Impact of Economic Growth on Poverty Reduction: Evidence from Ghana

Ofori Frimpong Henneh

Department of Management, Central University of Nicaragua (UCN), Nicaragua

Abstract

The main purpose of this article is to examine the effect of economic growth on poverty reduction in Ghana using monetary measurement approach. A time series data was collected on the variables deemed to influence the above relationship including headcount poverty, government spending, inflation, unemployment, and per capita growth in GDP. The data span from 1990 to 2021 and was sourced from the World Development indicators wxebsite. The data was analyzed using autoregressive distributed lags (ARDL) regression model and augmented Dickey-Fuller (ADF) for unit root test. The findings showed that economic growth and government spending have an inverse but significant interrelationship with reduction of poverty. Also per capita GDP has a significant positive relationship with poverty reduction. The annual inflation levels have an inverse insignificant impact on poverty reduction. The relationship between unemployment and poverty alleviation is positive though insignificant. Government should put appropriate policies in place to sustain economic growth at appreciable levels in order to reduce poverty. Agricultural productivity should be improved to provide jobs for teeming unemployed youth. Inflation should be curtailed and kept at moderate levels to ginger economic activities in the country. The Government should spend on pro-poor activities and economic infrastructure to grow the economy, create jobs, reduce income disparity, and alleviate poverty.

Keywords: Monetary poverty, Multidimensional poverty, Economic growth, Government spending, Ghana.

Introduction

Monetary poverty has been the dominant phenomenon in the studies of the association between growth of the economy and poverty reduction. The other measurement procedure which has not attracted much consideration is multidimensional poverty. A lot of conversation has dominated the academic discussions and policy levels in recent years involving the extent of influence the progress of an economy has on poverty alleviation particularly in less developed economies. Achieving sustainable economic progress has a great influence on the development of any nation.

Several studies have stressed the importance of strong growth of the economy to solving the challenges of poverty. The studies by [1, 2], lend credence to the significance of economic progress on decline in poverty. Findings from [3] using data from 75 nations indicate that increased rise in incomes of individuals resulted in a quick drop in poverty. Similar results on growth-poverty nexus have been espoused by [4] and [5]. The growth of income per person is considered key for poverty alleviation since income distribution largely remains relatively stable in several economies. [3-5], all support this assertion.

The influence of economic progress on decline in poverty could be via growth effect or distribution effect [3]. Where income distribution is relatively stable, any variation in economic growth is due to the growth effect. In effect, where the spread of income among the population is stable and the poverty line indicated, any appreciation in mean income of

the people will result in poverty reduction. Likewise, where the income spread favours the poor, poverty is reduced. With a stable income levels and poverty threshold, any income distribution which reduces income inequality would result in decline in poverty [3-5]. The average increases in income, the initial level of income disparity, as well as changes in inequality level will determine the rate of poverty reduction [3, 6]. A rise in income or consumption arising from economic growth greatly affects poverty alleviation [7-10].

Academics, researchers, and policy makers tend to agree on the interconnections between economic progress, income disparity and poverty alleviation [11], however, the conceptualization and measurement of growth in favour of the poor has been a contentious debate in recent times. Several different explanations and dimensions have been given to a growth strategy intended to help the poor. The contentious debate is whether to measure growth favouring the poor in "relative" or "absolute" terms [11]. Growth in relative terms can be described pro-poor where that growth results in the poor receiving an income higher than the average of the population. In effect, the rate of growth of the poor person's income must exceed that of the economy. This relativity concept has been widely accepted in literature in spite of its flaws [11-12]. Putting much emphasis on the inequality aspect at the expense of absolute growth may result in adopting growth strategies that do not produce maximum returns for anyone.

The absolute growth concept emphasizes the kind of growth that brings real increase of growth to the poor [11-12]. Growth favouring the poor is where in absolute terms the poor people gain from it in real terms, no matter how the overall benefits are shared among the people in the economy. Some economists and policy makers try to strike a balance between absolutism and relativism aspects of poverty by recognizing a likely tradeoff between high growth and fair distribution of growth among the

population [11-12]. [12] advocate for some measure of government involvement in pro-poor and social activities to enhance poverty alleviation as against relying solely on economic growth to transform the poor. In an economy where there is high income disparities growth is stifled [13]. The poor, with little income and no access to capital are unable to take advantage of growth-enhancing avenues for investing in assets and knowledge. An increased growth can impact poverty levels in numerous ways. One significant means is providing more job opportunities and higher remuneration [1, 5]. Also, where government raises more revenue through taxation and applying it in pro-poor growth activities, and support social services like health, education, and sanitation, which go a long way in supporting the poor. [1] express that an increased growth decreases poverty through quality jobs and better real income. [14] keenly advocates for greater government spending on social and pro-poor activities to benefit the poor.

