

Exploring the Relationship between GDP Per Capita, Government Expenditure, and Poverty Reduction in Tanzania

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Abstract

The government of Tanzania has been actively engaged in efforts to reduce poverty, yet the challenge remains persistent. This study examined the relationship between GDP per capita, government expenditure (GCE), and poverty reduction in the country. The main objective was to analyze the trends and cointegration between these variables in Tanzania. Utilizing a statistical study design, this research employed time series data covering the period from 1981 to 2017. The findings revealed that while poverty has been trending downwards, both GCE and GDP per capita have shown upward trends. Moreover, the analysis demonstrated a significant cointegration between GDP per capita, GCE, and poverty reduction, indicating that these variables are interrelated in the long run. This implies that government expenditure and economic growth are crucial factors in the ongoing efforts to alleviate poverty in Tanzania. Based on these insights, it is recommended that the government increase investment in education and health services to further enhance GDP per capita growth. Additionally, expanding infrastructure projects can create employment opportunities, directly impacting poverty reduction. Lastly, implementing efficient fiscal policies that prioritize social welfare spending will sustain and amplify the positive trends in poverty alleviation.

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1. Introduction

Tanzania has been recognized as one of the nation's fighting against poverty since independence. In Tanzania, the poverty rate is still high. In 2007 more than 34.4 per cent lived below the poverty line (Kitole, Msoma, & Sesabo, 2024; Dimoso & Andrew, 2021). In 2018 almost 26.4 per cent of Tanzanians lived below the poverty line even though the statistics show that the poverty rate in Tanzania declined (World Bank, 2020; Fumbwe, Lihawa, Andrew, Kinyanjui & Mkuna, 2021). This decline in poverty has been associated with economic improvement, and it is commonly thought that economic improvement is measured in terms of gross domestic product (GDP) and is directly related to poverty reduction. GDP per capita growth has a strong relationship with poverty reduction (World Bank, 2020; Kitole, Tibamanya, & Sesabo 2023). Many economists believe that economic improvement recompenses almost all residents of a nation which stimulates the process of poverty reduction (Kitole & Utouh, 2023; Zaman, Rashid, Khan, & Ahmad, 2011).

Economic growth is a necessary condition, but not a satisfactory condition to decrease the problem of poverty. Some countries have higher economic growth and per capita income, but the results of poverty reduction are less effective. In contrast, there are lower-income per capita countries, but poverty reduction is better (Kitole & Sesabo, 2022; Theobald & Kitole, 2024). In Tanzania, people who consume more than \$1.9 are at a higher risk of falling below the poverty line. The statistics show that within the group of four Tanzanian people who lived above the poverty line three Tanzanians are at higher risk to fall into poverty again (Kitole, Mbukwa, Tibamanya, & Sesabo, 2024). This shows that a large number of Tanzanians who lived above \$1.9 per day have a higher danger of falling back below the poverty line of \$ 1.9 (Kitole & Genda, 2024; Kitole & Sesabo, 2024).

Tanzania mainland poverty assessment report of 2019 shows that the percent of people in Tanzania who lived below the poverty line is more concentrated in rural areas compared to urban areas and the distribution of the available resources in Tanzania are not equally distributed among the regions. As a result, some parts of the country are more developed than others (World Bank, 2019; Kitole, 2023). This increases the poverty in those regions which receive a small portion of the resources such as poor availability of social services like hospitals, schools, electricity and water supply and other infrastructure facilities like roads in rural areas compared to other developed urban areas which receive a larger share of the resources.

However, currently, the government has tried to reduce the widening *gap* between rural and urban areas. Based on the existing level of poverty in Tanzania, different approaches and strategies including economic growth, investment in human capital, provision of loans of low-interest rate, and investment in infrastructure and other facilities achieve the reduction of poverty in Tanzania (Nguyen, 2020). These are very crucial to be executed to speed up the reduction of poverty in Tanzania. Those strategies and approaches focus on improving economic growth, improving the living standards of the people, infrastructure facilities and other millennium development goals (Swinkels et al., 2019).

World Bank, (2020) report showed that the GDP growth rate in Tanzania has reached 5.44 per cent in 2018 since 1990. However, the World Bank report showed that the GDP performance in 2018 decreased compared to the performance of the previous year in 2017 from 6.79 to 5.44 per cent. Also, the report showed that the GDP growth rate was high at 7.67 per cent in 2012 since 1990

and was low at 0.58 per cent in 1993. The overall annual GDP growth rate in Tanzania is 5.44 and 5.42 per cent from 2018 to 2019 respectively. The government of Tanzania spent a total of 23.5 trillion Tanzania shillings (TZS), approximately 10.1 billion U.S. dollars, in 2019/2020, of which most was recurrent expenditure including wages and salaries, interest costs, and other recurrent expenditure (NBS,2021).

2. Empirical Literature Review

Uddin, (2014) conducted a study entitled “Financial development and poverty reduction nexus: A cointegration and causality analysis in Bangladesh”. The study has highlighted that financial development contributes much to poverty reduction by examining the relationship which exists between economic growth, financial development and the decline of poverty in Bangladesh. The study uses time-series data covers from 1975 up to 2011. This study is significant. It shows clearly the main goals of economic improvement and the financial sector towards poverty reduction. The study employed the ARDL model cointegration techniques. The results show that there is a long-run relationship that exists between economic growth, financial development and poverty reduction in Bangladesh. The study concludes that financial sector development and economic growth both help in reducing poverty in Bangladesh.

Odhiambo, (2017) studied the association between economic growth and poverty in Ethiopia the study used data from 1970 up to 2014. Through a time, series analysis, the study results reveal that there is a strong relationship between economic growth and poverty in Ethiopia; economic growth can be stimulated through the use of different techniques such as a trickle-down theory technique. Both ARDL bound test approach and a Granger causality technique were used to examine relationships that exist between poverty and economic improvement in Ethiopia. The outcomes revealed that a cointegration exists between economic growth and poverty in Ethiopia and Granger causality results prove that there is a unidirectional causality running from economic growth to poverty reduction but in the short-run, a bidirectional causality exists.

