Public Debt and Economic Growth: Evidence from Tanzania

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Authors' contributions

This work was carried out in collaboration between both authors. Author SY designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author AOS managed the analyses of the study and the literature searches. Both authors read and approved the final manuscript.

Article Information

ABSTRACT

External debts can have either positive or negative effects on the economic growth of country's economy. If external debts are used for development expenditure then the country may benefit because development expenditure like infrastructure may have a multiplier effect on boosting economic growth. This paper examines the impact of public debt on economic growth in Tanzania for the period 1970 to 2015. The study utilized co-integration and Vector Error Correction Mechanism (VECM) Approach to test the relationship between public debt and economic growth and granger causality test to examine the causal relationship between variable. The unit root tests showed that all variables were integrated after taking the first difference, the Johansen co-integration result showed that the variables were co-integrated. The VECM estimate showed that there is a negative relationship between public debt and economic growth in Tanzania over the study period. In addition, granger causality test revealed that there is no causal relationship between public debt and economic growth. Based on these findings, this study recommended that

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Government and policy makers should stop the accumulation of external debt stock overtime and prevent concealing of the motive behind external debt; external debts should be used only for productive investment of highest priorities that would help in yielding returns for economic reasons (productive purposes) and not for social or political reasons.

1. INTRODUCTION

The attainment of sustainable economic growth and development of an economy are the most important objectives of macroeconomic policies especially to the Less Developed Countries (LDCs) like Tanzania which are characterized by low capital formation due to low levels of domestic savings and investment. Many LDC's when facing a scarcity of capital would resort to borrow fund from either internal or external sources so as to supplement domestic saving to provide service to the citizens [1]. Moreover, the Government normally decides to borrow in order to finance public goods that increase welfare and promote economic growth [2]. Therefore, borrowing may be considered as a best alternative to the capital formation during periods of depression in an economy.

However, external debts can have either positive or negative effects on the economic growth of country's economy. If external debts are used for development expenditure then the country may benefit because development expenditure like infrastructure may have a multiplier effect on boosting economic growth. But also, external debt can have adverse effects on the economy if, firstly, in some instances, the amount of the external debt might be large compared with the economy size of the borrower which can lead to a possible capital flight which may most likely discourage private investment [3]. Secondly, servicing the external debt by export earnings may affect economic growth by depleting available income from social service activities.

Because of the controversial impact of external debt on economic growth of countries, currently, it has become a debatable issue among scholars since the onset of debt crisis in 1980s such as [4,5]. Most of Least Developing Countries depend on debts to finance the budget deficit, there may be domestic or external debts. The first option for countries that face deficit is to borrow domestically from financial institutions, however, due to lack of well-established banking systems, the internal debts are usually insufficient to finance the entire budget deficit [6]. Being a developing country, Tanzania also is no exception when it comes to the use of external borrowings due to budget deficit. For instance, as the result of budget deficits, public debt and external debt has increased from 26 and 29 percent of GDP, respectively after debt relief in 2006 to both 43 percent of GDP in 2013 [7].

It can be seen from Fig. 1; Tanzania total external debts have consistently been growing from USD 4,696 million in 1986 to the peak level of USD 8,017 million in 1995 and start a slitter dropping. Between 2000 and 2001 there was a decline in the country external debt from USD 7.9 billion to USD 6.9 billion respectively due to debt cancellation under Paris club VII arrangements. The trend continues to grow but in 2006 there was a further decline of country external debt stock this was due to the cancellation of debt under the Multilateral Debt Relief Initiative of approximately USD 3 billion. However external debt stock has continuously on the rise since 2007 reaching USD 13,281.4 million in June 2013 (MOF, 2013), representing 75 percent of the national debt stock of USD 17,690.5 million. In which domestic debt was USD 4,409.1 million representing 25.0 percent of the national debt stock, these increases are alarming and needs attention.

