education boosts economic growth in Kenya. Applying the generalized least squares regression method, Ogbeba (2015) established that a higher level of

school attainment significantly and positively affects economic growth in some selected OECD countries. Hanif and Arshed (2016) examined the effect of school education on the economic growth of SAARC countries over the period 1960-2013. The authors found that in comparison to enrolment in primary and secondary education, enrolment in tertiary education significantly influences economic growth. Also, Abugamea (2017) investigated the effect of education on Palestine's economic growth using the OLS technique and with data covering from 1990-2014. The author revealed that economic growth in Palestine is negatively influenced by higher enrolment in universities and technical institutions. By comparing Islamic and non-Islamic countries, Ridho and Razzaq (2018) noted that secondary school enrolment significantly increases economic growth in the studied countries. Marquez-Ramos and Mourelle (2019) showed that secondary and tertiary education levels positively impact economic growth in Spain. Employing the ARDL technique, Kenneth et al. (2020) indicated that secondary school and tertiary enrolment ratios positively and significantly influence economic growth in Nigeria. In the ASEAN-5 countries, Maneejuk and Yamaka (2021) observed that enrolment rates in secondary and higher education significantly contribute to economic growth.

4. Methodology

Variables and Data Sources

The study employs time series data spanning from 1970-2017. The data for all the variables are gleaned from the World Development Indicators maintained by the World Bank. Economic growth serves as the dependent variable which is proxied by GDP per capita growth. Educational expenditure and school enrolment are the main independent factors. Educational expenditure is defined in this study as the total government expenditure on education as a percentage of government overall expenditure. The percentage gross enrolments in primary school, secondary school, and tertiary school represent school enrolment. The study also controls for the impact of gross fixed capital formation (in terms of percentage of GDP).

Model Specification

To assess the impact of government educational expenditure and school enrolment on economic growth, the basic empirical model is presented as follows:

$$GDPG_t = \alpha_0 + \beta_1 GEE_t + \beta_2 PSE_t + \beta_3 SSE_t + \beta_4 TSE_t + \beta_5 GFCF_t + \varepsilon_t \quad (1)$$

where GDPG, GEE, PSE, SSE, TSE, and GFCF are economic growth, government expenditure on education, primary school enrolment, secondary school enrolment, tertiary school enrolment, and gross fixed capital formation respectively. From the equation, α denotes the intercept and β_1 to β_5 are the coefficients of the explanatory factors.

Analytical Approach

The objective of this study is to look at the short- and long-term effect of government educational expenditure and school enrolment on economic growth. Therefore, the Autoregressive Distributed Lag (ARDL) model by Pesaran and Shin (1998) and Pesaran et al. (2001) is employed. The unit root test is used initially to determine how the variables are integrated before applying the ARDL model. The ARDL approach is applicable when the variables are integrated at the level (I(0)) or first difference (I(1)). It is also feasible for estimating long-run and short-run relationships in small sample studies (Yakubu, 2020). Considering the variables of interest, the ARDL model is specified as:

$$\begin{aligned}
GDPG_t = & \alpha_0 + \sum_{i=0}^n \alpha_{1i} \Delta GDPG_{t-1} + \sum_{i=0}^n \alpha_{2i} \Delta GEE_{t-1} + \sum_{i=0}^n \alpha_{3i} \Delta PSE_{t-1} + \sum_{i=0}^n \alpha_{4i} \Delta SSE_{t-1} + \\
& \sum_{i=0}^n \alpha_{5i} \Delta TSE_{t-1} + \sum_{i=0}^n \alpha_{6i} \Delta GFCF_{t-1} + \delta_1 GDPG_{t-1} + \delta_2 GEE_{t-1} + \delta_3 PSE_{t-1} + \\
& \delta_4 SSE_{t-1} + \delta_5 TSE_{t-1} + \delta_6 GFCF_{t-1} + \rho ECT_{t-1} + \varepsilon_t
\end{aligned} \tag{2}$$

where the difference operator is represented by Δ . $\alpha_1 - \alpha_6$ and $\delta_1 - \delta_6$ are short-run and long-run coefficients respectively. The coefficient of the error correction term (ECT) is denoted by ρ , where ECT_{t-1} is the error correction term lagged by one period.

