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An Empirical Study On How Education Expenditure Impacts On Income Per Capita In Ghana

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Abstract:
Background*: Education increases people's productivity and efficiency that can steer the economy in the direction of long-term and hence sustainable growth. Hence, it is necessary to invest in high quality education for their human capital. Ghana over the years has invested in education through numerous policies. Hence, the study aims to examine the impact of education expenditure on income per capita in Ghana using annual data from 1980 to 2020.*
Materials and Methods*: The time series data were estimated using the ARDL (Autoregressive Distributed Lag) model and the Granger causality approach.*
Results*: It is recommended that the government prioritize education spending in accordance with UNESCO principles of the 20% annual budget requirement.*
Key Word*: Education; Education Expenditure; Income; Income per capita; Ghana.*

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I. Introduction

Human capital is a cardinal part of national development. That is why national policy makers use it as a tool to improve livelihoods through educational investments since in the development of human capital, education is essential. Education increases people's productivity and efficiency, creating trained labour that can steer the economy in the direction of sustainable economic growth[1]. Additionally, education is anticipated to contribute positively to global economic development and the reduction of poverty, both of which are major concerns for the international community. An investment in human capital through education enables each person to make a useful contribution to their society. It becomes a crucial indicator of an economy's ability to experience rapid growth with low unemployment, a high wages and solid social cohesion[2].

Moreso, developing countries and for that matter Ghana are transitioning from being largely reliant on agriculture to service, creative, and knowledge-based sectors that are essential for sustainable development and economic prosperity[3]. For example, the economy of Ghana until 2006 was dominated by agriculture contributing more than 50% in terms of national output and employment but is now led by the service sector accounting for about 45% of national output. Agriculture now makes up about 19% while industry contributes 28% of total national output in 2021[4]. It is therefore important that the Ghana government invest more in education. More especially as education encourages countries to adopt, create, and use cutting-edge manufacturing technology to the production process[5]. However, according to Appiah[2], financial restrictions to deal with the growing population and educational programmes have left them handicapped. Therefore, in order for developing nations to increase their per capita GDP, they must first increase productivity, which may be attained by investing in high-quality education for their human capital. Mercan and Sezer[5] even claimed that, one of the main causes of economic performance differences between developed and developing countries is the differences in the level of education. It is therefore imperative to examine how education spending has impacted on income per capita in a developing country such as Ghana.

Many studies have researched into the relationship between education and economic growth using diverse indicators of economic growth such as GDP, annual GDP growth among others but few studies have used income per capita. Few studies found a positive relationship. For example, according to Shafuda & Utpal[6] and Ayeni *&* *Omobude*[7], education spending and income per capita in emerging nations are positively associated. This is because education improves the competence, skills, ability, and productivity of citizens through continuous learning[7]. According to Riasat, Atif and Zaman[2], productivity of the labour force determines the performance of economy and the educational level of the labour force is a determinant of its productivity.

In Ghana, public expenditure on education has been declining consistently since 2011 whilst interestingly, income per capita has been rising during the same period. According to data from the World Development Indicators from the World Bank as shown in Figure 1, public expenditure on education as a percentage of GDP was 8.1% in 2011 and this figure reduced consistently to 3.5% in 2021. On the other hand, income per capita was 3926.7 Ghana cedis in 2011 which then increased to 4400.3 Ghana cedis in 2015 and continually increased to 5193.1 Ghana cedis in 2021 in Figure 2. These trends in the graphs are in contrast to the positive relationship theory postulated. Thus, it will be interesting to show the relationship between education expenditure and income per capita empirically.

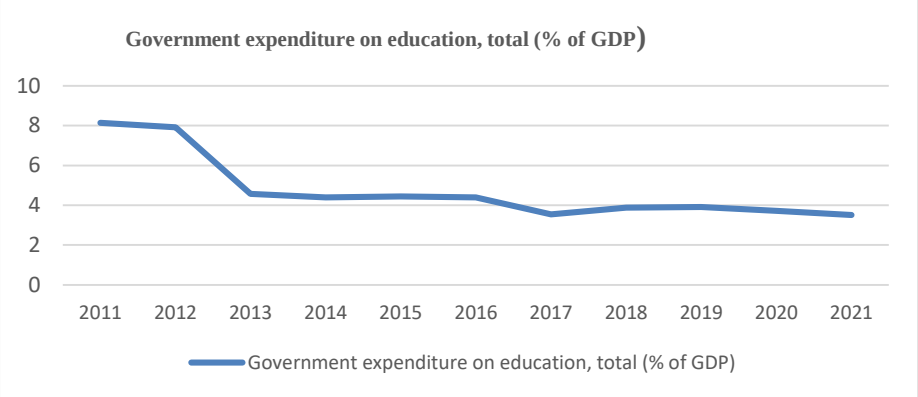

Figure 1: Government Expenditure on Education, Total (% of GDP) in Ghana
Source: World Bank's World Development Indicators (2022)