The evidence above shows that despite the government conscious effort in managing the nation's debt, the issue of debt has still been a burden to the Tanzanian economy. Large debt service payment obligations (see Fig. 2) and debt burden has depressed investment and hence economic growth through its illiquidity and disincentive effects due to these increasing trends of external debts. For example, in 1975 and 1985 government spending average above 30% of GDP, increase government spending contributed to fiscal deficits which also trigger an increase of external debt [8]. This paper examines the impact of public debt on economic growth in Tanzania for the period 1970 to 2015. The study applied Vector Error Correction Mechanism (VECM) Approach to test
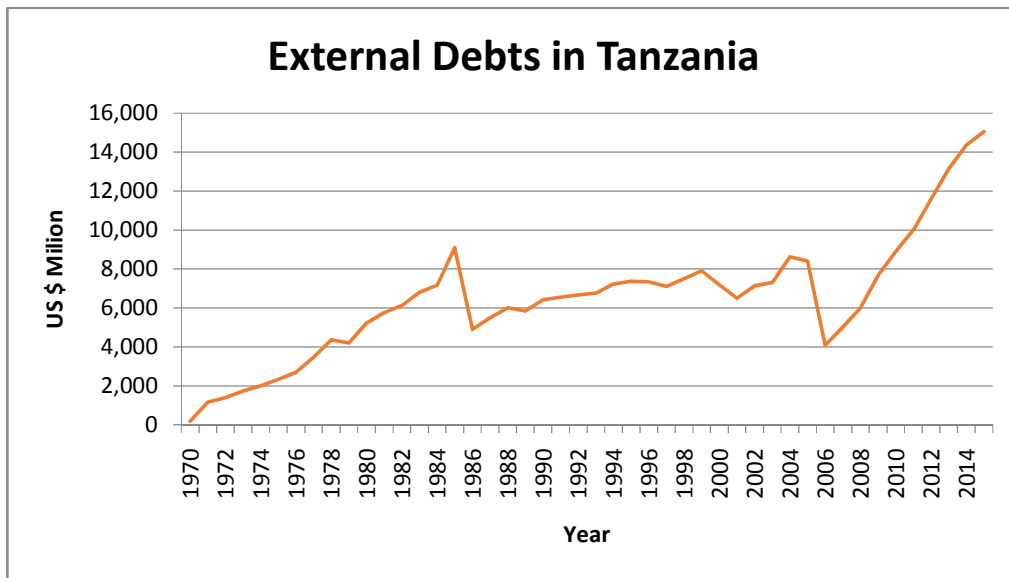
External Debts in Tanzania

Fig. 1. External debt trends
Source: Compiled from World Bank source, 2017
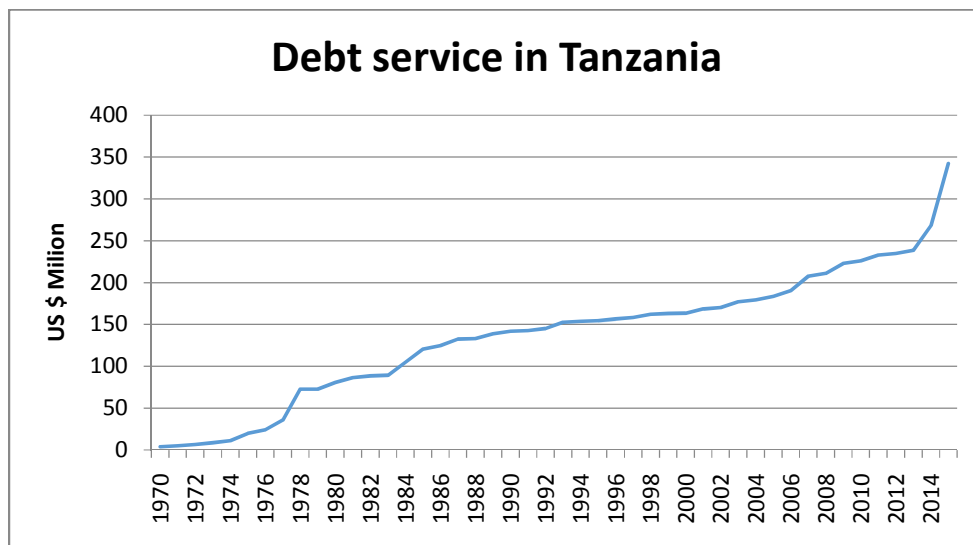
Debt service in Tanzania

