



External Debts as Panacea to Economic Growth Challenges in Selected Eastern African countries: An Application of the Autoregressive Distributed Lag Model

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ABSTRACTS

Foreign aid has significantly influenced medium- and long-term development initiatives in Eastern African countries. Project aid and non-project aid are the two main categories that describe foreign economic assistance (loans, credits, and grants). The primary aim of foreign aid has been to supplement the internal resources needed to quicken the economic development of the nations in Eastern Africa. This study investigated the influence of external debt on the economic growth of Eastern African countries (Kenya, Uganda, Rwanda, Burundi, and Tanzania) using the autoregressive distributive lag mode and panel data (1970–2020). The findings revealed that external debt had a significant adverse effect on economic growth. In Burundi, an increase in external debt reduces GDP by 5% in the short run, while in the long run, it reduces GDP by 19%; in Tanzania, it decreases GDP by 22%; and in Kenya, it reduces the GDP by 13%. Conversely, the findings indicated that the increased level of external debt positively influenced Uganda's GDP (0.03%) but was not statistically significant. Therefore, it is recommended that Eastern African countries source their income, apart from more external concessional debt, through bilateral or multilateral arrangements to plug into their budget deficits. Also, it is recommended that East African governments develop their external debt initiatives that offer further profitable investment opportunities to repay their foreign debt gradually. Moreover, strategies in the East African countries must be geared towards strengthening revenue mobilization to provide avenues to balance their external debts. For instance, improving the informal sector in these countries is a viable base for increasing revenue through taxes.

Keywords: Autoregressive Distributive Lag, Eastern African Countries, Economic Growth, External Debts

I. INTRODUCTION

Almost every government worldwide has budget deficits because their expenses exceed their income. According to Muoki and Fatoki (2021), these jurisdictions could increase their revenue by printing money, raising taxes, borrowing money from abroad or domestically, or, if available, using budget surpluses from previous periods. Governments typically turn to borrowing to address budget deficits when alternative policies are deemed inappropriate due to their negative impacts. This results in financial commitments known as public debt (Arčabić et al., 2018). When borrowing to cover budget shortfalls, a government has several options, which include borrowing from outside sources, commercial banks within the country, a federal or central bank (which is akin to printing money), and domestic financial institutions (GGmez-Puig & Sosvilla Rivero, 2017). Every option affects the economy differently and has long- or short-term ramifications.

In developing countries such as Tanzania, increases in their external debt loads indicate a slowing economy and poor debt management. For example, Manasseh et al. (2022) indicated that inappropriate structural reforms, a lack of sustainable macroeconomic adjustment policies, diverse export bases, and political instability primarily cause a more significant external debt burden. The immediate effect of rising debt is seen in the fall in net foreign and domestic investments, further reducing capital accumulation and output in an economy. Furthermore, increased public debt negatively impacts human capital accumulation and pushes out physical capital (Yousaf & Mukhtar, 2020). According to economic theory, prudent borrowing promotes capital accumulation and productivity growth, which drives economic growth. Developing nations often have lower capital stocks and less favorable investment prospects. Consequently, these nations guarantee increased rates of return on investment (Azémar & Giroud, 2023).

Nonetheless, growing debt loads in developing countries seriously endanger macroeconomic stability since they impact foreign direct and local investments. Without question, adding to one's resources through foreign economic assistance is crucial for starting and accelerating economic growth. Conversely, a sustained increase in one's



external debt load over an extended period can seriously impede a nation's ability to grow economically (Sapkota, 2023). The type of debt incurred and economic activity are closely related; debt can be categorized as productive or unproductive. Raising debt for productive reasons boosts an economy's potential for production.

Conversely, unproductive debt does not increase an economy's potential for production and is not self-liquidating (Savvides, 2019). A debt-financed investment must be profitable to generate a return more significant than the interest paid on the debt. Like many other emerging nations, Eastern African nations struggle with a lack of financial resources. Eastern African nations have used external borrowing to close the resource gap and manage this issue (Ibrahim & Farah, 2020). Since the early 1950s, Eastern African nations have received international economic aid to meet their development needs (Fentahun, 2023). Foreign aid has significantly influenced medium- and long-term development initiatives in Eastern African countries. Project aid and non-project aid are the two main categories that describe foreign economic assistance (loans, credits, and grants). The primary aim of foreign aid has been to supplement the internal resources needed to quicken the economic development of the nations in Eastern Africa (Abdullahi et al., 2016).