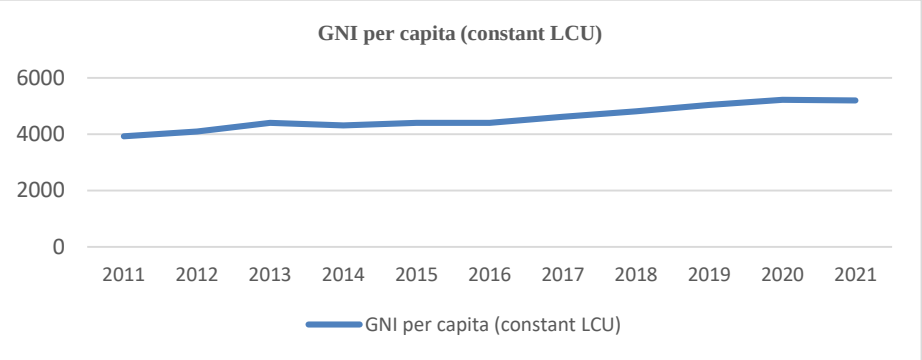

Figure 2: GNI per Capita (Constant LCU) in Ghana between 2011 and 2021
Source: World Bank's World Development Indicators (2022)

In order to achieve education for all and quality education in Ghana, past and present administrations have demonstrated through their policies that expansion in education expenditure is needed to achieve economic growth. They have achieved this through the introduction of policies and programs that guarantee equal access to quality education for all Ghanaians. For example, the introduction of free meals for pupils, expansion in infrastructure, and free senior high schools, amongst others, constitute educational interventions by various government. These interventions are capital-intensive projects which require more funding to achieve. Whether these interventions have yielded the necessary results constitute another motivation for this study. This question is challenging because establishing the relationship between Ghana's education expenditure and income per capita has not been conclusively evaluated using relevant variables in previous studies, which is why it requires further disclosures in Ghana. Hence the aim of the study.

This paper contributes to the literature in that, whilst there have been numerous policies and programmes implemented accompanied by spending, there have been empirical studies to examine the impact of government spending on education on income per capita.

Educational Expenditure West African Countries

Educational expenditure in West Africa is important because it is a major driver of the economy and it determines the kind of manpower available for employment[3]. In line with the Economic community of West Africa protocol on education in West Africa, the regional governments pledged to industrialize the region through scientific innovation and technology by investing in education. The charter exists to promote mechanized

agriculture, add value to raw materials, and create long-term employment for the teaming youth. It is also to signal a shift from being an exporter of raw materials to building a knowledge-centred society with entrepreneurial skills to compete globally[3]. The goals of educational spending are to achieve an excellent educational level in which students not only enrol for enrolment and certification but also acquire basic skills that can transform livelihoods.

Governments across the region are constrained by the ever-increasing and uncontrolled youthful population and financial commitment to deliver standard education to the citizens. That is why Appiah[3] in her study suggested that, if a West African country intends to increase the income per capita amongst its citizens, the first thing to do is to increase educational expenditure, which can directly improve human capital for productivity.

In Figure 3, the country with the highest educational expenditure in 2018 in West Africa is Sierra Leone, at 32.7 percent of total government expenditure, representing 6.9 percent of gross domestic product. Burkina Faso's educational expenditure is 22.7 percent of total expenditure, representing 5.4 percent of gross domestic product, followed closely by Togo and Senegal at 4.8 percent and 4 percent, respectively, according to the data. Ghana spends 18.6 percent of total government expenditure on education, which amounts to four percent of GDP. Also, according to the 2018 report, the percentage of educational expenditure on total government spending has significantly been on the increase[8]. This increase has ensured that Ghana has constantly met the ECOWAS education expenditure threshold provided in the ECOWAS education charter.