Fig. 2. Debt service

the relationship between public debts and economic growth and granger causality test to examine the causal relationship between variables. The rest of the paper is organized as follows: In the next section, we present a brief review of literature on the linkage between external debts and economic growth. In section 3, we provide the empirical methodology and in section 4, we discuss the empirical results. The last section contains concluding remarks of the study.

2. LITERATURE REVIEW

The relationship between public debts and economic growth has been an issue of controversy and verification by academics and researchers in recent years. Several empirical studies support a positive impact of public debts and economic growth [9, 10, and 11]. [12] investigate the effect of external debt on economic growth in Sierra Leone using macroeconomic data from 1970 - 2001. In

achieving it, this study estimates vector autoregression (VAR) models in the form of bivariate and multivariate (VAR) models. In the multivariate VAR framework, the model incorporates other relevant variables such as the terms of trade and gross capital formation since they are the possible variables through which indebtedness can work for or against economic growth. Empirical results from the bivariate model establish a long-run statistical relationship between external debt and GDP and a causal (Granger) relationship between them. In addition, in the multivariate model, there is sufficient evidence of the existence of one cointegrating vector, implying a long-run relationship linking GDP with the debt stock via terms of trade and gross capital formation.

Hailemariam [13] examined the impact of external debt on economic growth and private investment of Ethiopia using a cointegrated VAR model over the period 1960/61-2008/09. The findings of the cointegration test, implementing using Johansen Maximum likelihood approach, indicate the occurrence of long run relationship among the variables included in both growth and private investment models. The study confirmed the existence of debt overhang but, in the long run both external debt stock and debt servicing ratio have a negative and significant impact on economic growth and private sector capital accumulation activity. He concluded that the estimated short run growth equation showed that the current flow of external debt has a positive contribution while the past external debt accumulation which has long run growth equation reveled the negative and significant relationship between external debt and economic growth.

Kabadiya [14] examine the impact of external debt on economic growth in 19 Transitional economies and adopting the panel autoregressive distributed lag (ARDL) model. The study found that external debt has positive impact on economic growth, also openness of the economy has a positive impact in the long run, while external debt to export ratio has a negative impact on growth rate of the transitional economies in the short run. [15] investigated the impact of external debt on economic growth in Nigeria using GDP as the dependent variable while ratio of external debt to export, inflation and exchange rate were used as the independent variables. Annual time series data covering the period of 1970 to 2010 were used, which were analyzed using the ordinary least square

technique, ADF, unit root test, Johansen co-integration test and Error correction model (ECM). Results from the study showed that external debt has a positive impact on the Nigerian economy in the long run.

Shah and Pervin [16] examine the effect of external public debt on economic growth from the perspective of Bangladesh economy for the period 1974 - 2010. The study will probe debt overhang and crowding out effect of external public debt to represent the effect. To specify the debt overhang and crowding out effect of external public debt, the debt burden has been segmented into two part; external debt stock and external debt service. Long run significant negative effect of external public debt service and positive effect of external public debt stock on GDP growth have been found from this investigation. In short run, only external debt service has negative effect but the debt stock does not have any significant effect. Thus the investigation did not find any evidence of debt overhang provided that there is no significant adverse effect of debt stock on GDP growth. Likewise a study conducted by [17] examined the effect between external debt and economic growth in Jordan for the period 1990-2011. [18] examined the impact of external debt on economic growth in Nigeria for the period 1981-2014, using Auto-regressive Distributed Lag (ARDL) model. The result of the ARDL test shows that a significant relationship exists between external debt and economic growth both at the long and short run. The study also observed that no causality exist among the variables.