The conventional measure of poverty in Ghana has been the monetary poverty assessment using consumption expenditure. The monetary measurement uses income or consumption whereas non-monetary measurement uses other socioeconomic factors. The asset index approach based on Demographic Health Surveys (DHS) has been accepted as the best measure of multidimensional poverty recently [6, 15-16]. Economic transformation and poverty reduction have been the cardinal goals pursued at all levels of government. Ghana, with the support from IMF has for the last forty years undergone through different economic and structural changes to eliminate poverty [17]. Other social interventions and pro-poor programs in education, health and infrastructure have been carried out as a way of reducing poverty particularly among the vulnerable [18].

There have been a lot of interesting and strategic discussions around economic progress and decline in poverty by policy makers as well as academia in recent times. Several studies have

found a strong relationship between growth of the economy and reduction in poverty and that growth of the economy has a role in reduction of poverty. An empirical study by [19-21] stress the contribution of the growth of economy in alleviating poverty even though it can also result in increased inequality. In effect, the essence of this paper is to assess the elasticity of poverty expressed in monetary terms to growth of the economy in Ghana. In recent times Ghanaian economy has experienced a phenomenal growth which averages over 7% per annum. This growth has, however, not translated into poverty reduction and job creation. This paper seeks to unravel why Ghana's impressive economic performance is not being translated to reduction of poverty. Using the international poverty line of $1.90 PPP$ per day, this article provides a new dimension to knowing how poverty is affected by economic growth in Ghana.

The remaining sections are arranged as follows: section 2 reviews the literature and empirical studies about the subject matter, the methods and data are specified in section 3, while empirical results are addressed in section 4. Section 5 concludes and suggests measures to be implemented to address the challenges.

Poverty and Development Paradigm

The core and integral principle of development is poverty reduction. [22]. [23] identifies poverty and inequality as the biggest challenges confronting the world today and that it is the duty of governments to fight and break poverty and inequality cycle. The problem of poverty traps has been extensively researched in growth and development economics literature [24-25]. The situation is such that the poor countries are destined to be poor based on their peculiar nature which reinforces itself. [26-27] indicate that countries have fallen into poverty traps [24], because of low savings and inadequate capital to turn the economy to prosperous state. The core challenge to development is how to reduce poverty. The reduction of poverty is seen as fundamental to

development as it is core to human well-being. [14] observes that the development and the attainment of human capabilities are based on economic growth. Efforts have been made over time to eliminate poverty through various development measures which have not been achieved in developing countries. The initial thinking of development was viewed from the standpoint of economic growth, as 'development' was equated with economic growth [28].

Various hypothetical propositions have been advanced to address poverty particularly in developing countries. [29], based on human rights approach proposed several policy interventions to increase the capability of poor persons to function in the society. These include creation of job and business avenues for the poor; strengthening the resources base of poor persons by safeguarding the ecosystem; provision of accessible and affordable health care and education; provision of good nutrition to the poor child; making globalization work better for the benefit of the poor; establishing strong governance and institutions; tackling gender inequality issues; developing poverty reduction strategies; and ensure food security. [30] identify eight critical measures to alleviate poverty in Africa as stipulated by United Nations Economic Commission for Africa. These include developing national strategies and policies to incorporate the people, environment, science, and technology; embarking on social services infrastructure by targeting the poor; tackling gender disparities; beefing up the capability of the people to adopt new ways of doing things; integration of African continent; good governance; and prevention of HIV/AIDS pandemic.

The World Bank over the years has proposed and modified its recommendations for tackling poverty across the globe. In the 1950s and 1960s the emphasis was on building infrastructure and capital to expand the economies. This shifted in the 1970s to health and education, and in the 1980s to improvement in economic management

and greater market participation in the economy. The 1990s saw the shift of emphasis to three key areas; encouraging rapid labour intensive growth through open markets and economy and investments in infrastructure, guaranteeing basic social amenities for the poor, and develop a detailed strategy for alleviating poverty and creation of safety nets for the poor [30].

The MDGs with poverty reduction as its central theme has stretched development to include economic, social, cultural, political, and environmental to reduce poverty [31] [32]. A country experiences economic growth and development where its economic output increases faster than its population growth. However, [32] posits that the economic growth alone does not automatically lead to development because the global economy has experienced phenomenal growth over the years, yet several countries are still confronted with serious developmental issues. [33] argues that, to develop an economy totally calls for incorporating economic transformation with political, social, and cultural matters. As [34] puts it, "development only takes place when there is a decline in poverty, unemployment and inequality all at the same time" and no development if one or more of these factors are on the increase. [22] advocates for the overall welfare of each person in a society factored into any development process. [14] observes that the core objective of social development is, 'freedom' which is the ability of humans to realize their full capability. Human development involves enhancing the choices of people which comprise healthy living, knowledge, and good living conditions. Many opportunities for people remain elusive if human development elements are not present [35]. The decline in poverty in a country indicates prosperity for the citizens. From an economic point of view, poverty can occur based on three factors; 1) unequal availability of resources to everyone resulting in inequality of income; 2) variations of resource quality possessed by individuals; and 3) unequal opportunity for accessing capital [36]. These

three poverty factors result in [24] theory of "vicious cycle of poverty" [36].

