

Dynamic relationship between external debt and unemployment in Sub-Saharan Africa

Samuel Erasmus ALNAA

Bolgatanga Technical University, Ghana
sam.alnaa@gmail.com

Juabin MATEY

Bolgatanga Technical University, Ghana
e.juabin@gmail.com

Abstract. *The struggle to reduce cyclical unemployment by Sub-Saharan African countries is as a result of their inability to integrate fiscal policies into macroeconomic goals and establish independent, well-resourced bodies to manage borrowed funds. We examine the dynamic relationship between external debt and unemployment in Sub-Saharan Africa using data from 25 countries. This study demonstrates a direct relationship between foreign debt and unemployment, which is attributed to the erroneous application of discretionary fiscal policy decisions and the inefficient use of borrowed funds. Evidence also suggests a nonlinear relationship between external debt and unemployment across the countries studied.*

Keywords: external debt, investments, unemployment, job opportunity, fiscal policy discipline.

JEL Classification: E17, F34, F35, G18, J21, J64.

1. Introduction

A recent report by the International Labour Organization (ILO) indicates that there are more than half a billion unemployed and underemployed people worldwide (ILO, 2020). This situation is exacerbated by a resurgence of the financial squeeze through excessive external fund borrowing and its misappropriation. It is essential to have a fiscally disciplined approach to public investments that can guarantee the creation of new jobs using external borrowing. Externally sourced funds create money for development initiatives in an economy; however, when these funds are misappropriated, they worsen a country's macroeconomic vulnerability (Gill and Pinto, 2005; Manasseh et al., 2022). The national debt in Sub-Saharan Africa has witnessed steady growth, with debt servicing costs alone accounting for 15% of foreign exchange income – measured in-terms of revenue from exports of goods and services together with inflows from foreign remittances – (The Economic Intelligence Unit – EIU, 2022). Average public debt in the region hovered around 57% of GDP, in 2017, estimated to have swollen by 20% in just five years, raising concerns as the situation does not have a contractionary effect on unemployment (see, e.g., Selassie, 2018).

The COVID-19 pandemic and the Russian-Ukrainian war caused the global total debt (GTD) to rise rapidly, adversely affecting global economies in several dimensions. Global unemployment has risen to 6.5 percent, resulting in a decline in living standards (UNSTATS, 2020). Several studies, including Manasseh et al. (2022) and Iyola (1999), have found that external debt has contributed to an increase in African unemployment. Corroborating this revelation, Idenyi, Efeyinwa, and Gabriel (2016) discovered that an increase in public debt by one percent increases unemployment by 1.6 percent. Shuaibu, Muhammad, Abdullahi, and Qwazawa's (2021) research also shows a direct link between public debt and unemployment. It is also worth noting that none of these studies finds evidence of an inverse relationship between government debt and unemployment, which leaves a literature gap for investigation using a cross-national sample.

Research shows that increasing public debt, particularly in Africa, has little or no positive impact on employment creation (Ehikioya et al., 2020; Al-Tamimi and Jaradat, 2019). A surge in unjustified external borrowing is evident in most African countries with no positive results on employment creation. It is apparent that funds borrowed from external sources are largely spent on recurrent items at the expense of job-producing investments or diverted to unspecified "destinations". (Ehikioya et al., 2020; Al-Tamimi and Jaradat, 2019; Chimezie et al., 2020; Senadza et al., 2017). As a result of the unrestrained misappropriation of externally borrowed financial resources, the need for external credit has sparked heated debate. According to Ehikioya et al. (2020), obtaining external credit is practically a curse for Africans. Indeed, over 70% of borrowed funds that should have been invested in projects that reduce poverty through job creation go "missing" as a result of poor governance (n.d.).

This current study attempts to provide answers to the following questions: What is the impact of external debt on unemployment in the twenty-five sampled countries in Sub-Saharan Africa? Is the relationship between external debt and unemployment linear or non-linear? Having obtained relevant results from the analysis, we would be capable of

providing informed national policy directions. Policymakers can use these analyses to design policies that would ensure long-term economic stability and growth. The uniqueness of this study lies in its contribution to the literature on external borrowings and its short- and long-term impacts on employment creation. It also draws the attention of stakeholders to the dire consequences of the misappropriation of borrowed funds on the real economy.

Again, the novelty of this research is the use of sys-GMM to analyze the external debt-unemployment nexus with a cross-country sample, unlike a couple of sighted studies that are a single-country sample (Evans, 2022; Asafo and Matuka, 2019; Ogonna et al., 2016). The bulk of the identified areas researched in the literature have been the debt-growth nexus, faintly capturing unemployment issues or in different continent using different econometric approaches (Cahyadin and Ratwianingsih, 2020; Altvater and Vale, 1988). This study goes a step further by controlling for the annual GDP, inflation, and population growth rates. These macroeconomic variables have been proven to influence the outcome of unemployment in study models that have incorporated them.

Under the golden rule of national indebtedness, borrowed funds are expected to be invested in areas where jobs can be created. This will eventually boost household and national consumption, with multiplier effects on national purse (see Figure 1).

Figure 1. *External debt circuit*



Source: Adapted and modified from Mihaiu (2014).