Wycliffe, (2018) conducted a study to examine if economic growth contributes to poverty decline in Rwanda through the use of a time-series data set covering from 1980-2016. The ARDL bound test approach, Toda Yamamoto (TY) and Granger causality techniques were both employed. Through ARDL bound test outcomes show a long-run relationship exists between economic growth and poverty reduction in Rwanda also through the TY approach. Granger causality outcomes show causality between economic growth and poverty. Based on the outcome the study recommends the government introduce different policies such as education for all, and compulsory education for all to reduce all problems associated with poverty and to speed up economic development.

Pradhan, (2010) conducted a study entitled “Nexus between Finance, Economic Growth and Poverty in India: The Cointegration and Causality Approach in India” The study use data covers from 1951 to 2008 and employ a Granger causality and ARDL bound test approach to assess the cointegration and causality between the variable of the study. Through ARDL bound tests the outcomes prove that a long-run relationship exists between poverty, economic growth and financial improvement.

Thus, a major goal of the study is to examine the relationship which exists between Gross Domestic Product per capita, Government Consumption Expenditure and poverty reduction in Tanzania. The study employed ARDL bound test analysis, and use of a time-series data set covers a period from 1981 up to 2017.

3. Theoretical foundation

3.1 Economic Growth and poverty

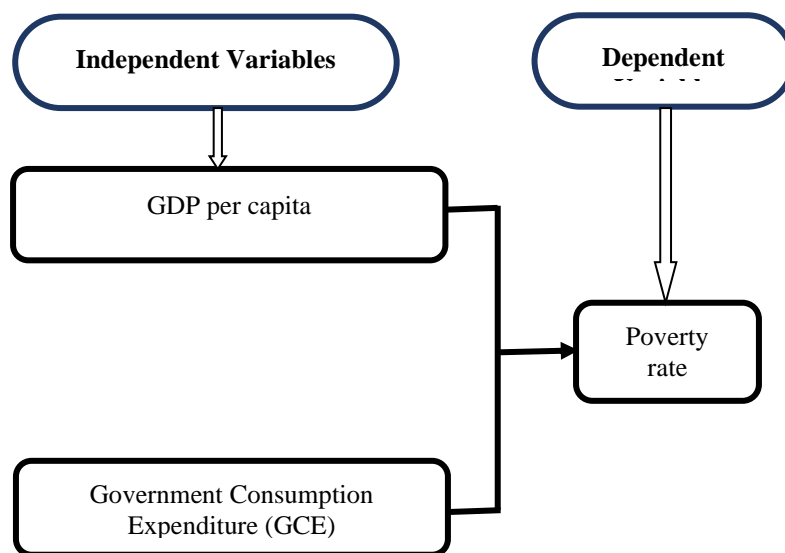
Economic growth is influenced by both direct and indirect factors. Direct factors include human resources like the increased inactive population and investing in human capital, natural resources like land and underground resources, and the increase in capital hired or technological progressions. Indirect factors include institutions like financial institutions and private administration, the extent of the aggregate demand, saving and investment rates, effectiveness of the financial system, budgetary and fiscal policies, migration of labour and the efficiency of the government (Boldeanu and Constantinescu, 2015).

World Bank (2019), poverty means a state of being inferior, insufficient, or a shortage in many aspects of life, including a shortage in social services like schools, health centres, treated water supplies, power supplies and other social services. Due to poverty, the income of the majority is very low which leads to a decrease in the saving and consumption power of the majority.

3.2 Conceptual framework

Outlines both independent variables and dependent variables which are discussed in a literature review. The study examines the relationship which exists between GDP per capita, GCE and poverty in Tanzania through a time series analysis by considering these macroeconomic variables to understand both a short-run and long-run relationship within the variables. The conceptual framework presented in Figure 1 describes the interconnectivity between GDP per capita, GCE per cent of GDP and poverty rate (PR).

Figure 1: Conceptual Framework



2.3. Analytical modelling

2.3.1. Autoregressive Distributed Lag Bound Test Model.

After testing stationarity for all the variables used, all variables become stationary either at level $I(0)$ or at the first difference $I(1)$. The next step is to estimate the model through the use of the ARDL bound estimation technique to examine the existence of cointegration which exists between a GDP per capita, GCE and poverty in Tanzania. The ARDL bound test has numerous advantages to estimate the model whereby the variables are stationary either at level or at first difference only. Pesaran et al., (2001) noted that the ARDL model can be applied to time-series data irrespective of whether the series is stationary at a level $I(0)$ or first difference $I(1)$. The second advantage of ARDL is that it is suitable for small sample size analyses and also more flexible because it can be used even when the order of integration of variables is not known before the cointegration test.

In the ARDL model if the variables are not cointegrated only the short-run ARDL model is specified. By applying ARDL techniques, unbiased long-run estimates are obtained. To perform a conditional ARDL (p, q_1, q_2) model with three variables are specified as follows;

$$\Delta \ln pr_t = a_{01} + b_{11} \ln pr_{t-1} + b_{21} \ln gdp_{t-1} + b_{31} \ln gce_{t-1} + \sum_{i=1}^p a_{1i} \Delta \ln pr_{t-i} + \sum_{i=1}^{q_1} a_{2i} \Delta \ln gdp_{t-i} + \sum_{i=1}^{q_2} a_{3i} \Delta \ln gce_{t-i} + e_{1t} \dots \dots \dots (1)$$

But when a log of the gross domestic product as a dependent variable ARDL model specified as;

$$\Delta \ln gdp_t = a_{02} + b_{12} \ln pr_{t-1} + b_{22} \ln gdp_{t-1} + b_{32} \ln gce_{t-1} + \sum_{i=1}^p a_{1i} \Delta \ln pr_{t-i} + \sum_{i=1}^{q_1} a_{2i} \Delta \ln gdp_{t-i} + \sum_{i=1}^{q_2} a_{3i} \Delta \ln gce_{t-i} + e_{2t} \dots \dots \dots (2)$$

Also, when a log of general government final consumption expenditure as a dependent variable ARDL model specified as;

$$\Delta \ln gce_t = a_{03} + b_{13} \ln pr_{t-1} + b_{23} \ln gdp_{t-1} + b_{33} \ln gce_{t-1} + \sum_{i=1}^p a_{1i} \Delta \ln pr_{t-i} + \sum_{i=1}^{q_1} a_{2i} \Delta \ln gdp_{t-i} + \sum_{i=1}^{q_2} a_{3i} \Delta \ln gce_{t-i} + e_{3t} \dots \dots \dots (3)$$

From equation (3) an ARDL bound test can be employed to establish the existence of any long-run relationship among variables when a log of poverty is a targeted variable. The ARDL bounds test for cointegration was established from the overall test of significance of the lag of all the variables at their level forms. The research tests significance of F- statistics. From equation (3) this research tests the hypotheses of the existence of no long-run equilibrium relationship against the alternative hypotheses of the existence of a long-run equilibrium association among the variables when a log of poverty is a targeted variable.

