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The Effect of Public Debt on Economic Growth in Tanzania

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Abstract: *This paper examines the effect of public debt on the economic growth of Tanzania from 2009 to 2019. It is a quantitative design and descriptive study employing secondary data from the central bank of Tanzania's website, the IMF's website, and the AFDB's website. The study employs least squares methods in the E-Views 12 package to examine the relationship between variables. The results revealed that external debt and private consumption are significant and positively affect economic growth. However, domestic debt has a negative, insignificant effect on economic growth. This means that governments have to take on more external debt than domestic debt due to the fact that borrowing internally can disturb private consumption. This is due to the fact that private consumption has a positive impact on economic growth. When the government borrows internally, it demonetizes the economy, which can slow economic growth. For faster economic growth, borrowing externally and injecting funds into the nation's economy can stimulate growth. However, external debt should be used for development and productive projects.*

Keywords: Domestic debt, external debt, GDP growth, private consumption, public debt

1. INTRODUCTION

Implementation of public borrowing policies is vital for the nation's sustainable economic development. This is due to the fact that public borrowing involves resources that have to be well employed and allocated in such a way that, due to their efficiency, if well managed, they may service the loan while enjoying the services.

With no doubt, the infrastructure is so expensive that it needs a lump sum of resources to implement it, though the resources are always scarce. So, one of the economic ways of mobilizing the same is through the employment of public debts [1]. Tanzania's government has grown its multilateral debt service from 29.4 million USD in 2007 to 168.8 million USD in 2018 [1]. Similarly, a treasury bond was valued at TZS 9247.62 billion in June 2019.

According to Chindengwike and Kira [1], Tanzania has implemented important socioeconomic initiatives such as the electricity projects, the North-South Highway, standard and medium gauge trains, interregional highways, education amenities, water supply, airway transport, and the health sector to increase economic growth and improve people's living standards. The Rufiji Hydro-Electricity Project (the second largest project in Africa), the Standard Gauge Railway (SGR) from Dar es Salaam to Mwanza, and to neighboring countries are currently in different completion stages; for instance, the Dar es Salaam to Dodoma line is in its final stages of completion. Also, according to Alfred [2] and Chindengwike and Kira [1], education programs for children's support are examples of projects that have taken advantage of foreign debt.

Tanzania has not been able to develop its economy to the level that is considered reasonable, nor has it been able to improve infrastructure or provide excellent services to its citizens using its own resources [1], [2]. Tanzania's government has been borrowing from both internal and external stakeholders, like domestic financial institutions, developing countries, the International Monetary Fund (IMF), and the World Bank (WB), among others, to finance its deficit budget [3].

Therefore, Tanzania's foreign debts have steadily increased from USD 4,696 million in 1986 to USD 8,017 million in 1995 before beginning to decline [1]. Financing the deficit budget is the main cause of public borrowing. Despite the government's efforts to grow the economy by boosting revenue collection, managing public expenditure, and investing in industrial-based projects such as transportation infrastructure and hydroelectric plant construction, among others, the government's debt appears to be growing continuously [4].

The research on the relationship between public debt and economic growth, on the other hand, has not been decisively brought forth. As a result, discussions about this topic have produced mixed conclusions. For instance, Elikana [5] shows that public debt has a negative impact on economic growth, while Tavakol & Dennick [6] show that public debt has a beneficial impact on economic growth. Particularly in Tanzania, Olivera & Lora [7] focused on only external debts and their servicing, Chindengwike & Kira [1] considered only external debt, and Cochrane [8] concentrated on domestic debt and economic growth in Tanzania. Since the two studies were done for a specific single item (external debt for Chindengwike and domestic debt for Cochrane 2011), our study covered the gap in the research for overall public debt instead of reporting on domestic or external debt only.

This type of research is motivated by the general observation that inflowing debts improve the borrowing economy. Tanzania engages in public borrowing, but to what extent it benefits from the same is not known. It is unclear whether more domestic or more external debt should be incurred. So, the government will use this study to assess the effects of its public debt concentration on economic growth.