This paper is organized into five sections. The rest of the sections are as follows: a review of the literature in Section II; methods and model specifications in Section III; presentation of results and subsequent discussion in the fourth (IV) section; and finally, in Section V, the conclusion is drawn, and recommendations are made for policy implementation.

2. Literature review

2.1. Theoretical literature

The majority of the literature on external debt concentrates on the link between external debt and economic growth (Dey and Tareque, 2020; Asafo et al., 2019; Manasseh et al., 2022; Ohiomu, 2020; Al Kharusi and Ada, 2018). This trend of research has gained acceptance by some development economists (e.g., Nafziger, 1993) for its growth and developmental prospects, although some economic theories (the Debt Overhang and Liquidity Constraint Theories) argue that external debt, unless prudently invested in productive sectors of the economy to promote economic growth in both developing and the developed countries through job creation, could constitute a source of worry as a result of the crowding-out effect (Krugman, 1988; Al Kharusi and Ada, 2018). A debt overhang-investment analysis performed by the International Monetary Fund (1989) suggests that the liquidity constraint and debt overhang theories explain slump investments in debt-mutilated countries.

Thus, with macroeconomic implications, hiring temporary labour with externally borrowed funds relaxes the liquidity constraint hypothesis. Although the provision of permanent employment is expensive, it is rather productive, especially if employment is in the vocational, industrial, and technical sectors of the economy, as it reduces the urge to borrow excessively to attend to the ever-increasing unemployment rates. This typically holds in the long run, when investments in human capital begin to yield positive results and reduce pressure on the national wage bill, as self-employment would have gained firm ground. Thus, fixed contractual bills on savings and foreign reserves are reduced considerably (Al Kharusi and Ada, 2018). Following Presbitero's (2012) study, countries that invest in the industrial sector become much more productive than their peers and tend to prudently apply borrowed funds, thereby curbing the tendency toward capital flight.

2.2. Empirical literature

2.2.1. External debt and unemployment

The empirical literature finds mixed results for external debt-unemployment nexus, either implicitly or explicitly. An indirect relationship (positive impact) is particularly evident in terms of the national government's ability to use borrowed funds to create jobs through sustained investments in the industrial sector. For instance, the implicit negative external debt-unemployment relationship was confirmed in a study by Sanchez-Juarez and Garcia-Almada (2016), who assessed public debt, public investment, and economic growth in Mexico. Indirectly, a good investment strategy targeting the industrial sector could create job opportunities for the youth in particular. Senadza et al. (2017) theoretically assert the relevance of external debt in terms of a country's making funds available for capital investment when borrowing to finance a budget deficit. Employment opportunities are created by making funds available for capital investment. In this manner, external debt positively and implicitly affects job creation. It is becoming increasingly impossible to find a single study that explicitly links external debt to unemployment or employment, either by reducing or increasing it respectively.

In theory, Ehikioya et al. (2020) appreciate governments' fiscal policies to invest in human resources and income-generating projects. Available idle but willing labour could be trained to take up technical jobs in the industrial sector, as most external funds are provided with strings attached. They indirectly linked external debt to employment creation. As (Ehikioya et al., 2020) stated earlier, when borrowed funds are judiciously invested with employment as the benchmark, the teeming unemployed will be offered the opportunity to have either temporary or permanent jobs, depending on the sector of investment. Matthew and Mordecai (2016) observed an indirect relationship between external debt and economic performance. Their argument finds solace in the neoclassical tradition of macroeconomic policy decisions that favour improved economic output through profitable investment. And as we do know, job creation is a direct function of viable investments in the country. In his appraisal of the effect of debt on an economy, Cohen (1992) alludes to the indirect relationship between external debt and investment. This, he emphasised, will only be possible when borrowed funds are prudently applied to fetch adequate returns to meet debt-interest-servicing obligations.

Studies, including those of Mihaiu (2014), find that public debt is proportionally related to public investment, thus discouraging national governments from increasing public debt because it does not simulate investment with the prospects of job creation in the economy. National governments require external funding to invest in profitable sectors to create employment opportunities. The challenge is that many externally sourced funds are misappropriated by bad governance. Another study that buys into the inverse external debt-unemployment relationship is that of Ehikioya et al. (2020), which bemoans the suboptimal use of externally borrowed funds in debt servicing to the detriment of productive investments where the idle labour force could have otherwise obtained temporary or permanent self-employed jobs. This finding is implicitly linked to the debt overhang hypothesis. As a result of these inconclusive deliberations on whether external debts serve the interests in which they were contracted, policymakers and academics alike continue to encourage writers to go the extra mile to find the ultimate results.

2.2.2. GDP-Unemployment nexus

Economic growth (using GDP as a proxy) and unemployment trends are important macroeconomic variables that are closely tracked by policymakers and the public because they help form a picture of a country's economy and level of development. Although quite aged, Okun's (1962) study acknowledges that there is usually a less than two percent increase in unemployment, caused by a percentage decrease in economic growth (proxied by GDP). Levine (2013) articulates this position of Okun's law by emphasising the negative relationship between the real GDP growth rate and unemployment. The negative unemployment-economic growth (GDP as a proxy) nexus has a long standing in the empirical literature (Hjazeen et al., 2021; Dayioglu and Aydin, 2021; Basnett and Sen, 2013; Melamed, Hartwig and Grant, 2011). It is worthy of note that growth should occur in sectors that can create employment, such as the construction, service, and manufacturing industries. Except for studies that struggled to disengage the reality of Okun's Law by illuminating the disproportionate change in unemployment resulting from a change in economic growth (e.g., Sanchez and Liborio, 2012), this study has failed to establish empirical evidence suggesting that real GDP growth can result in a deteriorating unemployment situation. Even in the case of Levine (2013), she emphasises that a shred of contrary evidence defusing the traditional inverse GDP-unemployment nexus may only look at where employment growth is less rapid than the growth in the labour force. Until then, the conventional negative unemployment-real GDP relationship will be upheld.