Karagoz and Caglar [19] attempted to examine the effect of debt on economic growth by using pooled regression, fixed effects and random effect models to analyse panel data model of 17 selected OECD countries. The result showed that a positive relationship exist between debt and growth for the OECD countries. On the contrary, there are also some empirical studies which support that public debts negatively affect economic growth. The more the external debt burden to the economy the more high level of external debt led to the devaluation of the national currency, increase in the retrenchment of workers, continuous industrial strike and poor education system [20]. [21] also studied the impact of external debt on economic growth had a negative but insignificant coefficient, indicating that the hypothesis of debt overhang effects could not be rejected.

Deshpande [22] assessing the impact of external debt on economic growth of 13 severely indebted countries for the period (1971 – 1991), showed a strong negative impact of external debt on investment although during the first half of the period (1975 – 1983), there were some favorable time factors that showed a strong positive effect of external debt on investment during the period in question. [23] using time series data, found that the empirical results shows that Kenya external debt accumulation has negative impact on economic growth and private investment, this confirms the existence of debt overhang problem in Kenya. The result also indicates that current debt inflow stimulates private investment and the study did not find any adverse impact of debt serving on economic growth but have some crowding out effect on private investment.

Butt and Hassan [24] tested the relationship between economic growth, trade, external debt, labor force and education in the long run and short run for Pakistan over a period of 1975-2005, using Autoregressive Distributed Lag Approach (ARDL) to Co-integration. Evidence presented suggests that total debt is not an important determinant of economic growth either in short run or in the long run. This result indicates that the external debt has not been used productively and efficiently in Pakistan which may be one of the reasons behind the slow economic growth.

Hameed et al. [25] analyse the relationship between external debt and economic growth in Pakistan. By using a production function model for time series data of gross domestic product, debt service, capital stock and labour force from 1970 to 2003, the study examines the dynamic effects that these variables have on economic performance. Multiple cointegration procedures were employed to identify long-run relationships between the variables. The long-run relationship shows that debt service affects gross domestic product negatively, most likely through its adverse impacts on capital and labour productivity. Granger causality was also estimated through a vector error correction model, and further indicates that short -run and long-run negative causality runs from debt service to gross domestic product.

Obademi [26] empirically examines the impact of external debt on economic growth in Nigeria by using ordinary least square method. The study indicated that external debt has a negative effect on Nigeria economic growth while debt service has a positive significant influence on economic growth. [2] conduct a study to examine whether or not relationships exist between external debt and economic growth in Nigeria. The result of ordinary least square model showed that external debt has a fairly significant positive relationship with economic growth. Some empirical studies explain the causality between public debt and economic growth. [27] addresses the Granger causality relationship between public debt and GDP, more precisely between the growth in real GDP per capita and public debt, represented by the current primary surplus/GDP and gross government debt/GDP ratios. By using OECD annual data for 20 countries between 1988 and 2001, clear Granger bidirectional causality was found.

Jayaraman and Lau [28] apply panel Granger causality estimations to examine the relationship between external/ public debt and economic growth in six Pacific island countries during 1985–2004. Their empirical results indicate a lack of evidence of a long-run Granger causality relationship between real output and the external debt to GDP ratio or between the same output index and the budget deficit to GDP ratio; however, in the short run, there is a significant causal relationship running from external debt and also budget deficit to output. In regard to the reverse relationship, in the long run, the results also point to the absence of causality; and in the short run, there is evidence of Granger causality running from output to external debt but not from output to public deficit.

From the foregoing, it is evident that the literature on external debt and economic growth is replete due to data quality and methodology used in existing studies. Nevertheless, only few studies have been conducted in Tanzania, thus, this study is necessary to be done in order to identify how external debt might affect growth in Tanzania economy.