This study builds on previous research on the effects of public debt on economic growth conducted worldwide,

including Tanzania. However, the reviewed literature identifies differences in timing, methodologies employed, and location, among others, as the need for this research. For instance, Akram [9], Pegkas [10], Sánchez-Juárez & García-Almada [11], and Sheikh et al. [12] conducted studies in the developed and emerging economies. This left room for such studies to be conducted in developing economies like Tanzania. The section that follows examines the literature to gain a better understanding of the context in which the knowledge base on the effect of public debt on economic growth has evolved. The following section explains the methodology used to reach the conclusion. The next section is for data analysis to present the research results and discuss the findings, and lastly, the conclusion.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Theoretical Literature Review

2.1.1 The Keynesian Theory of Public Debt

The Keynesian theory was developed after the economic crisis of the year 1930. The theory specifically analyzed the increase in public debt and financial stability. However, the theory supports public debt for economic growth. It highlighted the fact that public debt should be perceived as an asset and not a liability due to the provision of reasonable employment of factors of production. Supporting this, Ntshakala [13] explains that when the nation goes on a deficit spending spree, it creates massive employment of factors of production. In this case, public debt can boost economic growth through the facilitation of public spending.

According to Keynesian theory, if there are underutilised factors of production, for instance in the private sector, the government can engage them using a deficit budget to bring the economy into equilibrium. As a result, Keynes maintained that an increase in public debt would improve national income due to several impacts. The Keynesian in this case was attempting to undermine traditional budgeting and public finance principles. In this case, the theory tries to link public borrowing and deficit financing. According to Keynes, for economic growth, governments should employ public debt at the highest possible level due to the fact that this can cause a positive influence on demand and supply that leads to job creation and more output.

According to Lerner [14], public debts have advantages and disadvantages. However, nations should prioritize the advantages rather than concentrate on the disadvantages. The disadvantage of government borrowing comes from the types of government spending for which the debts are used. This can be explained by the increasing flow of money generated by financed projects, which leads to tax payments to service the loan. Increases in public debt contribute to the nation's current capital during periods of unemployment. Therefore, according to the theory, public borrowing encourages the growth of more institutionalized savings centers, such as capital markets and other financial institutions, which leads to economic growth.

2.1.2 Neo-Classical Growth Theory

The theory was developed in 1956 by Robert Solow, who proposed a formal model in which labor productivity is the fundamental factor in economic growth. In the same vein, the level of technology and capital is more critical and plays an important role in economic development. This can be explained by saying that the output (Y) is the efficiency and effective function of capital, labor, and technology. So, mathematically, the model is expressed as $Y = f(K, L, A)$, where Y represents aggregate production, K represents capital, L represents labor, and A represents current technology. For a better output, all the factors are required to contribute at their maximum [13].

2.2 Empirical Literature Review on Public Debt and Economic Growth

According to Mohamed [15], the phrase "external debt" refers to all outstanding debt owned by a country to foreign entities or foreign governments; that has a maturity of one year or longer and is payable in reserve currency, products, or services. Public debt is debt owed by the government to entities outside of the government, such as individuals, businesses, and foreign governments. Public debt is typically used to fund government projects and services, such as education, defense, and infrastructure. Overall debt is a combination of public and private debt. Private debt is debt owed by individuals, businesses, and other entities within the private sector to another entity within the private sector. This debt is typically used to finance investments, such as purchasing a home or a business. Therefore, our study uses public debt as one of independent variables. To test the relationship between public debt and economic growth, we use hypotheses.

The null hypothesis and the alternative hypothesis are two competing statements that are formulated and tested in statistical hypothesis testing. The null hypothesis, denoted as H_0, represents the default or assumed position in hypothesis testing. On the other hand, alternative hypothesis, denoted as H_a or H_1, contradicts or challenges the null hypothesis. It represents the researcher's or analyst's intended outcome or the possibility of an alternative explanation. Therefore, in hypothesis testing, the goal is to gather evidence to either reject the null hypothesis in favor of the alternative hypothesis or fail to reject the null hypothesis due to insufficient evidence. The decision is based on the analysis of data and the calculation of statistical measures such as p-values and confidence intervals.

2.2.1 The Relationship Between External Public Debts and Economic Growth

There has been much discussion about the connection between external debt and economic growth, both philosophically and empirically [16].