2.2.3. Inflation and unemployment

There is a well-established inverse relationship between unemployment and inflation, two macroeconomic variables that economists frequently use to assess an economy's health (see Perera and Wickramanayake, 2016). Lui (2008) finds a negative relationship between unemployment and inflation. As a result, as prices rise, entrepreneurs are encouraged to produce more in order to benefit from higher prices. This is accomplished by hiring more workers to supplement existing employee strength, thereby lowering unemployment.

2.2.4. Relationship between population growth and unemployment

Although the population-unemployment relationship is rife with hypotheses, common sense dictates that as the population grows, so does the unemployment rate, with the defused effects frequently overlooked. According to Skold and Tesfay (2020), there is a negative correlation between population growth and unemployment in this common-sense scenario. They believe that population growth drives consumption and encourages entrepreneurs to produce goods and services with increased demand. Singh and Kumar (2014) demonstrate a clear link between population growth and unemployment. Population growth has a positive effect on the labor force, leaving the majority of people unemployed. There is a mismatch between the labor supply and job opportunities. Population is regarded as the supply factor, whereas the economic conditions of a country are regarded as the demand factor. A similar study by Ali, Omar, and Yusuf (2021) revealed a 5.2 percentage point increase in unemployment resulting from an increased population in Tanzania.

3. Methods and model specification

We obtained data from the World Bank Development Indicators (WDI) made possible by the International Monetary Fund (IMF). These balanced panel data were collected from twenty-five (25) Sub-Saharan African countries that had a complete dataset for the variables under study, spanning 2010 to 2020 (annual frequency). The objective of this study was to establish the dynamic relationship between external debt and unemployment in these twenty-five Sub-Saharan African countries. As a result, we used the natural logarithm of two fundamental variables variance (External Debt Stock and Unemployment); taking a log of your data may result in transformed data with homogeneous as the independent and response variables, respectively. The paper incorporated three control variables (annual Gross Domestic Product-Growth Rate [GDP-GR], annual Inflation Rate [INFL-R], and annual Population Growth Rate [POP-GR]) to provide evidence of a hypothesised negative relationship (positive impact) between external debt and unemployment.

3.1. Empirical model

$$\ln UEMPL - R_{it} = \beta_0 + \beta_1 \ln UEMPL - R_{(1-t)} + \beta_2 \ln EXT DTS_{it} + \beta_3 \ln X_{it} + \eta_i + \lambda_t + \xi_{it} \quad (1)$$

$$\ln UEMP - R_{it} = \omega_\sigma + \omega_1 \ln UEMP - R_{(1-t)} + \omega_2 \ln EXT DTS_{it} + \omega_3 (\ln EXT DTS)_{it}^2 + \omega_4 \ln X_{it} + \eta_i + \lambda_t + \xi_{it} \quad (2)$$

$$\ln UEMP - R_{it} = \omega_\sigma + \omega_1 \ln UEMP - R_{(1-t)} + \omega_2 \ln EXT DTS_{it} + \omega_3 \ln (EXT DTS)_{it}^2 + \omega_4 (\ln GDP - GR + \ln INFL - R + \ln POPG - R)_{it} + \eta_i + \lambda_t + \xi_{it} \quad (3)$$

(This model above is adapted from Ehikioya et al., 2020.)

3.2. Robustness model specification

$$\begin{aligned} \ln UEMP - R_{it} = & w_0 + w_1 \ln UEMP - R_{(1-t)} + w_2 \ln EXT DTS_{it} + w_3 \ln (EXT DTS)_{it}^2 \\ & + w_4 (\ln GDP - GR + \ln INFL - R + \ln POPG - R)_{it} + (\mathbf{lnINT} - \mathbf{R})_{it} + \eta_i + \lambda_t + \xi_{it} \end{aligned} \quad (4)$$

To verify the robustness of the model, Equation (4) was developed to include interest rates (italicized and bold in Equation (4)) and redefine the GDP portion of the model into real GNI (formerly GNP) (see Results and discussion).

UMP-R is the annual unemployment rate in selected countries, EXT DTS is the external debt stock of respective countries (defined as the proportion of sovereign debt tied to GNI), \mathbb{X} represents all standard control variables, with country-specific effects represented by η , and the time effect represented by λ . The error term is proxied by ξ_{it} , with "it" denoting country "i" in period "t" for the sample space. The one-year lagged UEMPR is given by $UEMPR_{(1-t)}$ and $EXTSTS^2$ connotes the external debt stock squared term to GNI to test for a nonlinear relationship between the external debt stock and unemployment in the selected countries. The annual inflation rate, GDP growth rate, and population growth rate are control variables represented by \mathbb{X} .