3. METHODOLOGY

In order to appropriately capture the impact of public debt on the economic development of Tanzania, following the endogenous growth models developed by [29], [30] and [31], this study uses the linear specification to examine the relationship between debt and economic growth from 1970 to 2015. The time series data model estimated has the growth rate of real GDP as the dependent variable, and on the right-hand side

Table 1. Variables description

Variable	Measure	Expected sign
GDPpc	Economic Growth	
EDS	External debt stock measured in US dollar Million	+
ESP	Amount of money expended by the federal government on debt payment abroad and is measured in US dollar Million	+
E	Consist of transactions in goods and services from residents to non-residents.	+

Source: Author's construction (2017)

it includes debt variables. A multiple regression model was used with economic growth proxied with Gross Domestic Product Per Capita as the dependent variable, while external debt stock, external debt service payment and export of goods and services during the period of study are treated as independent variables (see Table 1 for variable description).

The structural form of the model is:

GDPpc = f (EDS, ESP, E)

The stochastic form of the model is:

GDPpc = $\beta_0 + \beta_1 EDS + \beta_2 ESP + \beta_3 E + \mu$

Hence, the linear regression model is represented as follows:

$$logGDPpc_t = \beta_o + \beta_1 logEDS_t + \beta_2 logESP_t + \beta_3 logE_t + \mu_t$$

Where β_0 is the constant term, β_1, β_2, and β_3 are the parameters to be estimated, t = 1, 2… is the time index for the years from 1970 to 2015 and μ is the stochastic error term. GDPpc represents domestic product per capita, EDS is for External debt stock, ESP for External debt service payment, E for Export of goods and services and β_0 for the intercept.

3.1 Empirical Methodology

3.1.1 Unit root test

To verify whether the data are stable for further analysis, it is important to test the order of integration of each variable in a model. This is to establish whether the data are non-stationary and how many times the variable needs to be differenced to derive stationary series. There are many tests for determining whether a series is

stationary or non-stationary, but this study used Augmented Dickey-Fuller (ADF).

3.1.2 Cointegration test

After having completed examination of the stationery of each time series, the next step is to figure out the level of co-integration between the examined variables by applying Johansen test. For simplicity, this step investigates whether the stochastic trends in the examined variable, which is supposed to contain unit roots, have a long-term relationship. This test is more appropriate than the Engle and Granger test since it allowed more than one long run association and, it is based on the ADF test which considers one long-run association.

3.1.3 Vector Error Correction Model (VECM)

The appropriate econometric specification for two or more nonstationary variables found to be cointegrated, that is to say, the variables have underlying stochastic trends along which they move together on a nonstationary path, is the Vector Error Correction Model (VECM).Engle and Granger have shown that when the variables are found to be both integrated of degree I(1), and cointegrated, then either unidirectional or bi-directional Granger causality must exist in at least the I(0) variables. If the variables are co integrated then there must exist an error-correction. VEC is just a special case of the VAR for variables that are not stationary at their level form and become stationary after differences (i.e., I (1)). Vector error correction model will be used in such situations where the existence of co integration relationships was proved, (VECM) used to detect such deviations within the co integration. The VECM is estimated as shown below:-

$$\Delta GDPpc_t = T_1 \sum_{i=1}^{k-1} u_{1i}\Delta GDPpc_{t-i} + \sum_{i=1}^{k-1} v_{1i}\Delta EDS_{t-i} + \sum_{l=1}^{k-1} w_{1i}\Delta ESP_{t-1} + \sum_{t=1}^{k-1} X_{1i}\Delta E_{t-1} + \mu_1 ECT_{t-i} + e_t$$

$$\Delta EDS_t = T_2 \sum_{i=1}^{k-1} u_{2i}\Delta GDPpc_{t-i} + \sum_{i=1}^{k-1} v_{2i}\Delta EDS_{t-i} + \sum_{l=1}^{k-1} w_{2i}\,\Delta ESP_{t-1} + \sum_{t=1}^{k-1} X_{2i}\Delta E_{t-1}$$
$$+\mu_2\, ECT_{t-i} \;+ e_t$$