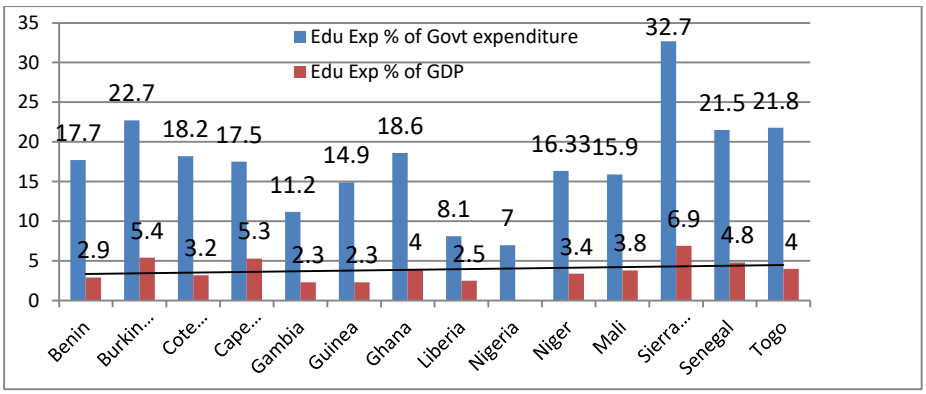

Figure 3: Educational Expenditure of ECOWAS Countries in 2018
Source: World Bank data (2020)

II. Material And Methods

Model Specification

This study employed the theory of production for its model in[9,10] defined a production process as a collection of components of inputs necessary to produce one quantity of output. It includes a production function, which is a technical relationship that connects inputs and outputs of factors. The production theory states that education spending and other macroeconomic factors (factor inputs) determine income per capita (factor output) in this study, implying that there is a functional link between income per capita and education spending and other macroeconomic variables. In this study, the Cobb-Douglas production function was used to model the functional connection between factor outputs (income per capita) and factor inputs (education spending and other macroeconomic factors) in Ghana. Other studies that have applied the production function model include[9, 11] and others in the study of various topics. This Cobb Douglas production is represented as:

$Y = AK^{a}\, L^{\beta}$…….1

Where

Y = Output, A = Total factor productivity, K = Capital and L = Labor

αand β= elasticity coefficients of capital and labor, respectively.

The independent variables in this study are defined as education expenditure, money supply, gross capital formation, policy rate, labour force participation rate, and education enrolment. The dependent variable is income per capita. The framework postulates that education expenditure and other macroeconomic variables directly affect income per capita. This is shown in the functional form as:

$$I_{t=}\ \ f(EE, MS, K, INT, L, EDU, \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2)$$

This relationship in the form of Cobb- Douglas production function (3) is represented as;

$I_{t=}A(EE)_{t-1}^{\beta}(MS)_{t-2}^{\beta}\, K_{t-3}^{\beta}(INT)_{t-4}^{\beta}(L)_{t-5}^{\beta}(EDU)_{t-6}^{\beta}\, u_t$……3

Where

I = Income per capita, EE= Education expenditure, L= Labor force participation rate, EDU= Education enrolment ratio, MS=Money supply, K=Gross capital formation, INT=Policy rate, t= year, μ= error term, β_i= elasticity coefficients and i=1, 2, 3,4…

The Cobb-Douglas production function, given in equation (3), is converted into natural logarithm as; to evaluate the link between income per capita and education spending and other macroeconomic determinants.

$$lnI_t = \beta_0 + \beta_1 lnEE_t + \beta_2 lnMS_t + \beta_3 lnK_t + \beta_4 lnINT_t + \beta_5 lnL_t + \beta_6 lnEDU_t + V_t \ldots\ldots 4$$

Where;

$\beta_0 = lnA, V_t \sim$ IIDN$(0, \sigma 2)$

As a priori, the signs of β_1 and β_6 are unknown as they can either be positive or negative. The relationship between the policy rate and income per capita is negative. Therefore, the coefficients of the policy rate are less than zero or negative, whilst the labour force participation rate, money supply, and gross capital formation has a positive effect on per capita income.

Data

The data utilized in the research was mainly secondary data from the[12], which consisted of yearly observations for each indicator from 1980 to 2020. This study examined education spending and its influence on income per capita using a quantitative survey approach. Description of the data used are as below;

Labour force participation rate: The labour force participation rate is the percentage of the population aged 15 to 64 who are economically active, characterized as all persons who offer labour for the production of goods and services over a certain time period.

Education Expenditure: Direct expenditure on educational institutions as well as educational-related public subsidies supplied to families and supervised by educational institutions make up public spending on education. This value is expressed as a proportion of GDP, separated into primary, secondary, non-tertiary, and tertiary levels. Other than ministries of education, public institutions comprise municipal and regional governments as well as other government agencies.

Income per Capita: The quantity of money earned per person in a certain location is referred to as income per capita. This may be in terms of states, regions, or a country's average per-person income and is used to assess living circumstances and quality of life in various places.

Policy rate*:* A central bank's policy rate is a short-term reference rate. In reality, three separate policy rates exist. The refinancing rate is the most important one, and it's the one that everyone speaks about in the news. It's the interest rate at which commercial banks can borrow from their central bank.