This study used the two-step system generalized method of moments (sys-GMM) estimator of Holtz-Eakin, Newey, and Rosen (1988), Arellano and Bond (1991), and Blundell and Bond (1998) to estimate a dynamic panel model from twenty-five (25) Sub-Saharan African countries. The sys-GMM technique was adopted because of its ability to isolate the inefficiencies of the first differences of instruments that are uncorrelated with the fixed effect, using the difference GMM estimator modelled by Blundell and Bond (1998). Consequently, the generalized least squares (GLS) model was augmented to address the validity and robustness of the results using GMM. It is important to emphasize that the use of GMM allows for the correction of autocorrelation and endogeneity challenges arising from panel data.

A variety of data tests were performed to check data stationarity, as the data obtained were time-series. Therefore, a test for unit roots using the augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) methods is conducted (see Table 4). Therefore, the ADF and PP unit test models are specified as follows.

$$\Delta \lambda_t = \delta \lambda_{t-1} + \sum_{i=1}^p \beta_i \Delta \mathbb{X}_{t-i} + \xi_t \quad (5)$$

$$\Delta \lambda_t = \pi \lambda_{t-1} + \beta_i \mathbb{D}_{t-1} + \xi_t \quad (6)$$

Where Δ – the first difference, P – the lag operator, t – the time subscript, ξ – error term, \mathbb{D}_{t-1} – deterministic trend component.

The decision is made when the test statistic is greater or < the ADF critical value. The cointegration test was performed once the data were confirmed to be integrated in Order I(1). The reason for the test performance was to establish the presence of a long-run relationship between external debt stock and unemployment in the 25 African countries, using Johansen's (1991) cointegration test. The Johansen cointegration test is preferred

because of its ability to resolve the measurement challenges associated with Eagle and Granger techniques (see Ehikioya et al., 2020). Following this, the restricted vector autoregressive (VAR) model defined in the error correction parlance, the Johansen model, is specified as follows:

$$\Delta \Pi_t = \Omega + \sum_{j=1}^{k-1} \mu_j \Delta \Pi_{t-j} + \Theta \Pi_{t-k} + \xi_t \quad (7)$$

where Δ represents the first difference notation, Π_t refers to $p \times 1$, the vector of the n variable, Ω denotes $p \times 1$ (a constant vector representing a direct movement in a system), and k is the lag structure. The Gaussian white noise residual vector is represented by ξ_t , while μ_j is defined as; $p \times (k-1)$ matrix explaining the short run changes between and among variables across the " p " equation at the " j^{th} " lag. Π is a $(p \times p)$ coefficient matrix that represents the cointegration vectors. The vector error correction model by Johansen (1991), which employs the trace statistic, was used to evaluate the reduced rank of matrix Π . Thus, the following model was formulated:

$$\lambda_{\text{Trace}} = -T \sum_{i=r+1}^p \ln(1 - \lambda'_i), \text{ and the Maximum Eigenvalue method;}$$

$$\lambda_{\text{max}} = -T \ln(1 - \lambda'_{r+t}) \quad (8)$$

The model positions T as the number of observations in the 25-country sample and r as the number of independent series. Lambda (λ) in the model denotes the eigenvalues. This study posits that the null hypothesis should be rejected if the trace or max-eigen-statistic p -value is greater than 5 per cent. If there is an established fact that the time series has a long-run relationship, then variables are cointegrated; in this case, in an event where the economy experiences a shock in the short term, there is a high probability of reconvergence of these variables in the long run (Ehikioya et al., 2020). In real economic terms, if the economy becomes destabilized as a result of unexpected events, normalcy is assured as the economy will get back on track.

4. Results and discussion

Data properties

Table 1. Unit root test results

Variable	ADF-Fisher Chi-square							
	Level		First Difference		Level		First Difference	
	Const.	Const. & Trend	Const.	Const. & Trend	Const.	Const. & Trend	Const.	Const. & Trend
lnUNEMPLR	43.0438	53.0906	120.176***	91.6878***	24.753	20.5896	129.010***	90.9328***
lnEXTDT	43.422	16.2582	134.714***	134.636***	58.0734	15.7647	258.323***	241.326***
lnGDPGR	120.640***	102.481***	313.993***	245.712***	231.846***	200.035***	1327.86***	2515.63***
lnINFLR	183.095***	171.600***	440.901***	350.723***	281.494***	315.083***	1402.17***	2499.21***
lnPOPGR	351.233***	521.075***	338.209***	568.979***	76.5752**	43.4915	125.247***	340.450***

Note: *** and ** denote significance at the 1% and 5% levels, respectively.

Source: Authors' computation from WDIs (2020).

Time series data were used to analyze the external debt-unemployment nexus by employing the two-step system GMM. This study assumes the presence of a unit root (null hypothesis). To establish this, this study adopted augmented Dickey (ADF) and Phillips-Perron (PP) tests. The tests revealed nonstationary data at levels (see Table 2). Having ascertained this, there was a need to integrate all variables used in the study at the first difference. After the first difference, the variables were stationary in order one (I[1]).