To investigate the long-term relationship among the variables, the bound test is applied. As shown in the following equations, the null hypothesis which states that there is no long-run relationship among the variables is tested against the alternative hypothesis which postulates cointegration among the variables.

$$H_0: \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = 0 \tag{3}$$

$$H_1: \text{At least one } \delta_i \neq 0, i=1, \dots, 6 \tag{4}$$

In testing for the presence of cointegration, the two critical limits, the upper and lower bounds are employed. A long-run relationship is established when the estimated F-statistics exceeds the upper critical bound $I(1)$.

5. Results and Discussion

Descriptive Statistics

The descriptive statistics of the variables are presented in Table 1. In terms of GDP per capita growth, economic growth has a mean value of 1.2475% with a maximum and minimum of 11.3155% and -14.5085% respectively. Government educational expenditure from the total government expenditure on average is estimated at 21.7566% and the highest value for the study period is 37.5210%. In terms of educational enrolment, the average gross enrolment in primary, secondary, and tertiary education levels are 80.5581%, 41.1631% and 3.7356% respectively. It is noted that aside from government education expenditure and gross fixed capital formation, the rest of the variables are not normally distributed considering the significance of the Jarque-Bera test probability values.

Table 1: Descriptive Statistics

	GDPG	GEE	PSE	SSE	TSE	GFCF
Mean	1.2475	21.7566	80.5581	41.1631	3.7356	14.7132
Median	1.9073	22.3481	77.9120	35.7351	1.1645	13.4528
Maximum	11.3155	37.5210	108.3379	69.0092	16.0131	29.0021
Minimum	-14.5085	7.6419	61.6421	33.2982	0.6915	3.5315
Std. Dev.	4.4865	7.1173	14.1389	10.7631	4.9557	6.6832
Skewness	-1.1904	0.0087	0.7375	1.7315	1.5726	0.3322
Kurtosis	5.5511	3.4733	2.3350	4.5413	3.8836	2.2790
Jarque-Bera	24.3524	0.2056	4.9081	26.9399	20.4565	1.9228
Probability	0.0000	0.9023	0.0859	0.0000	0.0000	0.3824
Observations	48	22	45	45	46	48

Unit Root Test

The unit root test results based on the Phillips-Perron unit root test are shown in Table 2. It is noted that economic growth (GDPG) and government educational expenditure (GEE) show stationarity at level while the rest of the variables are stationary at first difference. The results fulfil the underlying condition for the application of the ARDL model. One of the basic assumptions for the ARDL technique is that some of the variables are expected to be differentiated at level and others at first difference.

Table 2: Unit Root Test Results
Phillips-Perron (PP) unit root test

Variables	Level I(0)	First difference I(1)
GDPG	-4.537***	-21.041***
GEE	-2.951*	-5.903***
PSE	-0.078	-7.149***
SSE	1.954	-7.393***
TSE	1.580	-6.520***
GFCF	-1.750	-7.957***

Note: * and *** denote stationary at 10% and 1% significance level respectively

Test for Cointegration

From the cointegration results presented in Table 3, it is observed that the estimated F-statistic at 5% level of significance is above the upper critical bounds (1(1)) suggesting a long-run relationship among the variables. This thus justifies the estimation of the ARDL model.