$$\Delta ESP_t = T_3 \sum_{i=1}^{k-1} u_{3i}\Delta GDPpc_{t-i} + \sum_{i=1}^{k-1} v_{3i}\Delta EDS_{t-i} + \sum_{l=1}^{k-1} w_{3i}\,\Delta ESP_{t-1} + \sum_{t=1}^{k-1} X_{2i}\Delta E_{t-1}$$
$$+\mu_3\, ECT_{t-i} \;+ e_t$$

$$\Delta E_t = T_4 \sum_{i=1}^{k-1} u_{4i}\Delta GDPpc_{t-i} + \sum_{i=1}^{k-1} v_{4i}\Delta EDS_{t-i} + \sum_{l=1}^{k-1} w_{4i}\,\Delta ESP_{t-1} + \sum_{t=1}^{k-1} X_{4i}\Delta E_{t-1}$$
$$+\mu_4\, ECT_{t-i} \;+ e_t$$

ECT is the error correction term which explains the long run causality between variables. Where e_t is the error term which reflects the deviation from the long-run equilibrium path. The null hypothesis that EDS, ESP, E, does not Granger cause GDPpc is rejected if $T, U, V, W, X, , Z \neq 0$ or are jointly significant or the coefficient of the error-correction term Z is significant. This means that the variable EDS, ESP, E, can Granger cause GDPpc even if the coefficients on the lagged changes in variables EDS, ESP, E, are not jointly significant.

3.1.4 **Granger causality**

Finally, once a co-integration relationshipexists between two series, there is at least a causal effect between the variables. Next step is to apply the Granger causality test. The granger causality [32] test was performed only on co-integrated variables to examine causal relationship. The Granger method seeks to determine how much of a variable, Y, can be explained by past values of Y and whether adding lagged values of another variable, X, can
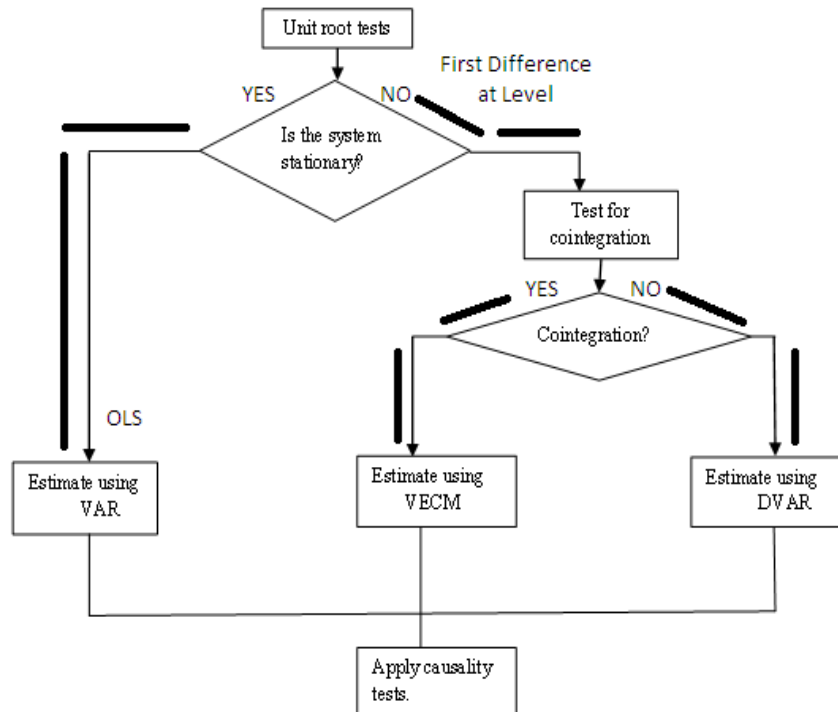

Fig. 3. Methodology summary
Source: Constructed by the author

improve the explanation. Once the co-integrating test is completed, this study will likely undertake the granger causality test to test the casual direction between variables in Tanzania. (Fig. 3 summarizes the methodology).