Table 2. Johansen Fisher panel unrestricted cointegration rank test results (trace and maximum eigenvalue)

Hypothesised No. of CE(s)	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from Max-eigen test)	Prob.
None*	1539	0.0000	843.3	0.0000
At most 1	1169	0.0000	1312	0.0000
At most 2	723.7	0.0000	406.6	0.0000
At most 3	402.2	0.0000	240.1	0.0000
At most 4	202.4	0.0000	202.4	0.0000

* Probability test performed using asymptotic chi-square distribution.

Source: Authors' computation from WDIs (2020).

According to the establishment of order one (see Table 1), it is necessary to ascertain the long-run equilibrium between the variables (Johansen, 1991) after adjusting Fisher's (1932) cointegration test, as shown in Table 2. The Johansen-Fisher cointegration test rejected the null hypothesis of no cointegration relationship between the variables; hence, a long-run relationship exists. Therefore, the results show that external debt could affect unemployment in all the sampled countries in the long run.

4.1. Regression results

Table 3. Two-step system generalised method of moments (sys-GMM) results

Variable	Model 1-Linear		Model 2-Nonlinear		Model 3-Combined	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
UNEMPLR _{t-1}	0.6233**	0.198	0.6785**	0.028	0.3699**	0.051
lnEXTDTS	0.4172**	0.003			0.0123**	0.007
ln(EXTDTS) ²			0.6156***	0.001	0.8496***	0.005
lnGDPGR	0.0307**	0.008	0.2672***	0.008	0.2604***	0.008
lnINFLR	0.1306**	0.008	0.5809**	0.019	0.0949**	0.017
lnPOPGR	0.0127*	0.091	0.7544**	0.062	0.1073*	0.086
Constant	0.3931**	0.013	0.4185***	0.029	0.5832***	0.024
Observations	575		575		575	
No. of Countries	25		25		25	
Hansen OIR Test (p-value)	0.308		0.137		0.263	
Wald chi-sq.(6) p-value	0.000		0.000		0.000	
AR(1) p-value	0.082		0.691		0.071	
AR(2) p-value	0.062		0.551		0.362	

Source: Authors' computations based on WDIs (2020). ***, **, and * denote significance at 1%, 5%, and 10% respectively.

The study set out to determine the dynamic relationship between external debt and unemployment in 25 countries in Saharan Africa. Before the robustness check for the validity of the results using the generalized least squares (GLS) method, we ran the analysis on the linear and nonlinear specifications using sys-GMM (see Table 3). To achieve the general objective, this study began by estimating the linear relationship between external debt and unemployment using the full variable sample controlled for GDP, INFLR, and POPGR in Column three of Table 3 (Model 3-Linear). Model 1 shows that external debt has a statistically significant positive relationship with unemployment. At the outset of this

study, we hypothesize that external debt stock has a positive impact on unemployment. Thus, as governments borrow and apply for these funds judiciously, the economic burden is reduced through job creation, which positively affects unemployment. The results of the linear model are in sharp contrast with our earlier hypotheses.

The finding in this study is in contrast with the negative relationship established by Sanchez-Juarez and Garcia-Almada (2016), who explained that borrowed funds strategically invested to target the industrial sector could serve as an employment cow for youth in particular. Ideally, external debt should positively affect unemployment (a negative relationship); however, the misapplication of borrowed funds negatively reflects citizens' welfare. In line with the reports in columns 2 and 3 of Table 3, we find that the coefficients of external debt squared are still statistically positive at the one per cent, reiterating the negative impact of external debt unemployment on the citizenry of these countries.

Column 2 shows the case of nonlinear analysis, while column 3 reflects the combined or full-sample scenario. These results re-echo the gravity of fund misappropriation, to the detriment of economic growth. This is a panacea for economic instability, with attendant effects on citizenry. As an objective of the study, the results confirmed that the external debt-unemployment nexus is nonlinear. The economic sense is that the application of borrowed funds by the sampled countries is not uniform across board. Therefore, the effects are not linear for the individual countries. Mathematically, a unit increase in external borrowing deteriorates the already volatile unemployment situation by approximately 0.62%, on average. These results are consistent with those reported by Ehikioya et al. (2020), Al-Tamimi and Jaradat (2019), Chimezie et al. (2020) and Senadza et al. (2017), that externally borrowed funds neglect job-providing investments or are diverted to unexplained "destinations". As put forth by Ehikioya et al. (2020), the eminence of debt overhang is glaring when external borrowings are unreasonably accumulated without positively impacting employment creation.

The statistically significant positive relationship between GDP growth rate and unemployment established in this study suggests that not all GDP growth is translated into the required purpose. Theoretically, the implication is that an increase in GDP does not necessarily positively impact employment, as confirmed by the results in Table 3. This revelation is in opposition to the postulates by Okun (1962) that a percentage increase in GDP would result in a 3-percentage increase in job creation. The results of this study contradict Okun's law by presenting a contrary result. Although quite unsuspected, the established positive relationship points to stakeholders being wary that mere increases in absolute figures are insufficient for a positive impact on macroeconomic stability through improved job creation.