Gross capital formation*:* Gross capital formation is the planned inventory stock that manufacturers maintain to fulfil future needs, it is the increase in stock of real capital in an economy computed over time, and it is also the production of items that enables us to generate more in the economy. Capital and labour are used by every country to generate goods and services. Capital creation happens when capital stock increases. When people save, more capital is created. But, when the savings are employed to generate additional products and services, capital creation may expand much more.

Money Supply: The money supply (or money stock) is the total amount of money accessible in an economy at any given time in macroeconomics. It is the entire amount of currency circulating in the economy over a certain time period, including all liquid assets. Most nations measure their money supply relative to the financial policy available in the country, regulated by the nation's Federal Reserve banks.

Statistical Analysis

The Autoregressive Distributed Lag (ARDL) Model and the Granger causality approach was utilized to estimate the parameters in the model. Three stages are performed to ensure reliability of the estimations in the ARDL approach. To verify for stationarity, each of the individual variables in the regression model was first checked for unit root. Secondly, the research used the ARDL Bounds test approach to determine if the variables in the models have a long-run equilibrium relationship. Finally, it used the ARDL framework to estimate the long-run and short-run parameters in the models.

Diagnostics Test: Following the estimation of the linear regression models, a battery of diagnostic tests is run to see if the models have heteroskedasticity, serial correlation, residual normality, or multicollinearity. Serial correlation Lagrange multiplier chi-square tests for functional form misspecification, non-normal errors, and heteroskedasticity are among the tests. The regression residuals are also subjected to a Durbin-Watson (DW) test for autocorrelation. The goal of these diagnostics is to determine the model's reliability.

III. Result

Results of the Unit Root Test

The unit root test was used to explore the stationarity qualities of the variables before performing the ARDL test. The Augmented Dickey-Fuller (ADF) tests were performed to explicitly establish their order of

integration for all variables in levels and first difference. Table 1 and Table 2 show the results of both unit root tests for all variables at their levels and their first difference respectively.

Table 1: Unit Root Test for the Order of Integration using ADF at Levels

Variable	Constant Stats	P-Value	OI	Constant with trend Stats	P-Value	OI
LNI	0.240	(0.972)		-1.704	(0.731)	
LNEE	-1.719	(0.414)		-2.616	(0.276)	
LNMS	-1.271	(0.634)		-2.474	(0.338)	
LNINT	-2.665	(0.089)*	*I(0)*	-2.759	(0.220)	
LNK	-4.022	(0.003)**	*I(0)*	-3.644	(0.039)**	*I(0)*
LNL	0.665	(0.990)		-1.518	(0.807)	
LNEDU	-0.403	(0.899)		-3.058	(0.130)	

Note: IO represents order of integration. * and ** represent significance at the 10% and 5% levels respectively.

From the results of the unit root test in Table 1, the null hypothesis of a unit root for all variables cannot be rejected at all levels. All variables, with the exception of capital formation and policy rate, are not stationary at levels because their p-values are greater than the 5% significance threshold, and hence the null hypothesis is not rejected.

Table 2: Unit Root Test for the Order of Integration using ADF at First Difference

Variable	Constant Stats	P-Value	OI	Constant with Trend Stats	P-Value	OI
LNI	-5.498	(0.000)***	*I(1)*	-5.617	(0.000)***	*I(1)*
LNEE	-5.580	(0.000)***	*I(1)*	-5.509	(0.000)***	*I(1)*
LNMS	-7.070	(0.000)***	*I(1)*	-6.973	(0.000)***	*I(1)*
LNINT	-6.253	(0.000)***	*I(1)*	-7.227	(0.000)***	*I(1)*
LNK	-4.382	(0.000)***	*I(1)*	-4.572	(0.000)***	*I(1)*
LNL	-4.426	(0.001)***	*I(1)*	-4.408	(0.006)***	*I(1)*
LNEDU	-7.591	(0.000)***	*I(1)*	-7.525	(0.000)***	*I(1)*

Note: IO represents order of integration. *** and * represent significance at the 1% and 10% levels respectively.

The result shown in Table 2 demonstrates that all variables are stationary at first difference. This is because the null hypothesis of the presence of a unit root was rejected for all variable at the 1% significance level. As a result of this, we conclude that all variables are stationary at orders one [I(1)].

Analysis of the ARDL Test Results

The ARDL Bound test was used to determine whether the dependent variable (Income per capita (I)) and the independent variables (Education Expenditure (EE), Education enrolment (EDU), Money supply (MS), Policy rate (INT), Capital formation (K), and Labor force participation rate (L)) had a long-run relationship. The Akaike Information Criterion was used to identify the maximum number of lags for the investigation (AIC).