The literature [1], [17] revealed that the total stock of foreign debt has a favourable effect on economic growth in Tanzania. The authors explain that the Tanzanian foreign debt

was still sustainable as it was below the required threshold for sustainable foreign debt. However, according to Bal and Rath [18], more public debt boosts economic growth in the short term but hurts it in the long run. The finding was contradicted by Teles and Mussolini [19] and Sueyoshi and Goto [20], who found that debt had little to no effect on economic growth. Akinlo [21] explains that a large impact of external debts on economic development is when they interact with productive spending. According to his findings, economic growth increases as debt for productive expenditures rises [21]. If the institutional framework is strong, public debt can have a real impact on economic growth. In contrast, if the institutional framework is weak, inadequate policies and institutions are likely to be the major impediment to growth [22]. Spilioti and Vamvoukas [23] discovered a beneficial impact of public debt on Greece's economic expansion. However, excessive levels of debt discourage investment and have a detrimental impact on the economy because they consume the majority of tax revenue for repayment [15], [24].

However, external debts significantly hinder economic expansion [9], [25]. The public sector frequently uses external debt to cover ongoing costs, even though it is more corruptible [21]. The finding was contradicted by Ahmed and Gasparatos [26], who claim that every external debt contracted represents marginal productivity higher than the principal and interest payments and make the argument in this example for the beneficial effects of external debt on the economy of the borrowing country. Using external borrowing can give a nation access to more resources than it would have by relying solely on internal borrowing, which merely moves resources around within the country [27]. The result was supported by Sulaiman and Azeez [28], who discovered that external debt is advantageous to the economy. They reasoned that making the best use of the government's foreign debt would prevent debt overhang and investment suffocation [28].

H_1: There is a positive relationship between external public debt and economic growth.

2.2.2 The Relationship Between Domestic Public Debts and Economic Growth

Domestic debts are obligations that are incurred within a nation's borders and are made through the purchase of debt instruments like Treasury bonds, Treasury bills, and Treasury certificates. Other types include promissory notes, development stocks, and FGN bonds [29]. A nation often has to use borrowed money to finish development projects, address fiscal deficits, meet trade deficits, and advance the development of the country and its citizens [24]. However, there has been much discussion about the connection between external debt and economic growth, both philosophically and empirically [16].

According to Akhanolu et al. [30], domestic debt has a positive impact on a variety of economic factors, including income growth, capital accumulation, unemployment, the distribution of goods and services, and stability. This is due to the fact that the money stays in the economy when the principal and interest on domestic debt have been repaid, which is one of the reasons why it promotes economic growth [31]. They added that the money can still be used in the economy for additional production after the government pays back the loans.

Domestic debt positively influences the economic development of Pakistan, which suggests that some of the money raised through domestic borrowing is used to finance government spending that increases GDP [12]. They went on to say that the fact that domestic debt is marketable may also be a contributing factor to the favourable correlation between domestic debt and economic growth in Pakistan [12].

According to Babu et al. [32], increasing domestic debt has a favourable and considerable impact on economic expansion. The fact that domestic debt markets encourage financial depth and economic efficiency is proof that economic growth and domestic debt are related [32]. According to Putunoi & Mutuku [33], the findings are due to the recent expansion of the capital market and financial sector deregulation in the EAC, which fuels growth.

However, domestic debt has had a detrimental impact on economic growth, and it is advised that the government take measures to pay off the outstanding domestic debt [4]. This is due to the fact that domestic debt limits access to private lending, particularly in nations with low national savings and thin financial markets [34]. This happens as debt consumes funds in the banking industry, reducing resources for borrowing by the private sector [35]. This decrease in the private sector's credit has a multiplier effect that raises interest rates, further decreasing credit demand and limiting domestic borrowing and investment [36]. The literature gives the contradicting effects of whether positive or negative effects prevail. We expect a positive relationship between the variables.

H_2: There is a positive relationship between domestic public debt and economic growth.

2.2.3 The Relationship between Private Consumption and Economic Growth

The amount of private consumption is strongly related to a country's revenue [37]. He went on to say that since consumption can be measured using constant prices, it may have an impact on the economy of the country. Knowing that household consumption and economic growth are intimately correlated in a multiple-economy setting means that as consumption declines, so does economic growth. As a result, consumer households use their spending to meet a variety of requirements over the course of a year [38].