4. RESULTS AND DISCUSSION

4.1 Unit Root Test

This study tests the presence of unit roots starting with levels and followed by first difference using ADF tests. The results show that the series were non-stationary (mean, variance and covariance is not constant over time) in level form (see Table 2) but all variables become stationary after taking the first difference (see Table 3), the P-values of the variables become significant (P<0.05), so we reject the null hypothesis. Thus, worth concluding that all variables are integrated of order two I(1).

Table 2. Unit root test results (level)

Variables	Constant	
	ADF test	
	Statistics	**P-Value**
D(LGDPpc)	-1.018858	0.7384
D(LEDS)	-1.911148	0.3243
D(LESP)	-3.254350	0.0234
D(LE)	0.414861	0.9814

Table 3. Unit root test results (First difference)

Variables	Constant	
	ADF TEST	
	Statistics	**P-Value**
D(LGDPpc)	-3.926992	0.0041
D(LEDS)	-5.839043	0.0000
D(LESP)	-3.940616	0.0039
D(LE)	-3.801779	0.0057

4.2 Johansen Cointegration Test

After testing and proving that all variables are integrated at the same order I (1), Johansen-Juselius procedure was implemented to detect the cointegration relationship between the variables. The cointegration test defines whether a long run relationship exists among the variables. Table 4 shows that both trace and Max- Eigen values are greater than Mackinnon critical value at 5%. This indicates that the Null hypothesis (series are non-cointegrated) can be rejected at 5% significance level. Therefore, it is concluded that the series are co-integrated and a long run relationship exists among the variables for that reason vector error correction mechanism was applied.

4.3 Relationship between Public Debt and Economic Growth (ECM Estimates)

Engle and Granger [33] showed by the error-representation theorem that cointegrated variables implied in effect an error correction model (ECM). They argued that regression of the first difference of cointegrated variables would result in misspecification error. Accordingly, the VAR was accordingly formulated in a Vector Error Correction model (VECM) to analyse the dynamics of the relationship. This involves the inclusion of the lagged errors of the cointegrating regression as one of the independent variables in the regression equation. Furthermore, the Error Correction Model [33] was then considered and estimated. The estimated error-correction equations are not subject to residual autocorrelation at the 5% significance level.

$$LogGDPpc = -C - \beta LogEDS + \beta LogESP + \beta LogE$$
$$LogGDPpc = 13.85 - 0.244 logEDS + 0.038 logESP + 0.806 logE$$

Table 4. Johansen Test for Co integration

Hypothesized	Trace			Maximum Eigen		
No. of CE(s)	Statistic	Critical Value	Prob.**	Statistic	Critical Value	Prob.**
None *	61.57900	47.85613	0.0016	36.88080	27.58434	0.0024
At most 1	24.69820	29.79707	0.1725	15.14773	21.13162	0.2787
At most 2	9.550471	15.49471	0.3169	8.943504	14.26460	0.2909
At most 3	0.606967	3.841466	0.4359	0.606967	3.841466	0.4359

Source: Author computation from collected Data (2017)
Note: Max-Eigen value test and Trace test t indicates 3 co integrating eqn(s) at the 0.05 level.
* denotes rejection of the hypothesis at the 0.05 level

Table 5. Vector error correction estimate

Variables	Coefficient	Std. Error	t-statistics
logGDPpct-1	1.000		
logEDSt-1	-0.244	0.16016	1.52077
logESPt-1	0.038	0.06493	-0.58006
logEt-1	0.806	0.04987	-16.1708
C	13.85		
R-squared	0.61438		
Adj. R-squared	0.50921		
Sum sq. resids	0.24655		
F-statistic	5.84187		
Log likelihood	49.956		
ECT	-0.0146	-0.0081	-1.81250