When the F-statistic is greater than the critical value bounds, we reject the null hypothesis that there is no co-integration, otherwise do not reject. Table 3 shows that the F-statistic (13.640) exceeds the 1% upper critical value bounds. Therefore, the null hypothesis is rejected, implying that the dependent variable and the independent variables are co-integrated. In other words, there is a long-run relationship between income per capita and education expenditure, policy rate, education enrolment, labour force participation rate, money supply, and capital formation. Having established the long-run relationship between the variables, the ARDL method is applied in the estimation of the parameters of the long run and short run.

Table 3: ARDL Bounds Test for Co-Integration.

F statistics	**Level of Significance**	**Lower bound**	**Upper Bound**
13.640***	1%	2.88	3.99
	5%	2.27	3.28
	10%	1.99	2.94

Note: *** represent significance at 1%.

The ARDL Long Run Results

From Table 4, the adjusted R^2 is 0.999; this indicates that all the independent variables explain about 99.9% of the variations in income per capita. Also, the F-statistic with a coefficient of 362.598 is statistically significant at the 1% significance level. This implies that all the variables under study jointly determine income per capita in Ghana.

According to economic theory, investment made in education (in the form of education expenditure) increases per capita income. From Table 4, education expenditure has a positive and significant effect on income per capita at a 10% significance level. Statistically, this is in consonance with the a-prior expectation. The coefficient of 0.720 implies that a 1% increase in education expenditure will lead to approximately a 0.720% increase in income per capita. That is, every one percent increases in educational spending results in a 72 percent return on investment for Ghana's income per capita. Generally, a resilient economy depends on the human capital required for productivity, which depends on education. This is because education improves the competence, skills, ability, and productivity of citizens through continuous learning. An educated population will lead to the efficient use of human and natural resources in the country. This will not only increase national output but will also increase income per capita at the same time. The findings of this study are consistent with the findings of[13, 3, 14].

Table 4: Estimated ARDL long run Coefficients Results

Variable	Co-efficient	Std Error	T- Statistic
LNEE	0.720*	0.329	2.186
LNINT	-0.227	0.264	-0.857
LNK	-0.606**	0.210	-2.882
LNL	-29.454**	8.182	-3.600
LNEDU	2.186	2.921	0.748
LNMS	-2.031**	0.775	-2.621
C	152.553**	38.019	4.013
F-Statistic	362.598***		
Adjusted R^2	0.999		

*** And * represents statistical significance at 1%, and 10% respectively.

The outcomes of this study showed that policy rates had no long-term influence on income per capita because the p-value is statistically not less than the 10% significance threshold. Similarly, education enrolment has a positive impact on income per capita with a coefficient of 2.186 but has no long-term influence on income per capita because the p-value is statistically not less than the 10% significance threshold.

According to Table 4, capital formation has a negative influence on income per capita with a margin of 0.606 percent and is statistically significant at the 5% significance level in the long run. The coefficient of -0.606 percent indicates that when capital formation increases by 1%, income per capita decreases by 0.606 percent. This is in contrast to economic theory, which states that capital development should raise income per capita by increasing investment and boosting purchasing power. The study of[14] findings is in contrast with the findings of this study.

In addition, the labour force participation rate has a statistically significant negative influence on income per capita in the long run. The coefficient of lnL is -29.454, as shown in Table 4, this implies that, whenever lnL grows by 1%, income per capita falls by 29.454%. This is contrary to economic theory. However, this coefficient is statistically significant at the 5% significance level. This is conceivable when a large number of people of working age want to work but are unable to find work. They become a burden to the working group in this situation, lowering national output and national income per capita. Clark[15] found a negative association between labour force participation rate and income per capita, but Claudia[16] found a positive link between labour force participation rate and income per capita.

Finally, the money supply was expected to have a positive impact on income per capita. However, the results from Table 4 indicated that money supply, with a coefficient of -2.031, had a negative impact on income per capita in Ghana. The negative coefficient implies that a percentage increase in money supply will result in a 2.031% decrease in income per capita in the long run. However, this coefficient is statistically significant at the 5% significance level. The negative sign contradicts prior expectations. This is because an expansionary monetary policy increases investment and, ultimately, national output and, consequently, income per capita.

The ARDL Short Run and ECM Results

The last step in the ARDL approach is to investigate the short-run effects after having estimated the long-run co-integration. Estimation results are presented in Table 5. The Error Correction Model (ECM) coefficient presents how quickly variables converge to equilibrium, and it should have a statistically significant coefficient with a negative sign. The coefficient of CointEq(-1) is -0.753, and significant at 1%. This implies that, the deviation from the long run per capita income is corrected by 75.3% in the model by the coming year. This finding shows that the speed of adjustment is high in the model.