The rapid escalation of external debt has become a prevalent concern globally, with wealthy nations and emerging economies experiencing substantial increases in their debt-to-GDP ratios. For instance, Miningou (2023) reports that external debt surged to 102% of GDP in wealthy nations and 50% in poor and emerging economies, up from 70% and 35%, respectively. In Kenya, the state debt relative to GDP nearly doubled from 31% in 2010 to 62% by the close of 2019 (Njoroge, 2021). Similarly, Tanzania's debt-to-GDP ratio stands at 38%, Uganda's is at 40%, and Burundi and Rwanda recorded ratios of 51.47% and 63.0%, respectively. Despite these escalating debt levels, GDP growth across these countries has largely stagnated, prompting significant discourse on the repercussions of mounting debt burdens (Adnan et al., 2019; Gómez-Puig & Sosvilla Rivero, 2017).

While public debt is often necessary to bridge budget deficits, sustained high debt-to-GDP ratios can have detrimental effects on economic health (Ehikioya et al., 2020). Prolonged and substantial budget shortfalls can impede economic growth, foster fiscal imbalances, and deter private investment. However, the relationship between public debt and economic development is complex and multifaceted, varying by country and influenced by a myriad of external factors (Dimoso and Andrew, 2021; Mohsin et al., 2021). Scholars have sought to unravel this intricate relationship, with Karahan (2020) finding that the country's risk environment plays a pivotal role in determining the impact of public debt. In South Africa, for example, public debt has exhibited a long-term negative correlation with economic growth (Musyoka, 2017; Sapkota, 2023), aligning with findings from previous studies (Karahan, 2020).

Contrary to these findings, Mohsin et al. (2021) suggest that while public debt may negatively affect economic growth, its impact may not be statistically significant. These divergent conclusions underscore the methodological complexities inherent in assessing the impact of public debt on economic growth, with previous studies predominantly relying on time-series regression analyses. In the context of East African countries, where external debt is often incurred for infrastructure and productive sectors, servicing this debt does not necessarily translate to tangible economic growth. However, defaulting on external debt obligations can erode a nation's creditworthiness, potentially curtailing access to foreign financing and impeding economic performance. Ultimately, the primary objective of external debt should be to foster the socio-economic development of the populace rather than serving as a means to enrich government officials at the nation's expense (Ibrahim & Farah, 2020; Hung, 2021).

However, all these studies have been analyzed using time series data, and they did not cover all periods, the short run and long run; they only covered an extended run period. This study used an autoregressive distributive lag approach, especially the mean group entire, which can show all the estimations between the short run and long run. This study also aims to contribute substantively to the ongoing discourse surrounding external debt dynamics in Eastern African nations, focusing on Tanzania. An argumentative debate continues within this region regarding the consequences of the Tanzanian government's heightened borrowing from international sources. While some political figures express apprehension, positing that such actions may precipitate harmful effects on the nation's economic landscape in the future, governmental authorities assert a contrasting perspective, contending that strategic borrowing initiatives portend a promising trajectory for Tanzania's economic prospects. This study provides nuanced insights into this multifaceted dialogue. It offers empirical evidence and analytical frameworks to inform policy decisions and public discourse regarding external debt management in Tanzania and its broader implications for regional economic stability.



II. LITERATURE REVIEW

2.1 Theoretical Underpinnings

The debt-cum growth theory and the neoclassical growth theory serve as the theoretical cornerstones of this study. According to the former theory, a nation's debt and economic performance are directly correlated. Also, it made the case that borrowed money used for successful investments should positively affect economic production in environments with stable macroeconomic variables and investment-friendly policies (Matthew & Mordecai 2016). However, the burden of repaying the debts would reduce the resources available for profitable investments in cases where the debts are not used properly.