The hypothesis for the ARDL model test is expressed as follow;

$$H_0: b_1 = b_2 = b_3$$

$$H_a: b_1 \neq b_2 \neq b_3$$

The study compares estimated F- statistic value to the lower and upper bounds critical values generated by Pesaran et al (2001); lower bound values are generated on the assumption that all variables are integrated of order zero while upper bound values are generated on the assumption that all the variables are integrated of order one. The null hypothesis is rejected only if the F-statistics value falls below the upper bound and it indicates the existence of a long-run equilibrium relationship among the variables used in the model. But when F-statistics falls below the lower bound then it implies that a study fails to reject the null hypothesis means that no long-run equilibrium association exists between the variables used in this study.

3. Data and Methodology

3.1 Data

The research uses only secondary data obtained from credible databases including, the Bank of Tanzania (BoT), the National Bureau of Statistics (NBS) and the World Bank (WB) development indicators. The benefit of using secondary data is that they are easily available and less expensive as compared to primary data. Also, using secondary data saves time and facilitates the timely accomplishment of the study. Based on the nature of the study a unit of analysis is the country of Tanzania and the study covers sample data of 36 years of Tanzania from 1981 up to 2017.

3.2 The Model

The Autoregressive distributed lag (ARDL) model specifies both a long-run and a short-run impact of the independent variables on the targeted variable. The study can only estimate long-run coefficients after a long run association has been detected and recognized within the variables. The long-run equation when a log of poverty as a dependent variable is specified as follows:

$$\Delta \ln pr_t = a_{01} + \sum_{i=1}^p a_{1i} \Delta \ln pr_{t-i} + \sum_{i=1}^{q_1} a_{2i} \Delta \ln gdp_{t-i} + \sum_{i=1}^{q_2} a_{3i} \Delta \ln gce_{t-i} + \lambda ECT_{t-1} + e_{1t} \dots \dots \dots (4)$$

When log GDP per capita is a targeted variable model become:

$$\Delta \ln gdp_t = a_{02} + \sum_{i=1}^p a_{1i} \Delta \ln pr_{t-i} + \sum_{i=1}^{q_1} a_{2i} \Delta \ln gdp_{t-i} + \sum_{i=1}^{q_2} a_{3i} \Delta \ln gce_{t-i} + \lambda ECT_{t-1} + e_{2t} \dots \dots \dots (5)$$

Also, when a log of general government consumption expenditure is the dependent variable, the model becomes:

$$\Delta \ln gce_t = a_{03} + \sum_{i=1}^p a_{1i} \Delta \ln pr_{t-i} + \sum_{i=1}^{q_1} a_{2i} \Delta \ln gdp_{t-i} + \sum_{i=1}^{q_2} a_{3i} \Delta \ln gce_{t-i} + \lambda ECT_{t-1} + e_{3t} \dots \dots \dots (6)$$

Whereas $\lambda = (1 - \sum_{i=1}^p \delta_i)$ a speed of adjustment parameter with a negative sign, $ECT = (\ln pr_{t-1} - \phi x_t)$ error correction term, $\phi = \frac{\sum_{i=0}^q \beta_i}{\alpha}$ long-run parameter, and a_{1i}, a_{2i}, a_{3i} are the short-run dynamic coefficients of the model adjustment for a long-run equilibrium.

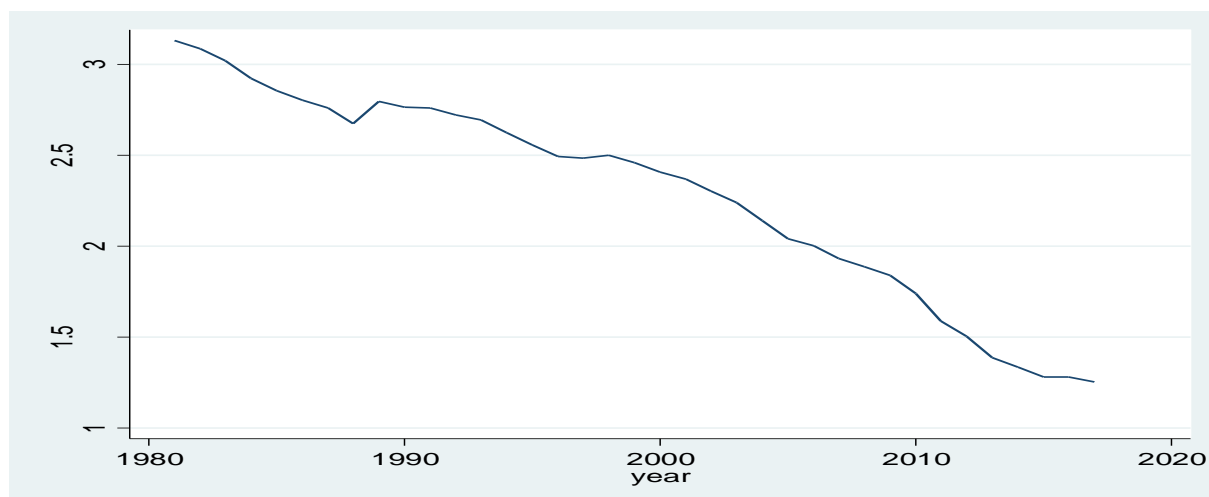
The short-run causal consequence is signified by the t-statistic on the explanatory variables short-run coefficients. A long-run association between the variables indicates the existence of a Granger causality in at least one direction which is determined by t-statistic on the coefficients of the lagged error correction term. The interpretation of the short-run coefficients is as normal as in any other linear regression model. Under ceteris paribus effects can be based on the usual OLS standard errors and test statistics.