Several studies have been conducted to establish economic growth-poverty nexus and factors that determine economic growth. [37] indicates that consumption, private investment, and government expenditure have a huge influence on the growth of the economy. [20] expresses that poverty has an inverse and strong inhibitive impact on the growth of an economy. [38] posits that household consumption greatly enhances economic growth. [36] find that economic growth is driven by investment which creates and expands the productive capacity by beefing up availability of capital which in turn enhances the well-being of the poor. [39] identify public investment as well as foreign capital investment as strong supporters of economic growth. [40-41] all agree that public spending especially on infrastructure enhances economic growth. According to [20, 38] and [36], the poor are likely to have very little chance to get borrowed capital and investment. Having little income implies a low standard of living, poor nutrition, and low education for the poor, which results in little productivity and low progress of the economy.

A study of various countries conducted by [3, 42, 43] all indicate that the association between progress of the economy and alleviation of poverty is strong and directly related. [43] find that a 10 percent appreciation in the living standards results in a 31 percent drop in the percentage of people living below the poverty cut-off, implying that growth brings about a fall in poverty headcount. [3] report that the mean income of poor persons, who are within the lowest twenty percent of the society, increases at the same rate as the country's mean incomes using data for 92 countries from 1950 to 1999.

Methods

The quantitative research design method and secondary data collection approach were used to gather the data from the World Development Indicators. The desk survey strategy was

adopted to gather a time series data spanning 1990 – 2021 for the dependent and independent variables. Explanatory research design was adopted to present and interpret the results. The study also adopted autoregressive distributed lags (ARDL) regression model and augmented Dickey-Fuller (ADF) for unit root test as analysis tools to derive the results. The overall research strategy consists of quantitative data and processes to answer the questions for the study.

Model Specification

The explanatory variables adopted for this study and influence the scale of poverty include government spending as a percentage of GDP. Governments have been undertaking various programmes with the view to eliminating poverty and creating decent jobs for the poor as well as providing social amenities for them. Governments spend resources on goods and services, infrastructure developments, transfers to the poor and vulnerable, and others to enhance and grow the economy which have impact on poverty reduction. Therefore, government spending as percentage of GDP has been used as proxy for government expenditure. The level of average inflation in the country has been used as one of the variables affecting poverty. Inflation (CPI) is added to compute mean variation in the quoted amount for products and services. This is included to measure the impact of the stabilization of macro economy on poverty [44]. The purchasing power of the poor are influenced by the inflation rate in the country. Higher inflation has an inverse influence on the growth of an economy as it decreases amount of products that can be bought by the people and lowers their living standards. Unemployment is where people in the working class are actively looking for jobs but cannot find any. If people are unemployed, it affects their ability to

effectively take part in economic growth and earning a decent standard of living, and therefore become poor. [45] explains the main processes for quickening poverty alleviation as employment generation, knowledge acquisition, infrastructural growth, and growth in agriculture output. As such a growth in agricultural productivity will directly translate to a significant creation of jobs and poverty reduction in the country.

The ARDL (1,0,0,0,0,0) regression model for the relationship between poverty headcount (PHC), Economic Growth (EcoGrow), Government Expenditure (GovExp), log of GDP per Capita (lGDPperCapita), Inflation (Infl), and Unemployment (Unemp) can be written as:

$$PHC_t = \propto + \beta_1 PH_{t-1} + \beta_2 EcoGrow_t + \beta_3 GovExp_t + \beta_4 lGDPperCapita_t + \beta_5 Infl_t + \beta_6 Unemp._t + \varepsilon_t$$

Where:

PHC_t is the poverty headcount at time t; PHC_{t-1} represents poverty headcount at time t-1; $EcoGrow_t$ represents Economic Growth at time t; $GovExp_t$ represents Government spending at time t; $lGDPperCapita_t$ is the log of GDP per Capita at time t; $Infl_t$ represents Inflation rate at time t; $Unemp_t$ represents Unemployment rate at time t; α is the constant term or intercept; $\beta1$ is the coefficient of PHC_{t-1}, which captures the impact of past poverty headcount on current poverty headcount; $\beta2$, $\beta3$, $\beta4$, $\beta5$, and $\beta6$ are the coefficients of $EcoGrow_t$, $GovExp_t$, $lGDPperCapita_t$, $Infl_t$, and $Unemp_t$, respectively, which capture the impact of each independent variable on poverty headcount; ε_t is the error term.

Results

The results from the analysis are presented below:

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Povertyheadcountra~o	32	21.031	9.61	8.5	36.3
GDP	32	5.309	2.497	0.51	14.05
GovExp	32	10.102	2.35	6.96	15.31
l GDPperCapita	32	8.157	0.291	7.785	8.656
Inflation	32	19.396	13.03	4.87	59.46
Unemployment	32	5.619	2.12	2.17	10.46
Source: Author's computations					

Table 1 reveals the average poverty headcount ratio of 21.031 indicating that, on average, more than 21% of the Ghanaians live beneath the daily poverty cut-off of $1.90 PPP$. This highlights the need for urgent action to decrease poverty in the economy. The standard deviation of 9.61 also suggests that the poverty headcount ratio varies widely across different regions in Ghana, which further emphasizes the need for targeted poverty reduction initiatives. The mean EcoGrow of 5.309 and the standard deviation of 2.497 suggest that the economic growth in Ghana has been unstable over the years. This indicates the need for policies that can stabilize growth of the economy to promote decreasing poverty in a sustainable way. The mean GovExp of 10.102 and standard deviation of 2.35 indicate that the government has been investing heavily in various sectors to boost growth and reduce poverty. However, it is essential to evaluate the effectiveness of these investments in reducing poverty in the country.