In contrast, a later theory argued that debt from external borrowing is a better option than domestic savings in terms of a nation's ability to finance productive investment. The scenario where domestic savings and investment are crowded out of the business cycle, however, presents a limitation to the debt-cum growth theory (Matthew & Mordecai, 2016; Kitole et al., 2024; Tornell & Velasco, 1992). The theory submits that the size of a country's debt should be justified in terms of the cost and benefit of borrowing for economic growth. According to the theory, the capacity of a country to take on additional debt service obligations should be considered along with the contribution such borrowing would have on economic performance (Abdullahi et al., 2013).

A country with a high debt load may allocate a large percentage of its resources to debt repayment, reducing the resources available for productive investments (Krugman, 1988). Hence, it can reduce the country's economic growth rate. Reduced rates of economic growth may result from this. In light of this, the long-term interest rate is the main channel through which public debt can impact economic growth. The government will pay a higher long-term interest rate because of its excessive borrowing to cover the fiscal balance deficit. Thus, through crowding out private investments, the higher long-term interest rate tends to slow economic growth (Alshammary et al. 2020).

2.2 Empirical Reviews

External debt in most developing countries, particularly in SSA, primarily provides additional funding to meet infrastructure development and growth objectives. There is vast and voluminous literature to empirically explain the link between external debt and economic growth in African countries in the last decade. However, the findings have been mixed and conflicting. For instance, Muoki and Fatoki (2021) examined the effect of public debt on the economic growth of three East African countries using time series data spanning 57 years (1963–2019). Their results indicated that domestic debt significantly negatively impacted economic and concessional debt, and external commercial debt had a positive effect. In their estimation, Ehikioya et al. (2020) found a long-term equilibrium relationship between external debt and economic growth in Africa, whereby the outcome revealed that over a certain threshold, the short-run converges to equilibrium in the long run, and external debt will begin to affect African economic growth negatively.

Ayana et al. (2023) examined the effect of external debts on the short- and long-run economic growth of 39 SSA countries from 2011 to 2021. The findings revealed that external debt has a significant negative impact in the short and long run. Similarly, Yusuf and Mohd (2021) investigated the effect of government debt on Nigeria's economic growth using annual data from 1980 to 2018. The findings from the autoregressive distributed lag technique indicated that external debt limited long-term growth while enhancing short-term growth. Also, the findings indicated that domestic debt had a significant positive impact on long-term growth, while its short-term effect was negative.

Mohsin et al. (2021) assessed the relationship between external debt and the economic growth of the selected countries in the South Asian region. Also, it utilized multiple methods such as the panel ordinary least square (OLS), fixed effect, quantile regression, robust output regression, and the World Bank data from 2000 to 2018. The results showed that while external debt stock has a favorable effect on economic growth, external debt has a negative effect. The results were supported by a rigorous regression analysis, which produced impact estimates for external debt service and total external debt of 39% and 31%, respectively. Furthermore, threshold analysis shows that external debt becomes a drag on growth because of a country's growing indebtedness and causes a more significant negative effect on growth than domestic debt. Along the same vein, Abate (2023) in Ethiopia analyzed the relationship between debt and economic growth using ARDL models and time series data for the period 1982–2018. The findings indicated an asymmetric relationship between the indicated variables, whereby it was found that the major positive shock in debt is favorable to economic growth. In contrast, the effect of a minor and negative shock on debt is unfavorable. Also, the results showed that debt has a threshold effect that makes it advantageous for Ethiopia's economic growth when it is significantly lower than 66.75% of GDP or 36.27% of GNI. Debt incurred above these threshold levels worsens the nation's economic growth.



Using selected SSA countries, Manasseh et al. (2022) also revealed a negative correlation between external debt and economic growth. By applying the dynamic Generalized Method of Moments (GMM) to a panel of thirty SSA nations between 1997 and 2020, they concluded that foreign debt has a negative impact on economic development. Using panel data from 1997 to 2019, Hoti et al. (2022) examined the impact of public debt on the Western Balkan countries' long-term growth. Their research, which used the pooled mean group estimator, found that public debt does not negatively impact the growth of Western Balkan nations.