4. Results and Discussions

4.1 Trends of Poverty in Tanzania from 1981 up to 2017

The analysis of a trend in the poverty rate in Tanzania is significant since it conveys the path it has taken covering a period from 1981 up to 2017. Results show an actual trend of poverty in Tanzania through the line graph to understand the trend of poverty in Tanzania. The trend of poverty in Tanzania is represented in Figure 2 as follows.

Figure 2: Trend of Poverty in Tanzania from 1981 up to 2017

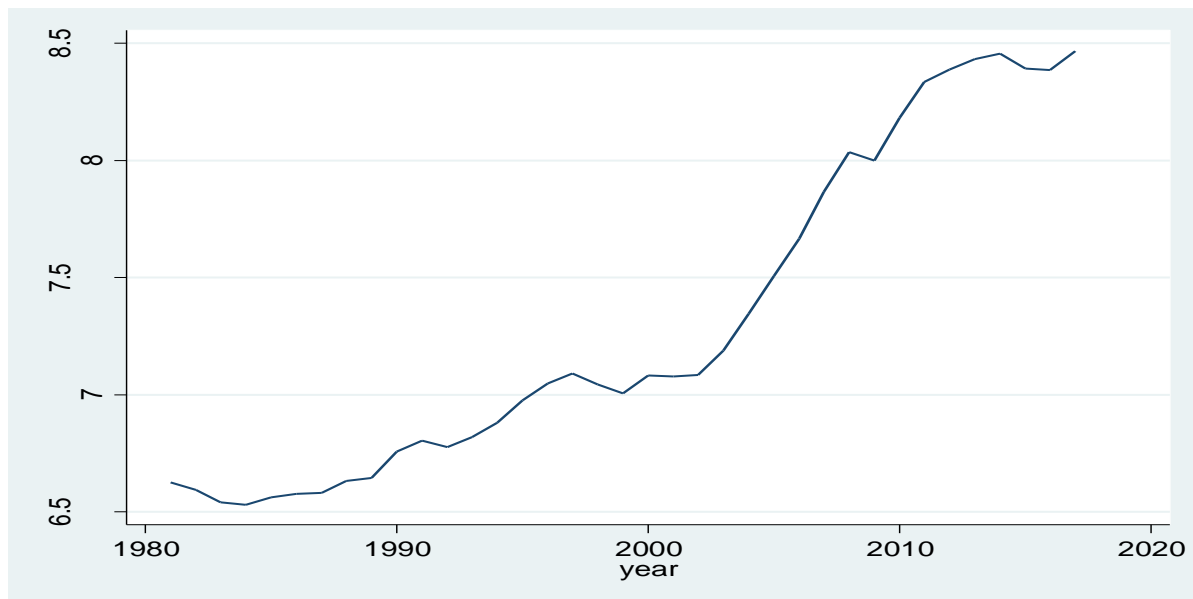


Results in Figure 2 presents the poverty rate in Tanzania which revealed a downward trend that implies poverty reduction. In 1981 poverty is relatively higher but start to decrease up to below 1.5%, this decline in poverty in Tanzania is due to different government efforts towards decrease per cent of the population living below the poverty line of \$1.9 per day, a decline in poverty in Tanzania also is caused by the improvement of the economic growth and growth of government consumption expenditure which stimulate investment which is one of the ways helps to reduce the problem of poverty in Tanzania.

4.2 Trends of GDP per capita in Tanzania from 1981 up to 2017

The analysis of GDP per capita in Tanzania trend is important since it brings out the path which covers a period between 1981 up to 2017. The trend revealed that gross domestic product per capita in Tanzania through the line graph shows an upward trend. The trend is represented in Figure 3 as follows.

Figure 3: Trend of GDP per capita in Tanzania from 1981 up to 2017



In Figure 3, GDP per capita in Tanzania has been in an upward trend since 1981 up to 2017. In early 1981 GDP per capita was relatively lower below 7% in 1984 but started to rise to almost 8.5% approximately in 2017, this rise in GDP per capita from Tanzania is caused by different government efforts which stimulate economic growth in Tanzania. Examples in the agriculture sector, infrastructure sector, tourism sector, and social services include education and health sectors all speed up economic growth, an increase of investment also contributes to GDP per capita to rise in Tanzania.

4.3 Trends of Government Consumption Expenditure in Tanzania from 1981 up to 2018.

The analysis of a government consumption expenditure in Tanzania trend is significant since it carries out the path it has taken over the period from 1981 up to 2018. A line graph revealed the actual trend of government consumption expenditure in Tanzania. The trend is represented in Figure 4.

Figure 4: Trend of Government Consumption expenditure in Tanzania from 1981 up to 2018.

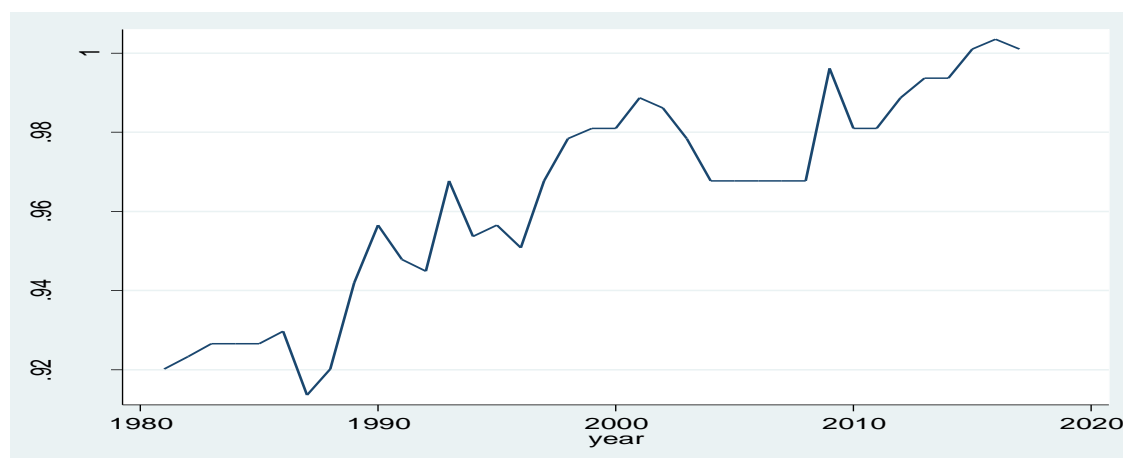


Figure 4 show that government consumption expenditure in Tanzania has been in an upward trend since 1981 up to 2018. In early 1981 gross domestic product per capita was relatively lower approximately equal to 0.93 in 1981 but start to increase before falling again up to 0.2 approximately in 1987 but in general, the trend increased upward, increase in government consumption expenditure in Tanzania is due to improvement of economic growth revealed by increase of government revenue collected from different economic and social sectors source for example in the agriculture sector, infrastructure sector, tourism sector, mining sector and other social services sector example in sports and games, both tend to speed up the economy provide enough money for a government to spend in the economy which causes multiplier effects to other sectors.