As the prices of goods and services increase, producers take advantage of manufacturing to compete with rising prices for profit. This study reveals a significantly positive relationship between inflation and unemployment. As indicated earlier, producers need to increase productivity to compete with the rising prices of goods and services, and there is a need to employ more labor to help in the production processes, thereby positively impacting employment (reduction in unemployment rates). This positive relationship can

be explained in two ways. The established significant positive relationship here means that as prices increase persistently, the cost of raw materials/inputs becomes expensive for producers, thereby deteriorating purchasing power. Fewer inputs are now acquired, which will require relatively few labor forces to work on these inadequate inputs, which theoretically worsens the unemployment situation. In other words, when inflation is spiral, the cost of living has an equal direct effect: workers demand an increase in wages or salaries, which tends to increase the cost of labor. Employers, going by this trend will be compelled to reduce the amount of labour hired, thus, increasing the unemployment rate in the system.

4.2. Robustness check

Table 4. Robustness check results – Generalised Least Square (GLS)

Variable	Model 1-Linear		Model 2-Nonlinear		Model 3-Combined	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
UNEMPLR _{t-1}	0.1036***	0.198	0.1034***	0.002	0.1035***	0.002
lnEXTDTS	0.0449**	0.022			0.0122***	0.003
ln(EXTDTS) ²			0.7098**	0.028	0.5951***	0.004
lnGDPGR	0.0132**	0.021	0.0138**	0.008	0.0141***	0.021
lnINFLR	0.0194	0.015	0.0131	0.016	0.0137*	0.016
lnPOPGR	0.1278*	0.029	0.1270***	0.029	0.1262***	0.029
lnINT-R	0.4211**	0.032	0.3301*	0.021	0.4112**	0.033
Constant	0.8444***	0.013	0.9919***	0.053	0.9481***	0.125
Observations	575		575		575	
No. of Countries	25		25		25	
R ²	0.751		0.751		0.751	
Adjusted R ²	0.749		0.749		0.749	
Durbin-Watson	1.9646		1.9625		1.9634	
F-Statistics	371.129		372.655		310.142	
Prob (F-Statistic)	0.0000		0.0000		0.0000	

Source: Authors' computations based on WDIs (2020). ***, **, and * denote significance at 1%, 5%, and 10% respectively.

To authenticate the results produced by the GMM system, researchers employed the generalized least squares (GLS) approach to establish a possible link between external debt stock and unemployment in selected countries in Sub-Saharan Africa. A test is performed to verify the robustness of the obtained results. The interest rate was added as a control variable, while GDP was redefined as the real GNI. After performing this test, the results remained significantly unchanged with only negligible variations (Table 4). The two main variables (external debt stock and unemployment) maintain statistical significance with the same signs, although unemployment becomes significant at the 5% level. The nonlinear relationship between external debt stock and unemployment was validated as they showed statistically significant results (see Tables 3 and 4). All control variables reflected similar results, as shown in Table 4, indicating consistency.

The model explains the variability in unemployment using the *p*-value (1%) of the 371 F-statistic. The explanatory variables in the model explain their contribution to determining the effect of external debt stock on unemployment by approximately 75 per cent. Invariably, 25 per cent of the causes of unemployment are attributed to different sets of variables outside the model. These results confirm that external debt is a positive game

changer in the useful application of borrowed funds. However, other external influences work together to offset the positive effects of external debt. These externalities could include the unmonitored disbursement processes of funds and weak legal and bureaucratic institutions. In both Tables 4 and 5, the results speak volumes of the fact that the hypothesised negative relationship between external debt and unemployment is one reality if a proper governance system in terms of fund disbursement and monitoring is implemented.

Table 5. *Diagnostic test*

Null Hypothesis	Test	F-statistic	P-value	Chi (X^2)/ <i>T</i> – statistic	P-value
No serial correlation	Breusch Godfrey Serial Correlation LM test	1.031411	0.3522	2.67246	0.2256
No conditional Heteroskedasticity	Heteroskedasticity test: Breusch-Bagan- Godfrey	1.2331634	0.3151	8.13931	0.2599
There is normality	Jarque-Bera	-	-	0.05679	0.8966
No significant specification error	Ramsey RESET test	0.665116	0.3948	0.87725	0.3821

Source: Researchers' computation (2022).

With a Jarque-Bera test statistic of 0.05679 and a *p*-value of 0.8966, the null hypothesis of the presence of normality was confirmed. Thus, the residual series is normally distributed. In addition, a serial correlation test was conducted using the Breusch Godfrey serial correlation LM test, which demonstrated the absence of serial correlation among variables and error terms. The heteroscedasticity test indicates that there is a constant variance property, inferring the presence of homoscedasticity.

4. Conclusion and recommendations

As African economies continue to accumulate debt, it is necessary to study how external debt affects unemployment. This empirical cross-country study provides evidence of a dynamic relationship between external debt stock and unemployment in Sub-Saharan Africa, using the sys-GMM approach. A linear exploration of the relationship between external debt and unemployment revealed a direct relationship. Unsustained external borrowing affects national governments' ability to engage in public investment, which has an indirect effect on employment creation.

It is important to note that some countries have achieved positive results from the judicious application of externally borrowed funds in several ways, including improved job creation and macroeconomic stability. Evidence also suggests a nonlinear relationship between external debt and unemployment across nations. The implication is that external debt has no uniform ramifications because of the differences in governance systems and autonomy-granted offices in charge of managing national debt across countries. The effectiveness of debt management by the occupants of these offices also stems from how well they are resourced.