When it comes to determining the periodic fluctuations in economic activities, household consumption plays a large role in economic growth [38]. The more goods and services are produced to satisfy demand, the more people consume. Consumption is directly correlated with income for an individual [38]. Lerner [37] also claims that when income rises, the average willingness to consume—a measure of consumption relative to income—declines. As a result, consumer spending has a beneficial impact on economic growth [38]. The finding was in line with Ebong et al. [39],

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who found that consumption expenditures have a beneficial impact on economic growth. The positive influence of private consumption on economic growth means that consumption stimulates economic growth [39]. The literature showed a positive correlation between household spending and GDP in Sri Lanka [40] and Nigeria [39], among others. Therefore, the following is the hypothesis:

H_3: Private consumption has a positive impact on economic growth.

2.2.3 The Relationship between Gross Public Investment and Economic Growth

Pritchett [41] suggested that public investment in many developing countries is far less effective than private investment and that this can be attributed to a history of unsuccessful public projects. This lack of success has led to a lack of confidence in the ability of these countries to expand their public investment, as well as wasted potential advantages that could have been gained from these projects. Developing countries face the challenge of investing greater amounts in infrastructure in order to foster and maintain growth [42]. The success of these investments is determined by the quality of project selection, management, and evaluation, as well as the regulatory and operational frameworks in place [41], [42]. This paper seeks to explore the potential of public investment in developing countries by controlling for the weak institutions and low track records seen in these nations. By using public capital as a factor in the regression, the study looks to determine whether or not it is productive in terms of economic growth. The findings of Gupta et al. [42] are considered in this analysis with the idea that public investment has a close relationship with economic growth. Therefore, as a controlling variable, gross public investment is expected to negatively affect economic growth.

H_4: Gross public investment has a negative impact on economic growth.

3 Research Methodology

To study the effects of public debts on economic growth in Tanzania for the years 2009–2019, we employed secondary data collected from the central bank of Tanzania website, the IMF website, and the AFDB website. The choice of the time period was based on the availability of data, which is essential for any empirical research. So, the years 2009 onward provide the most complete information set. On the other hand, the years after 2019 by means of 2020 and 2021 are excluded from the study due to the COVID-19 pandemic, as this could lead to biased results due to the presence of periodic outliers.

The variables employed in the study are gross domestic product growth (GDP), external debt (EXD), domestic debt (DOD), private consumption (PC), and gross public investment (GPI). The selection of these variables was due to the theme of the research, which wanted to examine the influence of public debts (external and domestic) on GDP growth. However, we know that there are other factors besides debt that contribute to GDP growth. Research has been conducted and published, such as in Batóg and Batóg [43], that indicates it is best to concentrate on the essential factors that have been linked to growth and then examine the significance of other elements if they are included in the primary set. This study chose and justified its variables based on the evidence that Barkhordari et al. [44] found consistently connected to growth. The strength of the independent variables in explaining the dependent variable is established in the R-square results. In data analysis, we performed Levin, Lin, and Chu t*; Im, Pesaran, and Shin W-stat; and ADF-Fisher Chi-square and PP-Fisher Chi-square unit root tests to study the integration order of the series. Subject to the results from the unit root test, all the variables were stationary at their levels, so we employed least squares for evaluation.

Therefore, the overall research design can be shown in fig. 1.