4.4 Results for Unit root

Moreover, before analyzing and assessing the model, an important procedure is to test all the variables for stationarity before proceeding with another procedure of analyzing the data. Because most of the time-series data sets the variable tends to vary over time and therefore may produce spurious regression outcomes if the data series is not stationary. The stationary test outcomes are shown in Table 1.

Table 1 displays results for the stationarity test both Augmented Dickey-Fuller and for Phillis-Perron test. In the model with no constant term, a constant term and trend and a model with a constant term and drift, the result shows that the variable both $\ln pr$ and $\ln gdp$ are stationary at level (Dickey & Fuller, 1979). The null hypothesis of the existence of a unit root at a 5 per cent level significance for $\ln pr$ and $\ln gdp$ are rejected at level, while $\ln gce$ at a level the value of the computed t-statistics fails to reject the null hypothesis that the series is not stationary. Then at first difference both $\ln pr$, $\ln gdp$ and $\ln gce$ become stationary implies the refusal of the null hypothesis at a 5 per cent level of significance hence alternative hypothesis was accepted.

Table 1: Unit Root Test Outcomes by ADF-test and PP at level.

Variable	ADF Test statistics at level	Test at critical value	At 1% critical value	At 5% critical value	At 10% critical value	PP Test statistics at level	Test at critical value	At 1% critical value	At 5% critical value	At 10% critical value
Lnpr	-2.951***		-2.644	-1.950	-1.604	-5.221***		-2.642	-1.950	-1.604
Lngdp	2.264**		-2.644	-1.950	-1.604	3.568***		-2.642	-1.950	-1.604
Lngce	-2.715		-4.288	-3.560	-3.216	1.445		-2.644	-1.950	-1.604

Whereby ***, **, * indicates the variables are statistically significant at 1 per cent, 5 per cent and 10 per cent respectively.

Table 2 results revealed that both lnpr and lngdp variables are stationary at a level I(0) while the lngce variable is not stationary at a level in both ADF and PP tests. This implies the need to differentiate the variable at the first difference to test for stationarity.

Table 2: Unit Root Test Results by ADF and test I(1).

Variable	ADF Test statistics at level	Test at critical value	At 1% critical value	At 5% critical value	At 10% critical value	PP test statistics at level	Test at critical value	At 1% critical value	At 5% critical value	At 10% critical value
d.lnpr	-2.701***		-2.453	-1.696	-1.309	-4.579***		-4.288	-3.560	-3.216
d.lngdp	-3.181***		-2.453	-1.696	-1.309	-3.667***		-4.288	-3.560	-3.216
d.lngce	-5.465***		-2.453	-1.696	-3.218	-6.730***		-4.288	-3.560	-3.216

Whereby *** indicates significance at 1% level

However, the results for a unit root test at level lnpr and lngdp variables are stationary except the lngce variable in Table 2 are shown clearly. The variable (lngce) becomes stationary after the first difference as shown clearly also in Table 2. The outcomes show that we can comfortably reject the presence of a unit root test for (lnpr), (lngdp) and (lngce) after the first difference because the test statistics after first differences absolute value of ADF and PP-test is greater than the absolute p-value of the critical value both at a 10%, 5% and a 1% level of significance. implies that (lnpr), (lngdp) and (lngce) both are stationary after first the difference I(1).

4.5 Estimation of optimal Lag length Based on Vector Auto regression Selection Order Criteria

After testing for the unit stationary test, the next procedure is the selection of optimal. The lagged observation may not only be observed independent variables but also from independent variables. Command varsoc is used to select the optimal lag length. Since the variables investigated are below three the best choice for selecting lags is Akaike Information Criterion (AIC). The results for optimal lag length selection are displayed in Table 3.

Table 3: Lag length Selection Order Criterion

Lag	LL	LR	Df	P	FPE	AIC	HQIC	SBIC
0	100.283	-	9	-	4.6e-07	-6.08016	-6.03461	-5.94275
1	210.427	220.29	9	0.000	8.3e-10	-12.4017	-12.2195	-11.852*
2	222.507	24.159	9	0.004	7.0e-10*	-12.5942*	-12.2753*	-11.6323
3	231.5	17.987*	9	0.035	7.3e-10	-12.5938	-12.1383	-11.2196
4	236.171	9.3415	9	0.406	1.0e-09	-12.3232	-11.7311	-10.5368

The results for lag selection in Table 3 shows that the appropriate lags that should be included for the model are lag 2 through AIC and HQIC all choosing the maximum lags of two.

4.5 Result for The ARDL regression

The test for ARDL model results shows that the overall results of the model are statistically significant and through the use of command ARDL with AIC the maximum lags selected is 2 as the same as in varsoc test in Table 4. Therefore, the lags for poverty are one, but for GDP per capita and government consumption expenditures is equal to two respectively.