The average GDPperCapita of 8.157 and standard deviation of 0.291 suggest that the GDP per capita has been steadily growing over the years. This is a positive development that can result in decreasing poverty in the country. The mean inflation rate of 19.396 and standard deviation 0f 13.03 indicate that Ghana has been experiencing high inflation, which could be hindering its efforts to alleviate poverty. Therefore, it is imperative to implement programs that can control inflation in the country to promote sustainable growth of the economy and fall in poverty. Finally, the mean unemployment level of 5.619 and standard deviation of 2.12 indicate that, on average, more than 5% of the population is unemployed, which could be contributing to the rising poverty levels. Therefore, there is a need to implement policies that promote job creation in the country to reduce unemployment and poverty levels.

Table 2. Pairwise Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) Povertyheadcou~o	1.000	-	-	-	-	-
(2) EcoGrow	-0.268	1.000	-	-	-	-
	(0.138)	-	-	-	-	-
(3) GovExp	0.564	0.127	1.000	-	-	-
	(0.001)	(0.488)	-	-	-	-
(4) l_GDPperCapita	-0.977	0.227	-0.572	1.000	-	-
	(0.000)	(0.212)	(0.001)		-	-
(5) Inflation	0.537	-0.306	0.298	-0.544	1.000	-
	(0.002)	(0.088)	(0.097)	(0.001)	-	-
(6) unemployment	0.472	-0.332	0.268	-0.546	0.408	1.000
	(0.006)	(0.063)	(0.138)	(0.001)	(0.021)	

Source: Author's computation

The pairwise correlation table indicates the correlation coefficient and p-values in brackets with acceptance levels of significance at 1%, 5%, and 10%. From the pairwise correlations table, we can observe that there is a negative correlation between poverty headcount and EcoGrow (-0.268). The correlation coefficient is statistically significant at a 10% significant level (p-value=0.138). Therefore, we can conclude that as EcoGrow increases, poverty headcount decreases. This conforms to the general understanding that economic growth results in a decline in poverty. Moreover, there is a direct correlation between poverty headcount and inflation (0.537), which is statistically significant at a 1% significant level (p-value=0.002). This suggests that as inflation rises, poverty headcount also increases. This suggests that policymakers should focus on managing inflation to reduce poverty. Inflation can be managed by implementing appropriate monetary policies such as interest rates, exchange rates, and reserve requirements.

There is a direct link between poverty headcount and government expenditure (0.564), which is statistically significant at a 1% significant level (p-value=0.001). This means that a rise in government expenditure results in poverty headcount rise. Hence, policymakers must prioritize government expenditure on poverty reduction programs. Such policies may include social welfare programs, public works programs, and targeted subsidies, amongst others. The pairwise correlation between poverty headcount and GDPperCapita is negative (-0.977), and the correlation coefficient is statistically significant at a 1% significant level (p-value=0.000). The implication is that as GDP per capita increases, poverty headcount decreases. Therefore, policymakers should focus on increasing GDP per capita to reduce poverty. This can be achieved through policies that promote economic growth, such as investment in infrastructure, education, and healthcare.

The pairwise correlation table also indicates that there is a direct correlation coefficient of 0.472 between poverty headcount and unemployment. This indicates that poverty headcount tends to increase as unemployment increases. The p-value of 0.006 is below the 1% significant level, which suggests that the correlation is statistically significant at 1% level. This implies that there is strong evidence that the positive correlation between poverty headcount and unemployment is not a chance occurrence.