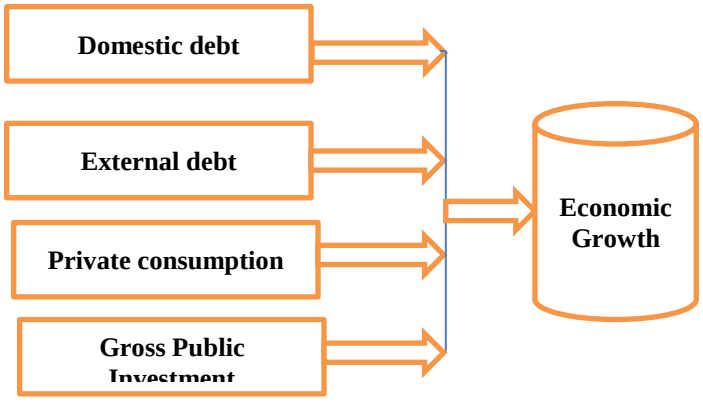

***Fig. 1** Conceptual framework*

3.1 Model Specification

This study employs a modified model grounded in neo-classical growth theory. The theory explains that output (Y) is a function of physical capital, labor, and technology, such that Y = f (K, L, A), where Y represents aggregate output, K represents capital, L represents labor employed, and A represents the current state of technology [13]. The theory is adopted on the assumption that public debt is borrowed to finance amenities such as health, education, energy, transportation, and other development infrastructures. As shown in the model, the borrowing is for productive use and is expected to contribute to economic growth. However, the model Y = f (A, K, L) is modified: GDP = f (LNDOD, LNEXD, LNPC, LNGPI) [13]. Where LNGDP denotes the natural logarithm of gross domestic product growth, LNDOD denotes the natural logarithm of domestic debt in the form of T-bonds, T-bills, and other instruments, LNEXD denotes the natural logarithm of external debt, LNPC denotes the natural logarithm of private consumption, and LNGPI denotes the natural logarithm of gross public investment. The linear equation is as follows:

$$\boldsymbol{LNGDP_t = \beta_0 + \beta_1 LNDOD_t + \beta_2 LNEXD_t + \beta_3 LNPC_t + \beta_3 LNGPI_t + \mu_t.}$$

μ_t is the error term, and β_0 is the constant term.

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4 RESULTS AND DISCUSSION OF FINDINGS

4.1 Descriptive Statistics

LNGDP shows the low volatility as represented by the standard deviation (Table 1) in such a way that one can predict future economic growth. Also, the normality test shows that the distribution of the residuals or errors can be reasonably approximated by a normal distribution.

Table 1: Descriptive statistics

Variable	Mean	Std Dev	Minimum	Maximum	Jarque-Bera	Observations
LNGDP	1.8173	0.1523	1.5041	2.0412	0.7580	11
LNDOD	2.0369	0.1593	1.7750	2.2618	0.7268	11
LNEXD	3.3078	0.0488	3.2189	3.3810	0.7563	11
LNPC	1.6718	1.3917	-2.3026	2.8034	18.7980	11
LNGPI	2.1475	0.1086	1.9741	2.3224	0.4872	11

4.2 Testing for Multicollinearity

When independent variables show a strong relationship among themselves, it causes a multicollinearity problem that produces biased results. We used the variance inflation factors (Table 2) and paired correlation analysis (Table A1) to test for multicollinearity problems. The literature needs a VIF range between 1 and 10 [45], [46]. Nevertheless, our results' VIF ranges between 1.1 and 3.6, which proves the absence of the multicollinearity problem in our series.

Table 2: Variance inflation factors

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
LNDOD	0.0808	658.4208	3.6390
LNEXD	0.7576	16183.42	3.1970
LNPC	0.0003	3.0143	1.1650
LNGPI	0.0575	519.1778	1.2040

4.3 Unit Root Test

To enable us to choose the right evaluation method, we tested the stationarity of our series (unit root) to establish the order of integration [47]. We performed Levin, Lin, and Chu t*, Im, Pesaran, and Shin W-stat, the ADF-Fisher Chi-square, and the PP-Fisher Chi-square unit root tests. Group unit root tests are most commonly used to detect the presence of a unit root in a group of related time series. They are usually used when there is a set of related time series that need to be tested for unit root at the same time, such as macroeconomic variables or financial markets. Our series have the same characteristics that qualify to be tested using the group unit root test (Table 3). The results from the unit root test (Table 3) show that the variables are stationary at their levels. In this case, we use the least squares technique to evaluate the effect of public debt on economic growth.

Table 3: Group unit root test - summary

Method	Statistic	Prob.*	Cross- sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.50093	0.0002	5	48
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.38270	0.0086	5	48
ADF - Fisher Chi-square	22.9767	0.0108	5	48
PP - Fisher Chi-square	37.1363	0.0001	5	50

** Probabilities for Fisher tests are computed using an asymptotic Chi square distribution. All other tests assume asymptotic normality

4.4 Regression Analysis

The regression results in Table 4 show that 85 percent of the dependent variable can be explained by the independent variables, and the remaining 15 percent can be explained by other factors. Durbin Watson statistics fall between 1.96 and 2 which is reasonable. Also, the series can collectively explain the dependent variable due to the fact that the p-value of the F-statistic is significant at the 5 percent level of significance.