Table 5: Estimated Short-Run Error Correction Model

Variable	Coefficient	Std. Error	T-Statistic
D(LNEE)	-0.081	0.047	-1.731
D(LNEE(-1))	-0.156***	0.021	-7.445
D(LNEE(-2))	-0.144***	0.022	-6.532
D(LNINT)	-0.105***	0.020	-5.137
D(LNK)	0.252***	0.054	4.712
D(LNK(-1))	-0.052***	0.006	-8.604
D(LNL)	-2.983**	1.095	-2.724
D(LNL(-1))	25.948***	2.590	10.019
D(LNL(-2))	9.097***	1.678	5.423
D(LNEDU)	2.040***	0.251	8.113
D(LNEDU(-1))	-1.202***	0.209	-5.744
D(LNMS)	-0.832***	0.113	-7.384
D(LNMS(-1))	-0.742***	0.094	-7.917
CointEq(-1)*	-0.753***	0.047	-16.183

*** represents statistical significance at 1%

Interestingly, the previous year's expenditure on education and two years lag of expenditure on education have a negative and significant impact on income per capita at a 1% significance level, whilst current year expenditure on education has no statistically significant impact on income per capita in the short run in Ghana. From the results, when the previous year's education expenditure and the previous two years' education expenditure increase by 1%, income per capita decreases by 0.156% and 0.144%, respectively.

Similarly, the policy rate has a negative impact on income per capita in the short run and is statistically significant at the 1% significance level. The policy rate coefficient, which is-0.105, implies that when there is a 1% increase in policy rate, income per capita decreases by 0.105% in Table 5.

Again, the result in Table 5 confirms the a-prior expectation that capital formation contributes positively to income per capita with a coefficient of 0.252%. However, the one-year lag of capital formation has a negative impact on income per capita with a coefficient of -0.052 and is statistically significant at a 1% significance level in the short run.

Similar to the result in the long run, according to Table 5, the labour force participation rate contributes negatively to income per capita with a coefficient of -2.982% and is statistically significant at a 1% significance level in the short run. Surprisingly, the one-year and two-year lags of the labour force participation rate have a positive impact on income per capita and are statistically significant at the 1% significance level, with coefficients of 25.948% and 9.097%, respectively. These coefficients imply that when the one-year and two-year lags of the labor force participation rate increase by 1% in the short run, income per capita will increase by 25.948% and 9.097%, respectively, in the short run.

Also, education enrolment has a positive impact on income per capita with a coefficient of 2.040 and is significant statistically at the 1% significance level in the short run. In the short run, however, the one-year lag of the education enrolment ratio has a negative impact on income per capita with a coefficient of -1.202% and is statistically significant at the 1% significance level.

More so, current year money supply and previous year money supply have a negative impact on income per capita in the short run and are significant at the 1% significance level. From the results, a 1% increase in current year money supply and previous year money supply results in a decrease of 0.832% and 0.742% in income per capita, respectively in the short run.

Analysis of the Granger Causality Test Results

The Granger causality findings are shown in Table 6. The results in Table 6 indicate that education expenditure does not granger cause income per capita. In the same vein, income per capita does not granger cause

education expenditure. Hence, there is a no directional relationship between education expenditure and income per capita.

Table 6: Estimated Results of the Granger causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
LNEE does not Granger Cause LNI	39	1.740	0.191
LNI does not Granger Cause LNEE		0.300	0.743
LNEDU does not Granger Cause LNI	39	4.632	0.017**
LNI does not Granger Cause LNEDU		0.314	0.733
LNK does not Granger Cause LNI	39	0.324	0.725
LNI does not Granger Cause LNK		0.513	0.603
LNL does not Granger Cause LNI	39	4.031	0.027**
LNI does not Granger Cause LNL		0.087	0.917
LNMS does not Granger Cause LNI	39	2.570	0.091*
LNI does not Granger Cause LNMS		0.125	0.883
LNINT does not Granger Cause LNI	39	1.543	0.228
LNI does not Granger Cause LNINT		0.438	0.649

** and * represents statistical significance at 5%, and 10% respectively.

Also, income per capita does not granger cause education enrolment, whilst education enrolment does granger cause income per capita. Hence, there is a unidirectional relationship between education enrolment and income per capita.

Again, capital formation does not cause income per capita. Likewise, income per capita does not Granger cause capital formation. This implies that past values of capital formation cannot be used to predict future values of income per capita.

More specifically, the labour force participation rate causes income per capita, but income per capita does not cause labour force participation. This indicates that the labour force participation rate and income per capita have a one-way connection. This means that previous labour force participation rates may be used to forecast future income per capita values, but not the other way around.