Trend lines

The graphs below provide a general pictorial overview of the movement of the individual variables over time, providing a vague idea of stationarity in the data series over the period under consideration.
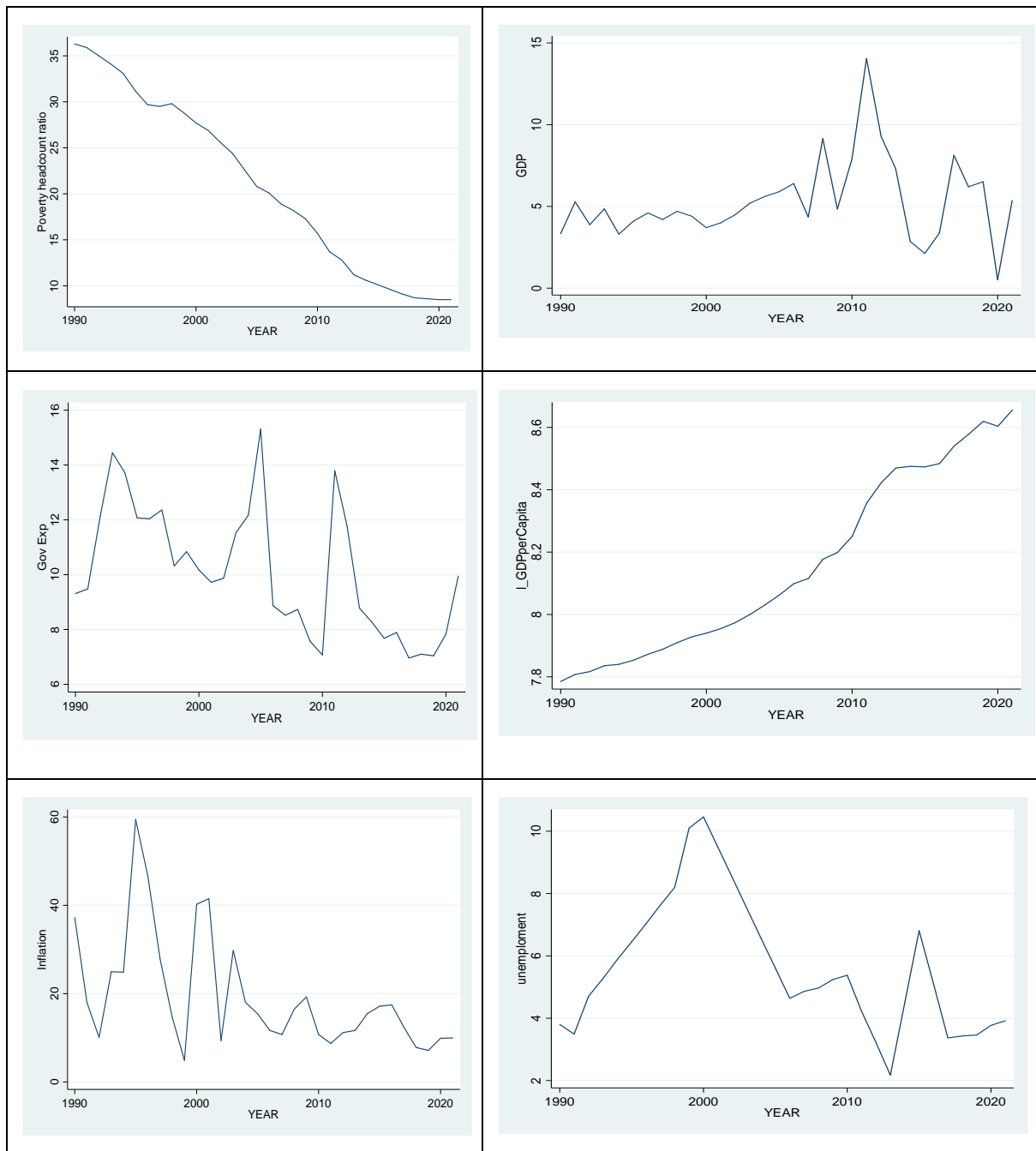
Figure 1. Trends of Individual Variables Movement

Augmented Dickey-Fuller Test for Unit Root

To assess the stationarity of the variables used in the analysis, the Augmented Dickey-Fuller (ADF) test was performed for unit root. The test is usually adopted in time series analysis to estimate whether a time series is stationary or non-stationary. The test involves comparing the test statistic against critical values at different confidence levels, including 1%, 5%, and 10%. The variables are integrated at levels I(0) and first difference I(1). The table below shows the outcomes of the ADF test for each variable, including the test statistic, 1% critical value, 5% critical value, and 10% critical value. The MacKinnon approximate p-value for Z(t) is also provided.

Table 3. Augmented Dickey-Fuller Test for Unit Root

Variable	Rank	t-statistic	1% Critical Value	5% Critical Value	10% Critical Value	MacKinnon approximate p-value for Z(t)
Povertyheadcountratio	1st Diff	-2.564	-2.479	-1.706	-1.315	0.0082
EcoGrow	levels	-2.807	-2.473	-1.703	-1.314	0.0046
GovExp	levels	-4.497	-4.334	-3.580	-3.228	0.0015
GDPperCapita	1st Diff	-2.633	-2.479	-1.706	-1.315	0.0070
Inflation	levels	-4.508	-4.334	-3.580	-3.228	0.0015
unemployment	1st Diff	-4.636	-4.343	-3.584	-3.230	0.0009

Source: Author's computation

Based on the results, stationarity is determined at the levels shown in the table. For instance, the test statistic for Unemployment is -4.636, which is below the 1% critical value of -4.343, indicating that we cannot accept the null hypothesis of non-stationarity and claim that the variable is stationary. Similarly, for other variables, the test statistic is less than the corresponding critical values, indicating that they are also stationary. For example, the test statistic for EcoGrow is -2.807, which is below the 1% critical value of -2.473. The suggestion is that we cannot accept the null hypothesis of non-stationarity and posit that EcoGrow is stationary. Overall, the outcomes of the ADF test indicate that all the variables are stationary at the levels I (0) and first difference I (1). Stationary time series data is needed to perform further econometric analysis.