External debt is found to be significant and positively affects economic growth (Table 4). This means that the increase in external debt helps raise the economic growth of the country. The finding is in line with the Keynesian theory of public debt, which supports public debt for economic growth. This is due to more factors of production being employed that boost the economy [37]. The theory highlights that public debt should be perceived as an asset and not a liability due to the provision of reasonable employment of factors of production that can boost the economy. The result is in line with findings by Chindengwike & Kira [1], Marobhe [17], Akinlo [21], and Pegkas [10]. It is due to the fact that when a country employs external debt with its adjustment regulations, it improves its technology, infrastructure, and productivity. The implementation of Keynesian theory in Tanzania's economy has enabled infrastructural development [1], such as the Tanzania-Uganda oil pipeline, standard gauge railway construction, construction of the Mwalimu Nyerere hydropower project, construction of the national fibre optic cable network named the National ICT Broadband *Backbone (NICTBB)*, airway and waterway rehabilitations, health infrastructure, and education infrastructure, among others.

This is the application of neo-classical growth theory, which insists on the availability and employment of the factors of production for economic growth. Therefore, the null hypothesis that external debt has a negative effect on economic growth is rejected.

On the other hand, the results (Table 4) show the significant negative effects of domestic debt on economic growth. The lower the domestic public debt, the higher the economic growth. Using external borrowing can give a nation access to more resources than it would have by relying solely on internal borrowing, which merely moves resources around within the country [27]. Also, when the government engages in domestic borrowing, it disturbs the money supply. The money that was supposed to be in the economy is still in the same position; only the government demonetized it from private sector expenditure to government expenditure. This is due to the fact that domestic debt limits access to private lending, particularly in nations with low national savings and infant financial markets like Tanzania [34]. In this case, when you disturb the domestic money supply, you also disturb economic growth. Therefore, we cannot reject the null hypothesis that the domestic public debt has a negative effect on economic growth.

This is evidenced in the research results (Table 4) that found a significant and positive influence of private consumption on economic growth [38]–[40]. For positive economic growth, it needs to increase private consumption. The findings are consistent with those of Pegkas [10]. Therefore, the null hypothesis that private consumption has a negative effect on economic growth is rejected.

The results (Table 4) show the insignificant effects of gross public investment on economic growth, though it has a negative effect. This is due to the fact that investment is one thing, but managing the investment is another, which challenges many developing countries, including Tanzania, as noted by Pritchett [41]. This lack of success has led to a lack of confidence in the ability of these countries to expand their public investment, as well as wasted potential advantages that could have been gained from these projects. Developing countries [42] face the challenge of investing greater amounts in infrastructure in order to foster and maintain growth. The success of these investments is determined by the quality of project selection and evaluation, as well as the regulatory and operational frameworks in place [41], [42].

Table 4: Regression analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNDOD	-0.7741	0.2843	-2.7224	0.0345
LNEXD	3.2833	0.8704	3.7722	0.0093
LNPC	0.0918	0.0184	4.9884	0.0025
LNGPI	-0.3362	0.2399	-1.4016	0.2106
C	-6.8979	2.3649	-2.9168	0.0267
R-squared	0.8542	Mean dependent. var		1.8173
Adjust R-squared	0.7571	S.D. dependent var		0.1523
S.E. of regression	0.0751	Akaike inf criterion		-2.0379
Sum square residual	0.0338	Schwarz criterion		-1.8570
Log likelihood	16.2082	Hannan-Qu criteria.		-2.1519
F-statistic	8.7910	Durbin-Watson stat		1.9794
Prob(F-statistic)	0.0110			

4.5 Diagnostic Tests

After obtaining our results, we had to conduct the diagnostic test for their robustness, and we tested for serial correlation, heteroskedasticity, and stationarity.

4.5.1 Test for Serial Correlation

We conducted the Breusch-Godfrey Serial Correlation LM Test with the null hypothesis that the series does not suffer from serial correlation. To achieve better results, we must obtain an insignificant p-value. In our results, the test shows an insignificant result, as shown in Table 5. Therefore, we cannot reject the null hypothesis that the series does not suffer from serial correlation.