Table 4: Outcomes for ARDL Model Regression

Lnpr	Coef	Std.Err.	t	p> t	(95% Conf. Interval)	
Lnpr						
L1.	0.7157	0.061321	11.67	0.000	0.50981	0.841641
Lngdp						
--.	-0.2247193	0.092093	-2.44	0.022	-0.41368	-0.035758
L1	0.1861933	0.152273	1.22	0.232	-0.12625	0.498632
L2	-0.1861397	0.093609	-1.99	0.057	-0.37821	0.005930
Lngce						
--.	1.718183	0.6066741	2.83	0.009	0.47339	2.962975
L1.	0.0984346	0.7446371	0.13	0.896	-1.42941	1.626304
L2.	-2.367633	0.5926393	-4.00	0.000	-3.5836	-1.151631
Cons	2.762352	0.6780559	4.07	0.000	1.37112	4.153607

The outcome in Table 4 displays that at lag one the lnpr variable is statistically significant at 1 per cent level of significance, lngdp is statistically significant at a level and lag 2 at a 10% level of significance but not at lag 1. And lngce at lag 1 and lag 2 is significant at a 1% level of significance but not significant at lag 1. Also, outcomes revealed that the overall model is statistically significant to represent variables not included in the model but influence poverty reduction in Tanzania.

4.5.1 Results for a matrix list of lags for lnpr, lngdp and lngce

The results also revealed that the optimal lags to be used for poverty variable (lnpr) is one while the lags for GDP per capita (lngdp) and government consumption expenditure (lngce) optimal lags 2 respectively displayed in Table 5 more clearly.

Table 5: Matrix List of Lags

Variable	Lnpr	Lngdp	Lngce
Lags	1	2	2

4.5.2: ARDL bound test results

Test for the existence of the short-run and the long-run equilibrium among the variables in the model was conducted ARDL bound test for cointegration. Outcomes for the bound test when the log of poverty rate as a targeted variable outcome are represented in Table 6 more clearly.

Table 6: ARDL Bound Test Result

D.lnpr	Coef	Std. Err.	t	p> t	(95% Conf. Interval)	
ADJ						
Lnpr	-0.2842691	0.0613517	-4.63	0.000	-0.4101523	-0.1583859
L1.						

LR							
Lngdp		-0.7903272	0.0535907	-14.75	0.000	-0.9002863	-0.6803681
Lngce		-1.938359	1.3536150	1.43	0.164	-4.715747	0.8390286
SR							
Lngdp							
D1.		-0.0000537	0.0920507	-0.00	1.000	-0.1889261	0.1888188
LD.		0.1861397	0.0936093	1.99	0.057	-0.0059308	0.3782101
Ingce							
D1.		2.269198	0.6127312	3.70	0.001	1.011978	3.526419
LD.		2.367633	0.5926393	4.00	0.000	1.151637	3.583628
Cons		2.762352	0.6780559	4.07	0.000	1.371096	4.153607

Results for a bound test based on AIC the maximum lag length is two generated from the ARDL model (1, 2, and 2) indicated that lngdp has a long-run balance association between variables at a 1 per cent level of significance with a p-value < 0.0000. The null hypothesis of no cointegration in the model is rejected against the alternative hypothesis of the model which is accepted, also, the results from the bound test show presence of both a long-run and the short-run association between a government consumption expenditure (Ingce) with poverty (lnpr) in Tanzania at a 1 per cent level of significance with a p-value < 0.0.001.

Table 7: Smith/Shin/Pesaran (2000) ARDL Bound Test Result

F = 8.665	[I_0] [I_1]	[I_0] [I_1]	[I_0] [I_1]	[I_0] [I_1]
	L_0.1 L_0.1	L_.05 L_.05	L_.025 L_.025	L_.01 L_.01
K_2	3.17 4.14	3.79 4.85	4.41 5.52	5.15 6.36
T= -4.633	[I_0] [I_1]	[I_0] [I_1]	[I_0] [I_1]	[I_0] [I_1]
	L_0.1 L_0.1	L_0.05 L_0.05	L_.025 L_.025	L_0.01 L_0.01
K_2	-2.57 -3.21	-2.86 -3.53	-3.13 -3.80	-3.43 -4.10

H₀: No levels relationship

The results from the ARDL Model Regression with the Error Correction Model (ECM) presented in Table 8 provide insightful findings on the dynamic relationship between the dependent variable, log of poverty rate (Lnpr), and the independent variables, log of GDP per capita (Lngdp) and log of government consumption expenditure (Lngce). The coefficient for the lagged dependent variable Lnpr L1 is 0.7157, which is highly significant ($t = 11.67$, $p < 0.000$). This indicates strong persistence in the poverty rate, suggesting that past values of the poverty rate have a substantial positive influence on its current values. The coefficient close to 1 implies that poverty rates are relatively stable over time but influenced by their previous values, highlighting the inertia in poverty levels.

Regarding the impact of GDP per capita, the first lag (Lngdp L1) shows a significant negative coefficient of -0.2247 ($t = -2.44$, $p = 0.022$). This suggests that an increase in GDP per capita in the previous period is associated with a reduction in poverty in the current period. Economic growth thus has an immediate and beneficial impact on reducing poverty, reinforcing the importance of fostering economic development as a strategy for poverty alleviation. However, the second lag (Lngdp L2) has a positive coefficient of 0.1862 but is not statistically significant ($t = 1.22$, $p = 0.232$), indicating that the effect of GDP per capita on poverty reduction does not persist

beyond the immediate past period. The third lag (Lngdp L3) also shows a marginally significant negative coefficient of -0.1861 ($t = -1.99$, $p = 0.057$), suggesting some fluctuation in the impact over different periods but generally supporting the negative relationship between GDP growth and poverty.

Table 8: Results for ARDL Model Regression with Error Correction Model

Lnpr	Coef	Std.Err.	t	p> t	(95 % Conf. Interval)	
Lnpr	0.715700	0.061300	11.67	0.000	0.509800	0.841641
L1.						
Lngdp	-0.2247193	0.0920939	-2.44	0.022	-0.4136803	-0.0357583
L1	0.1861933	0.1522733	1.22	0.232	-0.1262458	0.4986324
L2	-0.1861397	0.0936093	-1.99	0.057	-0.3782101	0.0059308
Lngce	1.718183	0.6066741	2.83	0.009	0.4733901	2.9629750
L1.	0.0984346	0.7446371	0.13	0.896	-1.429434	1.6263040
L2.	-2.367633	0.5926393	-4.00	0.000	-3.583628	-1.1516300
Cons	2.762352	0.6780559	4.07	0.000	1.371096	4.153607

The analysis of government consumption expenditure (Lngce) reveals some intriguing findings. The first lag of Lngce has a significant positive coefficient of 1.7182 ($t = 2.83$, $p = 0.009$). This implies that increased government consumption expenditure in the previous period is associated with an increase in the poverty rate in the current period. This counterintuitive result could indicate inefficiencies or misallocations in government spending, suggesting that current expenditure may not be effectively targeted towards poverty reduction. The second lag of Lngce (Lngce L2) has a positive coefficient of 0.0984 but is not statistically significant ($t = 0.13$, $p = 0.896$), indicating no significant effect on poverty in the short run beyond the immediate past period. Moreover, The constant term in the model is -2.3676 and is highly significant ($t = -4.00$, $p < 0.000$). This indicates that when the model is in equilibrium, the poverty rate is expected to adjust downwards, reinforcing the long-term relationship between the variables. The intercept term, with a positive value of 2.7624, is significant at the 1% level ($t = 4.07$, $p < 0.000$). This suggests the expected value of the poverty rate when all other variables are held at zero, providing a baseline for understanding the model's predictions.