Table 3: Bounds Test for Cointegration

	Significance	Critical values		
			I(0)	I(1)
F-Statistic	3.709**	10%	2.08	3.00
k	5	5%	2.39	3.38
		1%	3.06	4.15

k represents the number of independent variables and ** denotes 5% significance level

Regression Results

In Table 4, the long-run and short-run impact of government educational expenditure and school enrolment is depicted. From the estimation, the R-square value indicates that the fluctuation in the level of economic growth is explained by 85.65% variation in government expenditure and school enrolment rates. The coefficient of the lagged value of the Error Correction Term (ECM_{t-1}) suggests that the model's disturbance is reduced by 141.59% annually as it approaches equilibrium.

Table 4: ARDL Estimation Results

ARDL (1, 1, 1, 1, 0, 1)				
<i>Long-run Estimates</i>				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GEE	0.1534	0.1103	1.3902	0.2368
PSE	0.8320	0.2439	3.4116	0.0270**
SSE	1.7332	0.6813	2.5438	0.0637*
TSE	-5.8587	2.0614	-2.8421	0.0468**
GFCF	0.6286	0.1931	3.2548	0.0312**
C	-125.4823	38.6618	-3.2456	0.0315**
<i>Short-run Estimates</i>				
GEE	-0.1539	0.0970	-1.5877	0.1875
PSE	1.3369	0.2251	5.9390	0.0040***
SSE	1.6999	0.2817	6.0339	0.0038***
GFCF	1.9559	0.2780	7.0359	0.0022***
ECT _{t-1}	-1.4159	0.1758	-8.0560	0.0013***
R-square	0.8565			
Adj. R-square	0.7990			
Durbin-Watson stat.	2.3722			

Notes: *, ** and *** represent 10%, 5% and 1% statistical significance respectively.

From the results, government educational expenditure exerts a positive impact on economic growth in the long-run albeit insignificant. A percentage increase in educational expenditure improves economic growth by 0.153 percent. On the contrary, educational expenditure negatively and insignificantly drives growth in the short-run lending support to the finding of Suwandaru et al. (2021). The insignificant effect of government educational expenditure on growth in both the short- and long-run might be attributed to the government's unsatisfactory attempts to improve efficacy in the education sector in Ghana. The funds' government commits to supporting educational infrastructural facilities are quite inadequate which reduces the overall efficiency of the educational sector. This subsequently affects the quality of human resources to support economic growth.

The findings show that primary school and secondary education have a positive significant effect on economic growth in both the short- and long-run. The implication is that increasing enrolment in primary and secondary levels improves the basic skills of the individuals and provides a solid foundation for lifelong learning.

It is observed that increasing enrolment in tertiary education negatively and significantly affects economic growth in the long-term. This reflects the theory-based curriculum of the tertiary institutions in Ghana. The lack of practical know-how renders most of the graduates from the tertiary institutions unemployed as the limited job opportunities available in the formal sector are competed for by those with tertiary education. The finding implies that though tertiary education provides individuals with employable skills, increasing enrolment in the tertiary level results in higher unemployment rate which inhibits long-term economic growth.

Furthermore, in both the long- and short-run, gross fixed capital formation has a positive significant impact on economic growth. This suggests that increasing domestic investment significantly matters for Ghana's economic growth. The finding of this research is consistent with the result established by Yakubu et al. (2021) in the case of Turkey.

Diagnostic Tests Results

From the diagnostic tests in Table 5, there is an indication that serial correlation or heteroscedasticity issues are non-existent in this study. The Jarque–Bera test and the Ramsey RESET, respectively, reveal a normal distribution and no functional form misspecification.

Table 5: Diagnostic Tests

Test	F-statistics	Prob.
Serial Correlation	4.249	0.191
Heteroscedasticity	0.334	0.927
Ramsey RESET	0.605	0.493
Normality	5.223	0.073

The CUSUM plot in Figure 1 shows that the estimated model at 5% significance level is stable given that the CUSUM lines are in the critical boundaries. However, the CUSUM of squares plot indicates the model instability.