Table 4. Regression Output

ARDL (1,0,0,0,0,0) regressionSample: 1991 - 2021 Number of obs						31
F (6, 24)						1745.84
Prob > F						0.0000
R-squared						0.9977
Adj R-squared						0.9971
Log likelihood = -18.517559				Root MSE = 0.4998		
Variables	**Coef.**	**Std.Err.**	**t**	**P>t**	**[95%Conf.**	**Interval]**
Povertyheadcountratio L1.	1.106	0.058	18.920	0.000	0.985	1.227
EcoGrow	-0.077	0.043	-1.790	0.086	-0.165	0.012
GovExp	-0.094	0.053	-1.770	0.089	-0.203	0.015
lGDPperCapita	3.592	1.960	1.830	0.079	-0.452	7.637
Inflation	-0.013	0.009	-1.500	0.148	-0.031	0.005
Unemployment	0.033	0.062	0.530	0.604	-0.096	0.161
_cons	-31.094	17.379	-1.790	0.086	-66.962	4.773

Source: Author's computation

Analysis of Coefficients

The results of the ARDL (1,0,0,0,0,0) regression table indicate that the lag of Poverty head countratio has a coefficient of 1.106, and a p-value of 0.000. This finding suggests that poverty headcount is significantly related to the previous year's poverty headcount, and a unit rise in the previous year's poverty headcount results in a 1.106 unit rise in the current year's poverty incidence. The coefficient of EcoGrow is -0.077, and the p-value is 0.086. The outcome

indicates that EcoGrow is negatively related to poverty headcount at 10% significance level, implying that a unit rise in EcoGrow results in a 0.077 unit decrease in poverty headcount. The coefficient of GovExp is -0.094, and the p-value is 0.089. The finding implies that government expenditure is negatively related to poverty headcount at 10% significant level, meaning that a unit rise in government expenditure leads to a 0.094 unit decrease in poverty headcount.

The coefficient of lGDPperCapita is 3.592, and the p-value is 0.079. This result implies that log of GDP per capita is positively related to poverty headcount at 10% significant level, implying that a unit increase in log of GDP per capita leads to a 3.592 unit increase in poverty headcount. The coefficient of Inflation is -0.013, and the p-value is 0.148. This finding suggests that inflation is negatively related to poverty headcount, and a unit increase in inflation leads to a 0.013 unit decrease in poverty headcount. However, this relationship is not significant at the 5% level. The coefficient of Unemployment is 0.033, and the p-value is 0.604. This result

which is not significant at 5% level, implies that unemployment is positively related to poverty headcount, and a unit increase in unemployment results in a 0.033 unit increase in poverty headcount.

Discussion of Results

The adjusted R-squared value is 0.9971, suggesting that 99.71% of the variation in poverty headcount can be attributed to the independent variables. The F-statistic is 1745.84, with a p-value of 0.000, implying that the overall model is statistically significant. The log likelihood is -18.517, indicating that the model is a good fit for the data. The results suggest that previous year's poverty headcount, EcoGrow, and government expenditure have an inverse association with poverty headcount, while log of GDP per capita has a positive association with poverty headcount. However, only the relationship between the previous year's poverty headcount and poverty headcount is significant at the 1% level.

Post-Estimation Diagnostic Tests

Table 5. Autocorrelation

Durbin-Watson d-statistic (7, 31) = 1.993		
Breusch-Godfrey LM test for autocorrelation chi2	df	Prob>Chi2
0.016	1	0.899

H0: no serial correlation

The Durbin-Watson d-statistic result, which is also confirmed by the Breusch-Godfrey LM test for autocorrelation, suggests that there is no evidence of serial correlation in the regression model. The Durbin-Watson test is adopted to identify the existence of autocorrelation in the residuals of a regression analysis. The value of the d-statistic ranges from 0 to 4. A d-statistic value of 2 suggests the absence of autocorrelation, while values lower than 2 suggest positive autocorrelation and values higher than 2 suggest negative autocorrelation. In the present situation, the calculated d-statistic

value of 1.993 is close to 2, which indicates that there is no significant serial correlation in the model. The Breusch-Godfrey LM test also supports this conclusion with a chi-squared test statistic of 0.016 and a p-value of 0.899, which fails to reject the null hypothesis of no serial correlation.

These results are important in econometric modelling because serial correlation violates the assumption of independently and identically distributed errors, which leads to biased and inefficient parameter estimates. If autocorrelation is present, it is necessary to

adjust the model by incorporating lagged dependent or independent variables as additional explanatory variables to capture the omitted linear relationships between the variables. However, in this case, since no serial correlation is identified, the regression model can be considered valid and reliable for making predictions and drawing conclusions about the nexus between poverty headcount and the explanatory variables.