Therefore, these findings suggest several policy implications. The significant negative relationship between GDP per capita and poverty underscores the importance of promoting economic growth as a strategy for poverty reduction. Conversely, the positive association between government consumption expenditure and poverty suggests that current government spending may not be effectively targeted or efficiently utilized, pointing to a need for better allocation and management of government resources. The strong persistence in poverty rates indicates that policies need to be sustained over time to have a meaningful impact. This study highlights the complex dynamics between economic growth, government expenditure, and poverty, suggesting that strategic and well-implemented policies are crucial for reducing poverty in the long run.

5. Conclusion and Policy Implication

The primary objective of this study was to explore the relationship between GDP per capita, government consumption expenditure, and poverty in Tanzania using time series analysis. The

implications of the findings highlight the critical need for strategic government interventions to address poverty. This study underscores the importance of economic growth and effective government spending in alleviating poverty. The interrelationship between these variables suggests that comprehensive and targeted policy measures are essential for sustainable poverty reduction.

To address poverty effectively, the government should consider several policy recommendations. First, increasing government expenditure in key sectors such as education, health, agriculture, infrastructure, power, and water supply can stimulate economic growth and improve living standards. Investing in these areas can create jobs, enhance productivity, and provide essential services that uplift the poor.

Given the persistence of chronic poverty, especially in rural areas, additional initiatives should be introduced. For instance, providing free basic education to all Tanzanians can reduce educational disparities and empower individuals with skills necessary for better employment opportunities. Moreover, reducing government burdens through cost-sharing mechanisms can make essential services more accessible to the poor.

Future research should focus on exploring the relationships between various macroeconomic variables and poverty in Tanzania. Such studies can utilize different models, variables, and data sets, including panel data, to provide a more comprehensive understanding of the factors influencing poverty. Expanding the literature in this area will help policymakers design more effective strategies to combat poverty and promote economic development.

References

- De Janvry, A., & Sadoulet, E. (2010). Agricultural growth and poverty reduction: Additional evidence. *the World Bank Research Observer*, 25(1), 1-20.
- Kitole, F.A., Tibamanya, F.Y., & Sesabo, J.K. (2023). Cooking energy choices in urban areas and its implications on poverty reduction, *International Journal of Sustainable Energy*, 42:1, 474-489, DOI: [10.1080/14786451.2023.2208680](https://doi.org/10.1080/14786451.2023.2208680)
- Dickey, D., & Fuller, W. (1979). Distribution of the Estimator for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association*, 74(5), 427-431.
- Dimoso, R.L., & Andrew, F. (2021). Rural Electrification and Small and Medium Enterprises' (SMEs) performances in Mvomero District, Morogoro, Tanzania, *J. Bus. Sch.* 4 (1) (2021) 48–69, <https://doi.org/10.26677/TR1010.2021.717>
- Ellahi, N. (2011). How the development of finance contributes to poverty alleviation and growth: A time-series application for Pakistan. *African Journal of Business Management*, 5(30), 12138-12143.
- Kitole, F.A., & Utouh, H.M.L. (2023). Foreign direct investment and industrialization in Tanzania admixture time series forecast analysis 1960 - 2020, *Applied Economics Letters*, DOI: [10.1080/13504851.2023.2211324](https://doi.org/10.1080/13504851.2023.2211324)
- Fischer, S. (1992). Macroeconomic stability and growth. *Cuadernos de Economía*, 29(87), 171-186.
- Fosu, A. (2017). Growth, Inequality and poverty reduction in developing Countries: Recent global evidence. *Research in Economics*, 71(2), 306-336.
- Fumbwe, F., Lihawa, R., Andrew, F., Kinyanjui, G., & Mkuna, E (2021). Examination on level of scale efficiency in public hospitals in Tanzania. *Cost Eff Resour Alloc* **19**, 49 (2021). <https://doi.org/10.1186/s12962-021-00305-4>
- Gujarati, D., & Bernier, B. (2004). *Econometric*. Brussels: Boeck.
- Huang J., Zhang, Q., & Rozelle, S. (2008). Economic growth, the nature of growth and poverty reduction in rural China. *China Economic Journal*, 1(1), 107-122.
- Kitole, F.A. (2023). Economics of Agricultural Development: World Food Systems and Resource Use., *Agrekon*, 62:2, 194-196, DOI: [10.1080/03031853.2023.2181831](https://doi.org/10.1080/03031853.2023.2181831)
- Jamal, H. (2006). Does Inequality Matter for Poverty Reduction? Evidence From Pakistan's Poverty Trends. *The Pakistan Development Review*, 45, 439-459. Retrieved 2020.
- Kitole, F., Lihawa, R., Sesabo, J., & Shitima, C. (2023). The dynamism of communication technology adoption, market information and welfare: Evidence from Nile perch (*Lates niloticus*) fish market, Mwanza, Tanzania. *Lakes & Reservoirs: Research & Management*, 28, e12433. <https://doi.org/10.1111/lre.12433>
- Johansen, S., & Juselius, K. (1990). Some structural hypotheses in a multivariate cointegration analysis of the purchasing power parity and the uncovered interest parity.
- Kitole, F.A., & Sesabo, J.K. (2024). The Heterogeneity of Socioeconomic Factors Affecting Poverty Reduction in Tanzania: A Multidimensional Statistical Inquiry. *Soc* (2024). <https://doi.org/10.1007/s12115-024-00957-x>
- Jorge, R. (2018). Poverty and Economic Growth in Mexico. *Journal of Social Science*.
- Kar, M., Agir, H., & Peker, O. (2011). Financial development and poverty reduction in Turkey. Department of Economics, Adana Cukurova University, Turkey, 681-703.