Table 5: Breusch-Godfrey serial correlation LM test

Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	0.8235	Prob. F (2,4)	0.5017
Obs*R-squared	3.2083	Prob. Chi-Square (2)	0.2011

4.5.2 Testing for Heteroskedasticity

We conducted the heteroskedasticity test (Breusch-Godfrey) with the null hypothesis that the assumption of homoskedasticity is valid, meaning that there is no significant variation in the errors across different values of the independent variables in the model. For better results, we have to get an insignificant p-value. In our results, the test shows an insignificant result, as shown in Table 6. Therefore, we cannot reject the null hypothesis that there is no significant variation in the errors across different values of the independent variables in the model.

Table 6: Heteroskedasticity test: Breusch-Pagan-Godfrey

Null hypothesis: Homoskedasticity			
F-statistic	0.7470	Prob. F (4,6)	0.5942
Obs*R-squared	3.6569	Prob. Chi-Square (4)	0.4544
Scaled explained SS	0.9320	Prob. Chi-Square (4)	0.9199

4.5.3 Normality Test

The Jarque-Bera normality test was conducted with the null hypothesis that the distribution of the residuals or errors can be reasonably approximated by a normal distribution. For better results, we have to get an insignificant p-value. The results show an insignificant p-value, as figure 2 shows. Therefore, we cannot reject the null hypothesis that the

distribution of the residuals or errors can be reasonably approximated by a normal distribution.

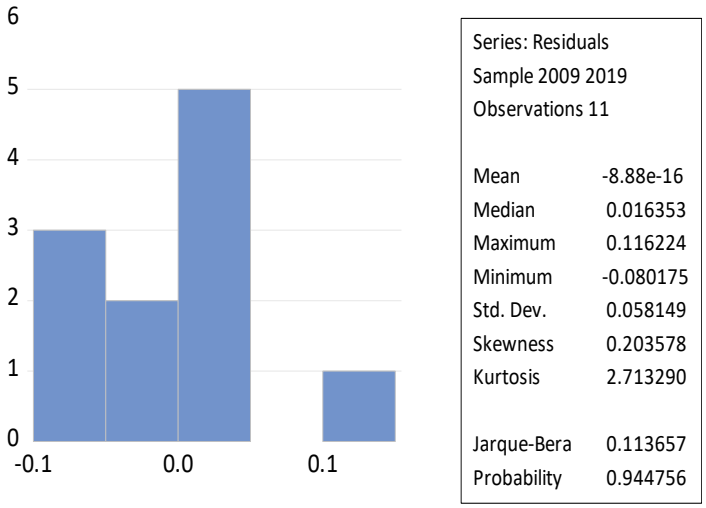

***Fig. 2** Normality Test*

5. CONCLUSION

The theme of this paper is to explain the effects of public debt on economic growth. The result shows that external debt and private consumption have positive effects on economic growth, while domestic debt has negative effects on economic growth. In this case, for higher economic growth, the Tanzanian government has to incur more external debt than internal debt. This is due to the fact that when the government borrows internally, it disturbs economic growth. This is demonstrated by the findings that private consumption is significant and has a positive effect on economic growth, implying that if one wants to improve economic growth, one must increase private consumption and vice versa. So, borrowing internally by the government hampers economic growth. So, reducing domestic debt can have positive effects on economic growth due to the full employment of available resources. Therefore, to maximize economic growth, governments have to employ more external debt while reducing domestic debts. However, for the economy to be sustainable, the public debt must be balanced with borrowing capacity and economic growth. Also, the government should mostly borrow from abroad when absolutely required, and the borrowed money must be used for productive endeavours like building infrastructure.

The main impediments included inadequate data quality, particularly with regard to domestic debt, as the data regarding this has been inconsistent in terms of definitions and coverage.

In future studies, research has to be done on the effects of public debt on economic growth for the highly growing economy (the East African Community), a unity that comprises seven countries as a single economic zone. Also, other researchers can carry on exploring potential elements that may have an impact on the connection between public debt and economic growth in the East African Community.

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Availability of Data and Materials
The datasets generated and analyzed during the current study can be available on the World Bank database, and from the author on demand.

Competing Interests
I, the author, declare that there is no potential conflict of interest regarding this research and its publication.

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