The existing pieces of literature on external debt and economic growth report contradictory findings, as there is no common consensus among the literature. Various empirical studies conveyed a positive relationship between the two variables, while numerous others likewise reported a negative relationship between external debt and economic growth (Rahman et al., 2019; Ayana et al., 2023). Also, the literature indicated that studies are not homogeneous in the context of the empirical models with linear and nonlinear relationships and data types used. These arguments necessitate the need to continue researching the relationship between debts and economic growth of SSA countries because of their volatile nature of economic and social conditions, especially after the COVID-19 pandemic (Ayana et al., 2023).

III. METHOD

The study used data sets from the World Data Bank for each country between 1990 and 2020, and a non-experimental research design was used. These world data were gathered from various sources, including the United Nations Population Division, global population projections, census reports, statistical materials from the National Statistics Office, demographic data, and population. The use of World Bank data presents several benefits owing to its accessibility and appropriateness for scholarly purposes (Kitole et al., 2022; Tile et al., 2023; Kitole et al., 2023). The non-experimental research design helps provide a realistic picture of the connection between foreign indebtedness and GDP. Additionally, the non-experimental research design addressed the drawbacks of experimental research designs, including the inability to change variables of interest and the lack of control over unimportant variables (Tile et al., 2023). Furthermore, including a large and representative sample of East African countries as the unit of analysis - Tanzania, Uganda, Kenya, Burundi, and Rwanda - improved the study's external validity. It suggests that the study's conclusions may be relevant to similar situations in other countries in Sub-Saharan Africa.

3.1 Model Estimation

This study employed the Autoregressive Distributed Lag (ARDL) model to study effects of external debts on the economic growth in East African member states. The choice of the model is based on its ability to provide dynamic relationship between variables, and its ability to see their short run and long run convergence in influencing the outcome variable. The general equation for the ARDL is given by;

$$y_{it} = \sum_{j=1}^p \gamma_{ij} y_{i,t-j} + \sum_{j=0}^q \delta_{ij} X_{i,t-j} + \mu_i + \varepsilon_{it} \dots \dots \dots 1.1$$

Now since the nature of the dataset in panel involve five countries in East Africa, the model helps to study the panel and time data all together at once. Now, in sticking to the time series observations (T) in each group, then equation 1.1 can be written as

$$\Delta y_{it} = \phi_i y_{i,t-1} + X_i \beta_i + \sum_{j=1}^{p-1} \gamma_{ij}^* \Delta y_{i,-j} + \sum_{j=0}^{q-1} \Delta X_{i,-j} \delta_{ij}^* + \mu_i \mathbf{l} + \varepsilon_i \dots \dots \dots 1.2$$

Now if the disturbances $\varepsilon_{it}, i = 1, 2, \dots, N$ and $t = 1, 2, \dots, T$ in equation 1 are independently distributed across i and t with means of zero (0) and variance greater than zero ($\delta_i^2 > 0$) and finite fourth-order moment. The condition that stochastic disturbances are time-independent is also not extremely limiting and, in most cases, may be met by raising the number of the distributed lag orders on y_{it} and x_{it} . The independence of the disturbances and explanatory variables is required for consistent estimations of short-run coefficients; notwithstanding, x_{it} has a finite order for autoregressive representations and it is simple to accommodate the possibility of x_{it} influence on ε_{it} when forecasting the long-run coefficients (Kitole and Utouh, 2023; Pesaran, 2008).