Table 6. Heteroskedasticity

White's test for Ho: homoskedasticity against Ha: unrestricted heteroskedasticity			
chi2 (27)	30.37		
Prob > chi2	0.2976		
Cameron & Trivedi's decomposition of IM-test			
Source	**chi2**	**df**	**p**
Heteroskedasticity	30.370	27	0.298
Skewness	10.890	6	0.092
Kurtosis	0.300	1	0.582
Total	41.570	34	0.174

Source: Author's computation

The outputs are showing the results of two tests for heteroskedasticity, which is a violation of one of the assumptions of linear regression models. The first test is White's test, which tests whether the residuals of the model have constant variance. The null hypothesis (Ho) in this instance is that the errors are homoskedastic (have constant variance), while the alternative hypothesis (Ha) is that they are heteroskedastic (have varying variance). The results from White's test show that the chi-square statistic is 30.37 with 27 degrees of freedom and a p-value of 0.298. Since the p-value is greater than 0.05, we fail to reject the null hypothesis and infer that there is no evidence of heteroskedasticity.

The second test is Cameron & Trivedi's decomposition of IM-test, which decomposes the overall heteroskedasticity into three components: heteroscedasticity due to variance of the errors, skewness of the distribution of the errors, and kurtosis of the distribution of the errors. The total chi-square statistic is 41.570 with 34 degrees of freedom and a p-value of 0.174. The individual chi-square statistics for each component are as follows: 30.370 for heteroskedasticity, 10.890 for skewness, and 0.300 for kurtosis. The p-values for skewness and kurtosis are 0.092 and 0.582 respectively, indicating that there is weak evidence of skewness but no evidence of kurtosis.

In econometric modelling, heteroskedasticity can result in biased standard errors, which can have an effect on the estimates of the parameters and their significance levels. Therefore, it is important to test for heteroskedasticity and take corrective measures if necessary. However, since both tests failed to reject the null hypothesis of homoskedasticity, we can infer that heteroskedasticity is not present in this model.

Jarque-Bera Normality Test

jb resid
Jarque-Bera   test for Ho: normality:
Jarque-Bera   normality test: 1.09 Chi(2) 0.579.

The Jarque-Bera (JB) normality test is a statistical test adopted to find if a given data set has a normal distribution or not. In this instance, the test is applied to the residuals from an econometric model where poverty headcount is the dependent variable and EcoGrow, GovExp, lGDPperCapita, Inflation, and Unemployment are the explanatory variables. The output of the JB test shows that the test statistic (Jarque-Bera) is 1.09 and the p-value associated with the test statistic is 0.579. The null hypothesis for the JB test is that the data is normally distributed. If the

p-value is less than the significance level (usually 0.05), then we fail to accept the null hypothesis and conclude that the data is not normally distributed. Alternatively, if the p-value is higher than the significance level, we accept the null hypothesis and conclude that the data is normally distributed.

In this case, as the p-value (0.579) is higher than the significance level of 0.05, we accept the null hypothesis and infer that the residuals from the econometric model are normally distributed. This means that the assumptions underlying the modelling are met, and it is appropriate to use this model for further analysis and inference.

Model Stability Test
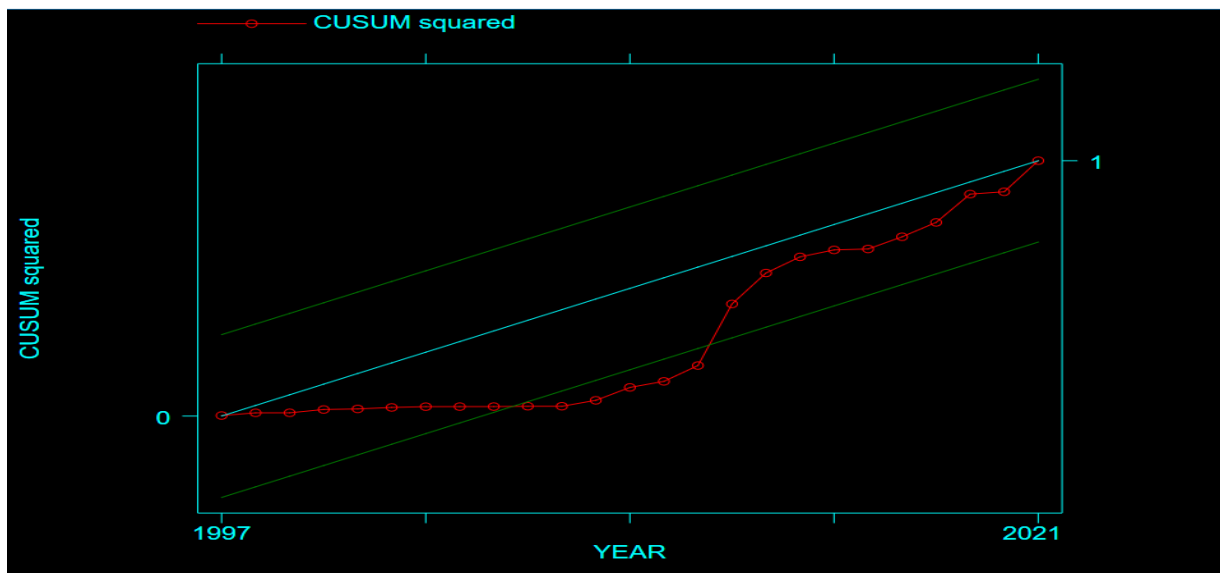
Source: Author's computation