Table 6. Granger causality

Null hypothesis	Obs	F-Statistic	Prob.
LEX does not Granger Cause LGDP	43	9.16634	0.0001**
LGDP does not Granger Cause LEX		5.76134	0.0025**
LDS does not Granger Cause LGDP	43	1.52817	0.2238
LGDP does not Granger Cause LDS		0.28670	0.8347
LDOD does not Granger Cause LGDP	43	0.31555	0.8140
LGDP does not Granger Cause LDOD		0.90874	0.4464

*Note: * and** represent statistical significance at 10% and 5% respectively.*
Source: Author computation

Result from the analysis shows that external debt has been negatively associated with the output level of the economy in both short and long run. This implies that an increase in the growth rate of external public debt leads to decrease in the growth rate of output after one year. This result is consistent with [26] who shows that external debts have been negatively associated with the output level of the economy in both short and long term.

In addition, the results reveal that there is positive relationship between export and economic growth in Tanzania. This means that, the coefficient of lnE indicates that for every one percent increase in exports, the GDP will increase by 0.80 percent. This finding agrees with the results obtained by several researchers [34-41]. Moreover, this result is constant with the debt overhang hypothesis, which states that an accumulated debt act as a tax on future output, discouraging productive investment plan of the private sector and adjustment efforts on the part of government (Debt overhang hypothesis) and this in turn will shift inward both investment and production curves in Solow's production function.

Furthermore, the results reveal that there is a positive relationship between external debt service payment and economic growth. This implies that, the coefficient of lnESP indicates that for every one percent increases in external debts, the GDP will increase by 0.037 percent.

4.4 Granger Causality

Based on the co-integration results, it can be ascertained that variables are co-integrated, and therefore, are causally related. The Granger causality method is used to test the direction of causality among the variables. Table 6 shows the results of granger causality, which indicate that there is a bidirectional causality relationship between external debts and economic growth, this result supports the results of [42].

Similarly, Table 6 reveals that causality does not exist between external debt and economic growth in Tanzania. This result is consistent with [18] and [43]. In contrast; empirical analysis result, bidirectional causality relationship from export to growth had been determined. Economic growth has caused to export increase and export increase has caused to economic growth.

5. CONCLUSION

This paper investigated the impact of external debt on economic growth in Tanzania. Annual

data from World Bank online database 2017 for the period 1970 to 2015 were used. The study required to know whether or not there exists a significant relationship between external debt and economic growth in Tanzania.

The Johansen estimates and Error correction model was used to test the first hypothesis of no significant long run relationship between external debt and economic growth. The null hypothesis was rejected as the result showed that a long run relationship exist between external debt and economic growth. The granger causality test was employed to test the second hypothesis of no causal relationship between external debt and economic growth in Tanzania. The null hypothesis is accepted as the result shows no causal relationship between external debt and economic growth. We suggest that Government and policy makers should stop accumulation of external debt stock overtime and prevent concealing of the motive behind external debt; external debts should be mainly used for productive investment of highest priorities that would help in yielding returns economic reasons (productive purposes) example raising productivity in agriculture as three quarters of the population live in rural areas by processing food and other agricultural produce and other forms of manufacturing which will create employment opportunities and reduce migration of young people from low productivity agriculture to urban informal service sectors, where productivity is just as low, and not for social or political reasons. Furthermore, adequate record of debt payment obligations should be kept by the authorities responsible for managing Tanzania's external debt and the debt should not be allowed to exceed a maximum limit in order to evade debt overhang. The Tanzania government should also encourage the exportation of domestic products like coffee, cotton, cashew nuts, tea, sisal, tobacco, pyrethrum and cloves and also Minerals (gold, gemstones, diamonds, and coal) that will enable its goods to be more attractive in the foreign market which will increase foreign exchange earnings and promote the growth of our infant industries. In addition, Tanzania must review and develop export oriented policies in order to increase more exports in order to contribute more to the economic growth rapidly.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sciencedomain.org/review-history/25261