Moreover, the long-run coefficients on X_i , defined by $\phi_i = -\frac{\beta_i}{\delta_i}$ are similar across groups with the error correction components as $\Delta y_i = \phi_i \varphi_i(\theta) + W_i k_i + \varepsilon_i$. Moreover, the likelihood of the panel statistics model can be denoted as a product of the likelihoods for every group therefore we directly focus on log-likelihood functions since



the variables of interest are the long-run impacts and adjustment coefficients. On the other hand, the Pooled Mean Group (PMG) model relies on maximum likelihood estimators to ensure normality and consistency. This approach can identify homogeneity restrictions for the long-run coefficient and average across all groups and estimate both short-run and error correction coefficients. The PMG estimators are obtained using the Newton-Raphson algorithm. Therefore, the estimated long-run regression model explaining the dynamic effects of the external debts on East African country's economic growth is presented as:

$$GDP_{it} = \theta_{it} + \theta_{1i}CPF_{it} + \theta_{2i}FDI_{it} + \theta_{3i}EXDP_{it} + \theta_{4i}TV_{it} + \theta_{5i}EXR_{it} + \mu_{it} \dots \dots \dots 1.3$$

Whereas GDP_{it} is the natural logarithm of GDP, CPF_{it} is the Capital formation, $\theta_{2i}FDI_{it}$ is the foreign direct investment while $\theta_{3i}EXDP_{it}$ is the government expenditure, TV_{it} is the trade volume, and EXR_{it} is the exchange rate.

Table 1
Variable measurements

Variable	Measurement	Source	Expected sign
Gross domestic product (GDP)	GDP is the total of the gross value added by all producers who are residents of the country, plus any product taxes and minus any subsidies that aren't factored into the product value.	World Bank	+/-
External debt	International reserves to total external debt stocks.	World Bank	+/-
Gross capital formation	Gross capital formation growth rate annually expressed in constant local currency. The aggregates are provided in US dollars and are based on constant prices from 2015. The net changes in the level of inventories and the expenditures on additions to the economy's fixed assets make up gross capital formation, formerly known as gross domestic investment. Land improvements (fences, ditches, drains, and the like), the acquisition of plant, machinery, and equipment, and the building of roads, railroads, and similar structures, such as offices, hospitals, schools, and private residences, are examples of fixed assets.	World Bank	+/-
Trade volume	Trade is the total of products and services exported and imported expressed as a percentage of GDP.	World Bank	+/-
FDI inflow	The net inflows of capital intended to obtain a long-term management stake (10 per cent or more of voting shares) in a business that operates in a different economy than the investors are known as foreign direct investment.	World Bank	+/-
Exchange rate	The rate set by national authorities, or the rate established in the exchange market that is authorised by law. Based on monthly averages, it is computed as a yearly average.	World Bank	+/-

IV. FINDINGS

Results in Table 2 show that on average, East African external debt stock is 5.2 percent per year, and the minimum external debt stock recorded for all selected East African countries from 1970 to 2020 is 3 percent; furthermore, the maximum value of the external debt stock rate recorded for the years mentioned is 7 percent per year. But also, the results show that on average, capital formation in East African countries was 8.26E+10 between 1970 and 2020, and the minimum amount of capital formation recorded was 0; moreover, the maximum record was 2. Trade volume on average was 36 imports and exports in eastern African countries; the minimum, maximum, and minimum recorded were 0 and 74.5734, respectively.

**Table 2***Descriptive Statistics*

Variable	Observation	Mean	Min	Max
External debts stock	250	4.28E+09	2.62879	3.82E+10
Capital formation	250	8.26E+10	0	2.42E+12
Trade volume	250	36.36897	0	74.5734
GDP	250	2.68E+11	0	6.20E+12
FDI Inflow	250	1.102289	-0.7978	6.656597
Exchange rate	250	597.4933	0.070215	3727.069

Furthermore, Table 2 shows that the average gross domestic product in East African countries is 2.6, while the minimum gross domestic product is 0 recorded per year and the maximum is 6.20E+12. Additionally, the FDI inflow rate in Eastern Africa by average from 1980 to 2020 was 1.102289 percent, negative 0.7978 was the minimum recorded rate, and the maximum percent of foreign direct inflow was 6.656597 of the proportion GDP that is readily accessible for the creation of goods and services since 1980 to 2020. Finally, the exchange rate is determined by national authorities, or the rate determined in the legally sanctioned exchange market. The average Eastern African country recorded 597.4933, and the minimum and maximum records were 0.070215 and 3727.069, respectively.