The theoretical implication for the positive external debt-unemployment relationship is that, as national governments engage in unsustainable external debt levels (above the 50% threshold of GDP at face value), public investments in capital projects that indirectly

provide employment are thwarted. The more national governments seek foreign funds, the more likely it is that unemployment rates will increase in the economy. Practically, foreign borrowed funds not invested in job creation sectors, such as the vocational and industrial sectors, invite economic hardship and insecurity into the system, as currently pertains to Ghana.

Another implication is that a sustained increase in capital flight and external debt accumulation would decrease governments' capacity to raise additional tax revenue because capital escaping the country cannot be taxed, thereby limiting their ability to make public investments. Since capital leaving the country cannot be taxed, this would decrease the capacity of the government to increase spending. A high debt service ratio may constitute a drain on domestic revenue mobilization, which will stifle domestic investments and negatively impact the continent's growth prospects through government spending.

This study encourages policymakers to employ proper strategies to disburse borrowed funds to target sectors that have the potential to generate job opportunities of either a temporary or permanent nature, such as the technical and vocational arms of the economy. It is also necessary that borrowed funds are not spent on recurrent expenditures or used to service existing debts. Another area that needs attention is resourcing offices that are earmarked for managing external debt to permit independent operations.

It is suggested that further study of the external debt-economic development nexus of all Sub-Saharan countries will provide another policy direction for sustained economic development. Economic growth is not necessarily economic development; therefore, studies on the external debt-economic growth nexus deny the laxity of going a step further to consider the welfare of the citizenry as a whole.

References

- Ali, O., Omar, M. and Yusuf, S., 2021. Population growth and unemployment in Zanzibar. *International Journal of Sciences: Basic and Applied Research*, 59(2), pp. 36-47. Retrieved from <<https://www.gssrr.org/index.php/JournalOfBasicAndApplied/article/view/1276>>
- Al Kharusi, S. and Ada, M.S., 2018. External debt and economic growth: the case of emerging economy. *Journal of Economic Integration*, 33(1), pp. 1141-1157, <<https://doi.org/10.11130/jei.2018.33.1.1141>>
- Al-Tamimi, K.A.M. and Jaradat, M.S., 2019. Impact of external debt on economic growth in Jordan for the period (2010-2017), *Int. J. Econ. Finance*, 11, pp. 114-118, <<https://doi.org/10.5539/ijef.v11n4p114>>
- Altwater, E. and Vale, M., 1988. The two sides of the coin: the relationship between unemployment and debt in the world economic crisis. *International Journal of Political Economy*, 18(2), pp. 85-101, <<http://www.jstor.org/stable/40470479>>
- Arellano, M. and Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies*, 58(2), pp. 277-297, <<http://www.jstor.org/stable/2297968>>

- Asafo, S.S., Matuka, A. and Dominic, N., 2019. External debt and economic growth: two-step system-GMM evidence for Sub-Saharan Africa Countries. *International Journal of Business, Economics and Management*, 6(1), pp. 39-48, <<https://doi.org/10.18488/journal.62.2019.61.39.48>>
- Basnett, Y. and Sen, R., 2013. *What do empirical studies say about economic growth and job creation in developing countries?* Institute. Economic and Private Sector, <https://assets.publishing.service.gov.uk/media/57a08a2340f0b652dd005a6/Growth_and_labour_absorption.pdf>
- Blundell, R. and Bond, S., 1998. Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87, pp. 115-143, <[http://dx.doi.org/10.1016/S0304-4076\(98\)00009-8](http://dx.doi.org/10.1016/S0304-4076(98)00009-8)>
- Chimezie, P.O., Omankhanlen, A.E. and Eriabie, S., 2020. Nexus between public finance and economic growth in Nigeria. *WSEAS Transactions on Business and Economics*, 17, pp. 184-194, <<https://doi.org/10.37394/23207.2020.17.20>>
- Cohen, D., 1992. Large external debt and (slow) domestic growth: a theoretical analysis. *Journal of Economic Dynamics and Control*, 19(5-7), pp. 1141-1163 <[https://doi.org/10.1016/0165-1889\(94\)00822-Y](https://doi.org/10.1016/0165-1889(94)00822-Y)>
- Dayioglu, A. and Aydin, Y., 2021. Relationship between economic growth, unemployment, inflation, and current account balance: theory and case of Turkey. Chapters, in: Terzioğlu, M. K. and Djurovic, G., (Eds.), 2021. Linear and nonlinear financial Econometrics-theory and practice. *Intech Open*, <<https://doi.org/10.5772/intechopen.88099>>
- Dey, S.R. and Tareque, M., 2020. External debt and growth: role of stable macroeconomic policies. *Journal of Economics, Finance, and Administrative Science*, 25(50), pp. 185-204, <<https://doi.org/10.1108/JEFAS05-2019-0069>>
- Ehikioya, I. B., Omankhanlen, A.E., Osuma, G.O. and Inua, O.I., 2020. Dynamic relations between public external debt and economic growth in African countries: a curse or blessing?. *Journal of Open Innovation, Technology, Market, and Complexity*, 6(3), p. 88, <<https://doi.org/10.3390/joitmc6030088>>
- EIU, 2022. Debt repayment costs are rising fast for many African countries: They are unlikely to default this year, but face trouble by 2024, <https://www.economist.com/middle-east-and-africa/2022/04/30/debtrepayment-costs-are-rising-fast-for-many-african-countries>
- Fisher, R.A., 1933. *Statistical Methods for Research Workers*. *Nature*, 131, 383, <<https://doi.org/10.1038/131383b0>>
- Gill, I. and Pinto, B., 2005. Public debt in developing countries: has the market based model worked? Policy Research Working Paper series (3674), World Bank, Washington, DC, <<https://openknowledge.worldbank.org/handle/10986/8632>>
- Hjazeen, H., Seraj, M. and Ozdeser, H., 2021. The nexus between the economic growth and unemployment in Jordan, *Future Business Journal*, 7(1), pp. 1-8, <<https://doi.org/10.1186/s43093-021-00088-3>>
- Holtz-Eakin, D., Newey, W. and Rosen, H.S., 1988. Estimating vector autoregressions with panel data. *Econometrica*, 56, pp. 1371-1395, <<http://dx.doi.org/10.2307/1913103>>
- ILO, 2020, 20th January. Insufficient paid work affects almost half a billion people, new ILO report shows, <https://www.ilo.org/global/about-theilo/newsroom/news/WCMS_734454/lang-en/index.htm>