Furthermore, the policy rate has no causal relationship with income per capita. Similarly, income per capita does not granger cause policy rate. This means that the previous values of variables cannot be utilized to predict their future values.

Finally, money supply granger causes income per capita. However, income per capita does not granger cause money supply. This indicates a one-way relationship from money supply to income per capita.

Model Diagnostics and Stability Test Results

The estimated parameters of a time series data, according to Hansen (1994), might alter with time. As a result, running parameter tests to validate model specification errors that may arise from unsteady parameters is both necessary and important. It may also result in bias estimations being eliminated using model diagnostics. The findings of the model diagnostics are presented in Table 7 and Figure 4.

Table 7: Model Diagnostics Tests Results

Diagnostic	**Statistic**	**Conclusion**
Breusch-Pagan-Godfrey Test	F-statistic 0.742(0.729)	There is no Heteroskedasticity.
Breusch-Godfrey Serial Correlation LM Test	F-statistic 0.002(0.989)	No serial correlation
Normality Test	Jarque-Bera 1.094(0.579)	Error normally distributed
Ramsey Reset Test	F-statistic 2.556(0.185)	No model misspecification

Table 7 shows the outcomes of the diagnostic tests. The residual distribution's normality test shows that errors are normally distributed. This is due to the statistical significance of the Jarque-Bera test. The null hypothesis is not rejected by the Breusch-Godfrey Serial Correlation LM series correlation test. As a result, the model's series have no serial correlation. The absence of autoregressive conditional heteroskedasticity in the residuals is demonstrated by the Breusch-Pagan-Godfrey Test. This shows that the model was correctly calculated. The adjusted R squared of 0.999 is seen in the goodness of fit statistics.

Finally, the Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUM) are used to examine the stability of the long run coefficients as well as the short run dynamics. In time series data, the stability of the regression coefficients is important, especially when we don't know when structural change occurred[17, 18]. This test determines if the regression equation has remained consistent over time.

The null hypothesis for both the CUSM and CUSUM of square is that the vector coefficient is the same in every period and is displayed against the 5% significant level critical bound (i.e., all coefficients in the error correction model are stable). Both the CUSUM and the CUSUM of square residuals plots are inside the borders, as shown in Figure 4. This indicates that the parameter stability has been maintained within its critical boundaries, indicating that the long run coefficients of both models have remained stable.

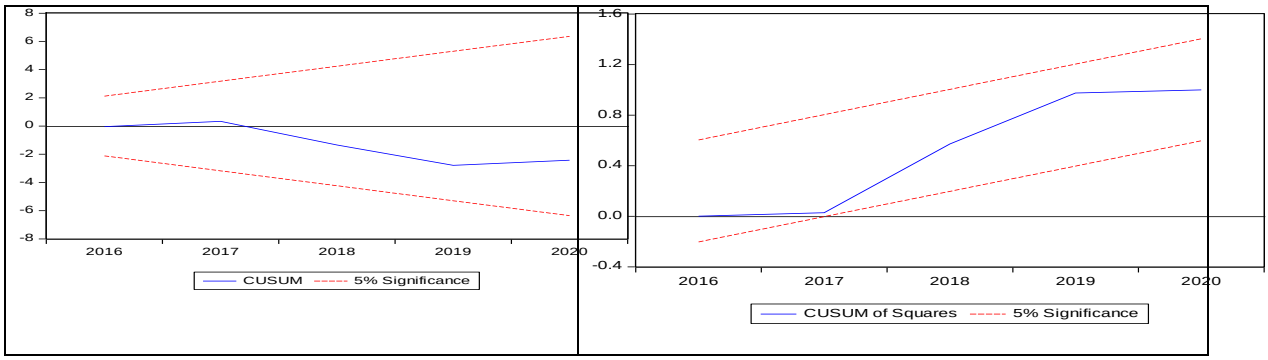

Figure 4. Plots of CUSUM and CUSUM of Squares

IV. Conclusion

The main findings have vital implications for the economy of Ghana. Therefore, based on the findings, the following are the recommendations of the study:

To begin with, it has been shown that educational spending has a long-term positive influence on income per capita. As a result, policymakers must continue to invest in well-coordinated and strategic educational initiatives to fill the vacuum created by a theoretical academic system that pays little attention to practical and technical education. Based on the findings, the research suggests that the government prioritize educational spending in order to satisfy the yearly quota of 20% set by UNESCO principles and policy.

Secondly, in both the long and short runs, Ghana's money supply had a causal relationship with and a negative influence on per capita income. As a result, it is advised that the monetary authorities provide a suitable and acceptable level of liquidity (money supply) in order to avoid injecting too much money into the economy, which would have a negative impact on demand and supply of goods and services.