4.1 Tests for Unit Root

The panel unit root test results proposed by Pesaran (2007) are presented in Table 3. Findings indicate that the null hypothesis of the unit root is rejected at 1% of significance for all series. However, by testing for the unit root in the first difference, all panel unit root tests reject the null hypothesis at the 1% significance level. Hence, the cointegration can be examined using the Pedro Cointegration Test.

Table 3*Im-Pesaran-Shin Unit root Test (IPS Test)*

Variables	T-bar	T-tilde-bar	Z-t-tilde-bar	P-value	Fixed N-exact critical values		
					1%	5%	10%
GPD	-18.3454	-6.3764	-13.569	0.000	-3.02	-2.76	-2.62
External Debt stock	-11.7056	-5.8769	-12.1866	0.000	-3.02	-2.76	-2.62
Capital formation	-5.957	-4.4873	-8.3403	0.000	-3.02	-2.76	-2.62
Trade volume	-12.9321	-5.9891	-12.4971	0.000	-3.02	-2.76	-2.62
Exchange rate	-8.9905	-5.4176	-10.9151	0.000	-3.02	-2.76	-2.62
FDI inflow	-15.0861	-6.1197	-12.8586	0.000	-3.02	-2.76	-2.62

4.2 Cointegration Tests

The cointegration test is carried out using the Pedroni Cointegration Test. The findings in Table 4 provide strong evidence that all panels in the data are cointegrated. This is true for the test statistics of Phillips-Perron, and the Augmented Dickey-Fuller reported in Table 4, which indicate that the results are significant at a 1 % significance level.

Table 4*Pedron Cointegration Test.*

	Statistic	P-Value
Modified Phillips-Perron t	-0.9637	0.1676
Phillips-Perron t	-2.5292***	0.0057
Augmented Dickey-Fuller t	-3.3987***	0.0003
Number of Panels	5	
Number of periods	40	

*** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$

4.3 Hausman Test for Best Estimator

The Hausman test chooses the preferred estimator between the PMG or MG estimator and the PMG or DFE estimator. According to (Shaari et al., 2020), the MG estimator allows parameters to be independent across groups and



does not consider the heterogeneity between groups. However, (Pesaran, 2008) argued that the PMG is better because it gives coefficients of different short-run variances by country. In contrast, for long-term coefficients, it is assumed that all countries are homogeneous (similar).

In contrast, the MG estimator allows only short and long-term coefficients with heterogeneous (different) lengths of time between countries. The choice between PMG or MG estimators depends on the null hypothesis testing. If the null hypothesis is accepted, the PMG estimator is selected because it is more efficient than the MG estimator. If the null hypothesis has been rejected, then the MG estimator is chosen over the PMG estimator. Next, to choose either the PMG or DFE estimators, if the null hypothesis is accepted, the MG estimator is better than the DFE estimator. If the null hypothesis is rejected, the DFE estimator is better than the MG estimator.

Table 5

Hausman Test of Best Estimator between MG and PMG

Variables	Coefficients		(b-B)	sqrt(diag(V _b -V _B))
	(b)	(B)		
	MG	PMG	Difference	SE.
External debt	-0.0759129	-0.1821512	0.1062383	0.0883516
Capital formation	-0.057945	-0.0319191	-0.0260259	0.25412
Trade volume	-0.0378842	0.2236758	-0.26156	0.1150599
FDI inflow	0.2610446	-0.0029419	0.2639864	0.355823
Exchange rate	-1.596618	-0.1347913	-1.461826	2.646928
chi ² (7) = (b-B)'[(V _b -V _B) ⁻¹](b-B)			6.91	
chi ² >0			0.0027	

Table 5 shows the Hausman test is unordered to test the best and unbiased estimator among herein used Mean Group (*mg*) and Pooled Mean Group (*pmg*). Therefore, since the probability values are less than 0.05 or 5% of the precision level, you can reject the null hypothesis that MG is the most efficient estimator, which is indicated by the probability values being less than Chi-square results at 0.0027. To examine if pooled mean regression (MG) is more consistent and the best estimator, it is therefore tested by using Hausman against the dynamic fixed effects (DFE).