Figure 2. Model Stability Test

The cumulative sum (CUSUM) graph is a statistical tool applied in econometrics to detect changes in the average value of a time series. It works by plotting the cumulative sums of deviations from a target value over time, with the aim of detecting when the cumulative sum deviates significantly from zero. If the CUSUM line stays between the upper and lower boundaries from the beginning of the data series in 1997, it indicates that the mean value of the time series has maintained relative stability over time, with no significant shifts or trends. However, if the line deviates outside the lower boundary briefly around the middle of the series, it indicates that there may have been a temporary drop in the average value of the series during this time. If the line then comes back into the boundary again and remains within it until the end in 2021, it suggests that the mean value of the series has returned to its previous level and

has remained stable over the rest of the time period.

Overall, the CUSUM graph can provide valuable insights into the behaviour of economic variables over time and can be useful for identifying periods of significant change or instability in the mean value of a time series. Based on the graph above where the CUSUM line falls within the upper and lower boundaries for most of the time series except for a brief deviation outside the lower boundary around the middle, it indicates that the mean value of the time series has maintained relative stability over the long run.

Conclusion

The dominant approach in literature for measuring poverty has traditionally been monetary measurement. The poverty gap index, income inequality and headcount ratio have been

used to measure those who are monetarily poor [46-48]. The measurement of human poverty using multidimensional indicators [48-53] has become an essential parameter for assessing human development and living standards in recent times. This study adds to knowledge by linking poverty and economic growth using an ARDL regression models.

The findings from the study show that government spending has negative and significant relationship with poverty reduction, implying that government spending does reduce poverty especially where the bulk of the spending is on social and pro-poor activities such as agriculture, education, and health. [54] observes that expenditure on recurrent pro-poor activities and direct transfers to the poor alleviates poverty. However, [55-56] as well as [54] posit that government spending on capital projects and day to day administration increases poverty. Economic growth was identified to have a negative and significant influence on decreasing poverty suggesting that a growth in the economy reduces poverty and vice-versa. The econometric data for the study shows that a 7.7% growth of the economy results in a 10% decline in poverty. This corresponds with findings of [57-60]. Inflation is identified to have a positive but insignificant impact on poverty implying that inflation may positively correlate with poverty as postulates by [57-63] argue that a country can experience economic growth and poverty reduction if inflation is moderate and stable.

Unemployment has a positive but insignificant influence on the alleviation of poverty. This conforms to the observation of [64] that unemployment, poverty, and economic growth have no long term connection in Nigeria.

Policy Implication

The observations from the study indicate that economic growth is a strong factor in reducing poverty in Ghana. Government should put appropriate policies in place to sustain growth at appreciable levels to reduce poverty.

Employment creation resulting from growth in agriculture is considered pro-poor growth and hence facilitates poverty reduction. [45] explains the main processes for quickening poverty alleviation as employment generation, knowledge acquisition, infrastructural growth, and growth in agriculture output. As such a growth in agricultural productivity will directly translate to a significant creation of jobs and poverty reduction in the country [45, 65]. Government should pursue policies and control its expenditures in such a way that inflation does not go off-hand. Inflation targeting policies being pursued by the government should be strengthened and work towards achieving a single digit inflation, which will stimulate sustainable consumption and production and economic growth [63]. Moderate levels of inflation provides satisfactory returns to savers, encourages investment, and hence, quickens growth of the economy. The stabilization of the macroeconomic environment is imperative for development and growth of the economy which translates to better living standards for the people [66]. Government should pay more attention to tackling corruption, reduce bureaucracies, promote healthy business environment to stimulate investment and attract foreign and domestic investors. Government should undertake programs that grow the real GDP higher than the population growth such that the per capita income will improve. This GDP growth should be redistributed to benefit the poor through taxing the rich to support investments in social services and rural infrastructure that enhance agricultural productivity, employment creation and poverty alleviation. The findings from this study imply that the focus of reducing poverty should not only be on income but rather, it is imperative to focusing also on providing basic facilities that improve life expectancy, reduce illiteracy, provide good drinking water and sanitation, provide social and economic infrastructure for the poor as well as ensure fair distribution of income. Economic growth reduces poverty and

facilitates provision of human needs. This can be achieved through macroeconomic stability, stable and adequate employment, improvement in agricultural productivity, government spending effectiveness and support for the poor. In conclusion, the results suggest that poverty reduction policies in Ghana should focus on addressing why Ghana's impressive economic performance is not being translated to reduction of poverty. The findings provide a new dimension to knowing how poverty is affected by economic growth in Ghana using the international poverty line of $1.90 PPP$ per day.

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Conflict of Interest

I Ofori Frimpong Henneh, the author do hereby declare that no conflict of interest situation arises as regards the publication of this research work.

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