Thirdly, in both the long and short runs, the labour force participation rate has a negative and statistically significant influence on income per capita. As a result, it is advised that the government and policymakers use policies to generate jobs for the jobless working age group in order to decrease, if not eliminate, the negative impact of the labour force participation rate on per capita income. This can be accomplished by enacting tax breaks for private investors or providing subsidies for certain inputs to encourage individuals to invest in regions with the potential to create jobs.

Finally, further research should be conducted to determine which types of specific educational expenditures have an influence on income per capita so that the government may focus on them and divert others to the private sector.

References

[1]. Zaman K (2008). An Investigation For Pro-Poorness Of Government Educational Policy In Pakistan (1991 - 2007). 2nd International Conference On Assessing Quality In Higher Education, 1st – 3rd December, 2008, Lahore – Pakistan

[2]. Riasat S., Atif R. M. And Zaman K. (2011) Measuring The Impact Of Educational Expenditures On Economic Growth: Evidence From Pakistan, Educational Research (ISSN: 2141-5161) Vol. 2(13) Pp. 1839-1846

[3]. Appiah, E. N. (2017). The Effect Of Education Expenditure On Per Capita GDP In Developing Countries. International Journal Of Economics And Finance, 9(10), 136-144.

[4]. Africa Centre For Energy Policy. (2020). Agriculture And The Ghanaian Economy. In Value For Money (VFM) Analysis Of Oil-Funded Irrigation Projects In Ghana: The Case Of Keyime And Ohawu Irrigation Projects In The Volta Region Of Ghana (Pp. 7–15). Africa Centre For Energy Policy. Http://Www.Jstor.Org/Stable/Resrep31216.4

[5]. Mercan M. And Sezer S. (2014), The Effect Of Education Expenditure On Economic Growth: The Case Of Turkey, Procedia - Social And Behavioral Sciences 109 (2014) 925 – 930

[6]. Shafuda C. P. P., & Utpal K. D. (2020). Government Expenditure On Human Capital And Growth In Namibia: A Time Series Analysis. Journal Of Economic Structures, Volume 9, Article Number: 21 (2020)

[7]. Ayeni, A. O., & Omobude, O. F. (2018). Educational Expenditure And Economic Growth Nexus In Nigeria (1987-2016). Journal For The Advancement Of Developing Economies Unl.Edu/Jade/35

[8]. Owusu-Nantwi V., (2015), Education Expenditures And Economic Growth: Evidence From Ghana. Journal Of Economics And Sustainable Development (Paper) ISSN 2222-2855 (Online) Vol.6, No.16, 2015.
[9]. Adu-Gyamfi, G., Nketiah, E., Obuobi, B., & Adjei, M. (2019). Trade Openness, Inflation And GDP Growth: Panel Data Evidence From Nine (9) West Africa Countries. Open Journal Of Business And Management, 8(1), 314-328.
[10]. Koutsoyiannis, A. (2003): Theory Of Econometrics: An Introductory Exposition Of Econometric Methods: 2nd Ed. Palgrave Publications. N.Y. 10010.
[11]. Fosu, A.K. (1990). Exports And Economic Growth: The African Case. World Development Journal, 18, 831-835.
[12]. World Bank's World Development Indicators (2021)
[13]. Oluwatobi, S. O., & Ogunrinola, I.O. (2011). Government Expenditure On Human Capital Development: Implications For Growth In Nigeria. Journal Of Sustainable Development, 4(3), 7280
[14]. Ahamba, K. O., Obi, K. O., Ezenekwe, U. R., Kalu U. C. (2020). Analysis Of Effects Of Government Education Expenditure And School Attainment On Income Per Capita In Nigeria. International Journal Of Academic Research In Business And Social Sciences, 10(8), 121–146.
[15]. Clark, R. L., York E. A., & Anker R. (1999). Economic Development And Labor Force Participation Of Older Persons, Population. Research And Policy Review Journal, Vol. 18, No. 5 (Oct., 1999), Pp. 411-432 (22 Pages)
[16]. Claudia, G., (1986). The Female Labor Force And American Economic Growth. National Bureau Of Economic Research Paper 890–1980 (P. 557 – 604)
[17]. Bahmani-Oskooee, M. (2001). Nominal And Real Effective Exchange Rates Of Middle Eastern Countries And Their Trade Performance. Applied Economics Journal, 33:1, And 103-111.
[18]. Oteng-Abayie, E. F., & Magnus F., J., (2008). Aggregate Import Demand And Expenditure. Journal Of Social Sciences 4 (1): 1-6, 2008.