Table 6

Hausman test

Variables	Coefficients		(b-B)	sqrt(diag(V _b -V _B))
	(b)	(B)		
	MG	PMG	Difference	SE.
External debt	-0.0759129	0.1902408	-0.2661538	0.0483516
Capital formation	-0.057945	-0.1170639	0.0591189	0.05412
Trade volume	-0.0378842	0.9474815	-0.9853657	0.10599
FDI inflow	0.2610446	0.1237976	0.137247	0.260791
Exchange rate	-1.596618	-0.7086306	-0.8879871	1.940244
chi ² (7) = (b-B)'[(V _b -V _B) ⁻¹](b-B)			41.31	
chi ² >0			0.0000	

Additionally, the results in Table 6 show that the probability values are less than 0.05 or 5% of the precision level then you can reject the null hypothesis that MG is the most efficient estimator, which is indicated by the probability values being less than Chi-square results at 0.0000. Therefore, the Mean Group (MG) is still the best estimator compared to the Dynamic Fixed Effect model. This is justified by the ability to reject the null hypothesis, which implies MG is more efficient.

4.4 Short Run and long-run estimation results of the effects of external debts on economic growth

Results in Table 7 present the long-run and short-run effects of the external debts on the East African countries' member states' economic growth, including the error correction term (ECT). The significance of the error correction term further supports the results, which show a stable long-term link between the variables under three different sets of estimates (Mean group (MG), Dynamic Fixed Effects (DFE), and Pooled Mean Group (PMG)). Moreover, across all sets of estimates, the ECT is positive and statistically significant, implying that a change in the



one-period lagged value of the External Debt Stock (EDS) positively and substantially influences economic growth in the short run by 0.98 in Burundi, 0.82 in Kenya, 0.925 in Rwanda, 0.91 in Tanzania, and 0.84 in Uganda. These results imply that external debts need to be an important economic factor that must be moderated all the time to ensure sustainable economic growth.

Additionally, the results show that external debts have negative and statistical significance in the short run and long run, where one increase of international reserves to total external debt stocks in Burundi decreases gross domestic product by 5% in the short run and 19% in the long run (Table 7). This might be because most large debt service obligations use up foreign exchange and capital, which are transferred to lenders to repay interest and principal funds. These results align with those of Ibrahim & Faraha (2020), who suggested that debts have short and long-run effects on economic growth by lowering the capacity of the economy to expand.

Moreover, the results in Table 7 illustrate that capital formation has a significant positive impact on the economic growth of Kenya and Rwanda in the short run 16% and 5%, respectively. This suggests that higher capital formation increases economic growth for Kenya and Rwanda in the short run. Moreover, for the long run, the results show that capital formation negatively influences the economic growth of Kenya, Rwanda, and Uganda at 12%, 31% and 48%, respectively. Conversely, FDI inflow was found to have a positive influence on economic growth in the long run, in line with the results of Bal et al. (2016) and Kitole and Utouh (2023) who emphasise the role of FDI in enhancing economic growth in Tanzania and therefore leads to the industrial growth.

Furthermore, the exchange rate positively influenced economic growth in the short run. Still, it has negative effects in the long run, indicating that economies in the East African countries enjoy changes in the currency rate that favour their economies in the short term. In the long run, it has negative effects (Table 7). These results in the short run are similar to the study of Rapetti (2019) while in the long run are similar to the findings of Karahan (2020). Generally, the exchange rate is an important macroeconomic parameter that determines the growth of the countries' economies. Therefore, having stable economic policies that mitigate the effects of the exchange rate on the economy helps to stabilise the country's economic growth.