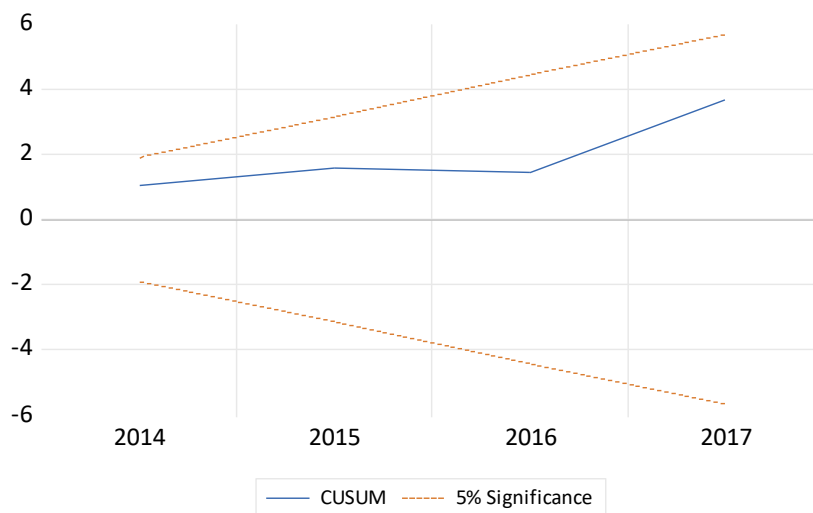


Figure 1: Plots of CUSUM

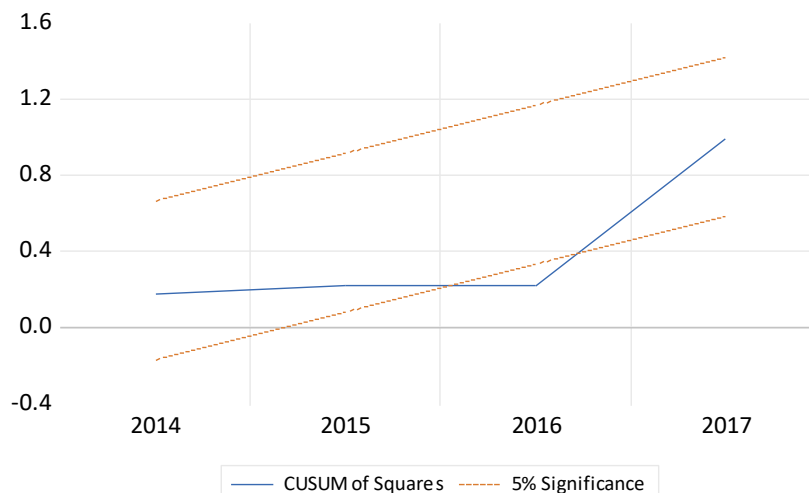


Figure 2: Plots of CUSUM of Squares

6. Conclusion and Policy Implications

This study empirically examined the impact of government educational expenditure and school enrolment on economic growth in Ghana over the period 1970 to 2017. Applying the autoregressive distributed lag (ARDL) technique, the authors found that government educational expenditure has an insignificant effect on economic growth in both the short-run and long-run. The finding also showed that primary school and secondary education have a positive significant effect on economic growth in both the short- and long-run while increasing enrolment in tertiary education negatively and significantly affects economic growth in the long-term. In addition, the findings revealed that gross fixed capital formation has a positive significant impact on economic growth. Based on the findings, the article recommends that the government should increase the education share of the total government budgetary allocation to boost educational infrastructure and services. Also, proper mechanisms must be instituted to deal with funds embezzlement in the educational sector. Furthermore, to increase the human capital base of the economy, there is a need to make education more accessible and affordable. That is, education should be subsidized at all levels to increase enrolments at a lower cost. To reduce the detrimental effect of tertiary education on economic growth, there is the need for tertiary institutions in Ghana to shift from theory-based learning to vocational education. This will help reduce the rate of unemployment in the formal sector.

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