- Kitole, F.A., & Genda, E.L. (2024). Empowering her drive: Unveiling the resilience and triumphs of women entrepreneurs in rural landscapes, *Women's Studies International Forum*, Volume 104, 102912, ISSN 0277-5395, <https://doi.org/10.1016/j.wsif.2024.102912>
- Kothari, C. (2004). *Research methodology: Methods and techniques*. New Age International.
- Lee, N., & Sissons, P. (2016). Inclusive growth? The relationship between economic growth and poverty in British Cities. *Environment and Planning: Economy and Space*, 48(11), 2317-2339.
- Kitole, F.A., Tibamanya, F.Y., & Sesabo, J.K. (2024). Exploring the nexus between health status, technical efficiency, and welfare of small-scale cereal farmers in Tanzania: A stochastic frontier analysis, *Journal of Agriculture and Food Research*, Volume 15, 2024, 100996, <https://doi.org/10.1016/j.jafr.2024.100996>
- Long, S., & Ervin, H. (2000). Using heteroscedasticity consistent standard errors in the linear regression model. *The American Statistician*, 54(3), 217-224.
- Lyon, D., & Tsai, L. (1996). A comparison of tests for heteroscedasticity. *Journal of the Royal Statistical Society: Series D (The Statistician)*, 45(3), 337-349.
- Maddala, G., & Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and Statistics*, 631-652.
- Kitole, F.A., Mbukwa, J.N., Tibamanya, F.Y., & Sesabo, J.K. (2024). Climate change, food security, and diarrhoea prevalence nexus in Tanzania. *Humanit Soc Sci Commun* 11 (1): 1-13. <https://doi.org/10.1057/s41599-024-02875-z>
- Maliszewska, M., & Mensbrugge, D. (2019). The Belt and Road Initiative: Economic, poverty and environmental impacts. *World Bank Policy Research Working Paper*, (8814).
- Mladen. (2015). Economics Growth and Development. *Journal of Process Management*, 3(1), 12-16.
- Kitole, F.A., Sesabo, J.K., & Lihawa, R.M. (2023). Instrumental variable approach on analyzing risk factors associated with noncommunicable disease prevalence in Tanzania: a nonexperimental design. *Health Sci Rep*. 2023; 6:e1585. [doi:10.1002/hsr2.1585](https://doi.org/10.1002/hsr2.1585)
- Modamba, E., Delgado, C., Simons, S., & Swinkels, A. (2019). Tanzania economic update: Transforming agriculture-realizing the potential of agriculture for inclusive growth and poverty reduction
- Mulok, D., Kogid, M., Asid, R., & Lily, J. (2012). Is economic growth sufficient for poverty alleviation? Empirical evidence from Malaysia. *Cuadernos de Economia*, 35(97), 26-32.
- Kitole, F.A., & Sesabo, J.K. (2022). Smallholder Livestock Keepers' Breeding Choices and Its Implication on Poverty Reduction in Developing Countries: Empirical Evidence from Tanzania. *Glob Soc Welf* 9, 241–251 (2022). <https://doi.org/10.1007/s40609-022-00252-9>
- Newbold, P., & Granger, W. (1974). Experience with forecasting univariate time series and the combination of forecasts. *Journal of the Royal Statistical Society*, 137(2), 131-146.
- Nyasha, S., Gwenthure, Y., & Odhiambo, M. (2017). Poverty and economic growth in Ethiopia: a multivariate causal linkage. *The Journal of Developing Areas*, 51(1), 343-359.
- Pesaran, H., Shin, Y., & Smith, R. (2001). Bounds testing approaches to the analysis of a level relationship. *Journal of applied econometrics*, 289-326.
- Kitole, F. A., Msoma, L. J., & Sesabo, J. K. (2024). Navigating the economic landscape: a comprehensive analysis of government spending, economic growth, and poverty reduction nexus in Tanzania. *Applied Economics Letters*, 1–5. <https://doi.org/10.1080/13504851.2024.2302902>

- Pradhan, P. (2020). The nexus between finance, growth and poverty in India. The cointegration and causality approach. *Asian Social Science*, 6(9), 114.
- Theodory, T.F., & Kitole, F.A. (2024). Does rural water resource outcry elevate communities' conservation for livelihoods in a pooled resource? A case of Mvomero district, Morogoro region, Tanzania. *Sustain. Water Resour. Manag.* **10**, (2): 1-19
<https://doi.org/10.1007/s40899-024-01070-x>
- Nguyen, T. (2020). "The results of poverty reduction in ethnic minority and mountainous areas are not, sustainable". Retrieved from. <https://www.qdnd.vn/chinh-tri/tin-tuc-su-kien/ket-qua-giam-giam-ngheo-vung-dan-toc-thieu-so-mien-nui-chua-thu-su-ben-vung-590767>.
- Uddin, G., Shahbaz, M., Arouri, M., & Teulon, F. (2014). Financial development and poverty reduction nexus: A cointegration and causality analysis in Bangladesh. *Economic Modelling*, 36, 405-412.
- URT. (2012). National Strategy for Growth and Reduction of Poverty II, Ministry of Finance and Economic Affairs, DSM.
- World Bank. (2019a). Tanzania Mainland Poverty Assessment. World Bank.
- World Bank. (2019b). World Development Report 2020. Trading for development in the age of global value chains.
- World Bank. (2020). Tanzania Mainland Poverty Assessment: Part 2-Structural Transformation and Firms Performance.
- Wycliffe, G., & Sun, S. (2018). Does economic growth contribute to poverty reduction? An empirical analysis of evidence from Rwanda. *Asian Journal of Economic Modelling*, 6(4), 374-390.
- Zaman, K., Rashid, K., Khan, M., & Ahmad, M. (2011). Panel data analysis of growth, inequality and poverty: evidence from SAARC countries. *Journal of Yasar University*, 21(6), 3523-3537.