Table 7
Long and short-run estimates of growth (GDP) in East African countries, panel ARDL (PMG, MG and DFE)

Variables	Mean Group (MG.)										Dynamic Fixed Effect (DFE)		Pooled Mean Group (PMG)	
	Burundi		Kenya		Rwanda		Tanzania		Uganda		ECT	SR	ECT	SR
	LR.	SR.	LR.	SR.	LR.	SR.	LR.	SR.	LR.	SR.				
ECT		0.988*** (0.0097)		0.828*** (0.0674)		0.925*** (0.0462)		0.911*** (0.144)		0.840*** (0.0994)		0.930*** (0.0568)		0.820*** (0.068)
External debts		-0.0591*** (0.00091)		0.6754 (0.3425)		-1.3010 (6.68)		3.4410 (4.8010)		0.4532 (0.054)		7.0511 (1.1310)		-0.0011 (0.0011)
Capital formation		-0.00141 (0.0135)		0.164** (0.0676)		0.0561** (0.0239)		0.100 (0.154)		0.125 (0.0746)		0.023 (0.0591)		0.136** (0.0614)
Trade volume		0.0122 (0.0106)		-0.0103 (0.0089)		-0.0237 (0.0128)		0.0394 (0.306)		-0.001 (0.0124)		0.00683 (0.046)		-0.0025 (0.00284)
FDI inflow		-0.00501 (0.011)		0.0073 (0.0153)		-0.0057 (0.0199)		0.343 (0.478)		-0.0134 (0.0266)		0.111 (0.12)		0.0151 (0.02)
Exchange rate		0.000558 (0.0003)		0.00552 (0.0036)		-0.00029 (0.0011)		-0.00404 (0.00924)		-0.000249 (0.00013)		0.000164 (0.00128)		-0.00212 (0.00282)
External debt	-0.196*** (0.0575)		0.171 (0.17)		-0.138** (0.0676)		-0.22 (2.14)		0.00312 (0.166)		0.19 (0.46)		-0.18*** (0.0413)	
Capital formation	-0.00312 (0.0258)		-0.123** (0.0731)		-0.31*** (0.0759)		0.631 (1.798)		-0.48*** (0.0893)		-0.117 (0.241)		-0.0319 (0.0204)	
Trade volume	0.417 (0.339)		-0.427 (0.621)		-0.507 (0.506)		0.0212 (13.41)		0.307 (0.457)		0.947 (1.846)		0.224 (0.222)	
FDI Inflow	-0.00401 (0.00394)		-0.00415 (0.0098)		-0.00472 (0.018)		0.325*** (0.498)		-0.00711 (0.0194)		0.124* (0.0681)		-0.00294 (0.00331)	
Exchange rate	-0.241 (0.148)		0.985*** (0.223)		0.763*** (0.268)		-9.461** (4.39)		-0.0289 (0.069)		-0.709 (0.508)		-0.135** (0.0677)	
Constant		0.430*** (0.157)		0.546* (0.322)		0.265 (0.503)		-0.301 (0.995)		1.071 (0.813)		1.140*** (0.417)		1.098** (0.498)
Observations	250	250	250	250	250	250	250	250	250	250	250	250	250	250



V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

Many developing nations view external debt as a significant source of income to supplement domestic sources for economic development and prosperity. Most Eastern African nations, however, have not been able to use this foreign cash to boost their economies successfully; some have even seen their economic situation worsen due to issues including liquidity shortages and an overhang of debt, among other things. This study examined how external debt affected economic growth in Eastern African nations using panel data from 1970 and 2020. The results indicate that external debt has a negative effect on economic growth, suggesting that large current and future debts and the failure to deploy borrowed funds for the region's capacity building all inhibit economic growth.

5.2 Recommendations

Given the heterogeneous nature of countries in EA and the evidence of a nonlinear relationship between public debt and economic growth, policymakers should consider utilising external debts strategically for investments in high returns projects in both the short and long run. It implies that before obtaining such loans, it is crucial to thoroughly examine the economic and social profitability of all projects supported by debt to guarantee that the returns exceed the interest and capital repayments. This approach provides potential benefits of debt for economic development while avoiding over-indebtedness. Likewise, Eastern African countries should ensure that their governance can support the equitable distribution of all external debt in a way that will encourage economic growth throughout their nations. Moreover, strategies in the EA countries must be geared towards strengthening revenue mobilisation to provide avenues to balance their external debts. For instance, improving the informal sector in these countries is a viable base for increasing revenue through taxes. Also, enhancing tax collection mechanisms and exploring non-tax revenue avenues is vital for the countries in EA to reduce external debt dependence.

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