- ILOSTAT, 2022, 10th March. Inflation more than doubled between March 2021 and March 2022, <<https://ilostat.ilo.org/inflation-more-than-doubled-between-march-2021-and-march-2022/>>
- IMF, (1989. IMF World Economic Outlook. Supplementary Note 1 Washington, D.C., IMF, 1989, <<https://www.imf.org/external/pubs/ft/ar/archive/pdf/ar1989.pdf>>
- IMF Global Database, 2021, January. 2021 updates IMF Global Debt Database, <<https://www.imf.org/en/News/Seminars/Conferences/2021/12/15/2021update-of-the-imf-global-debt-database>>
- Johansen, S., 1991. Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica*, 59(6), pp. 1551-1580, <<https://doi.org/10.2307/2938278>>
- Krugman, P., 1993. Financing vs. forgiving a debt overhang. *Journal of Development Economics*, 29(3), pp. 253-268, <[https://doi.org/10.1016/03043878\(88\)90044-2](https://doi.org/10.1016/03043878(88)90044-2)>
- Levine, L., 2013. Economic growth and unemployment rate. CRS Report for Congress 7-5700, R42063, <<https://www.crs.gov>>
- Liborio, C.S. and Sanchez, J.M., 2012. The relationships among changes in GDP, employment, and Unemployment: This time it was different. Economic Synopsis, (13), <<https://files.stlouisfed.org/files/htdocs/publications/es/12/ES20120518.df>>
- Lui, L.Q., 2008. Inflation and unemployment: the roles of goods and labour markets institutions, <<http://qed.econ.queensu.ca/pub/students/phds/liuqian/JMP.pdf>>
- Manasseh, C.O., Abada, F.C., Okiche, E.L., Okanya, O., Nwakoby, I.C., Offu, P., (...), Nwonye, N.G., 2022. External debt and economic growth in Sub-Saharan Africa: does governance matter? *PLoS ONE*, 17(3), <<https://doi.org/10.1371/journal.pone.0264082>>
- Matthew, A. and Mordecai, B., 2016. The Impact of public debt on economic development of Nigeria. *Asian Research Journal of Arts & Social Sciences*, 1(1), pp. 1-16, <<https://doi.org/10.9734/ARJASS/2016/27263>>
- Melamed, C., Hartwig, R. and Grant, U., 2011. *Jobs, growth, and poverty: what do we know, what don't? What should we know of this?.* Background note. London: Overseas Development Institute, <<https://cdn.odi.org/media/documents/7121.pdf>>
- Mihaiu, D.M., 2014. Analysis of public debt in the European Union-issues related to its sustainability. *Journal of International Studies*, 7(2), pp. 25-32, <<https://doi.org/10.14254/2071/8330.2014/72/2>>
- Nafziger, W.N., 1993. Debt, adjustment, and economic liberalization in Africa, *Journal of Economic*, 27(2), pp. 429-439, <<https://doi.org/10.1080/00213624.1993.11505426>>
- Ogonna, I.C., Idenyi, O., Ifeyinwa, A. and Gabriel, N., 2016. The Implications of rising public debt on unemployment in Nigeria: an auto regressive distributed lag approach. *Asian Research Journal of Arts and Social Sciences*, 1(1), pp. 1-15, <<https://doi.org/10.9734/arjass/2016/26394>>
- Ohiomu, S., 2020. External debt and economic growth nexus: empirical evidence from Nigeria. *The American Economist*, 65(2), pp. 330-343, <<https://doi.org/10.1177/0569434520914862>>
- Okun, A.M., 1962. Potential GNP: its measurement and significance. In Proceedings of the Business and Economics Statistics Section. Alexandria, VA: American Statistical Association, pp. 89-104, <<http://www.sciencedirect.com/reference/294493>>
- Perera, A. and Wickramanayake J., 2016. Determinants of commercial bank retail interest rate adjustments: evidence from a panel data model. *Journal of International Financial Markets Institutions and Money*, 45, pp. 1-20, <<https://doi.org/10.1016/j.intfin.2016.05.006>>
- Presbitero, A., 2012. Total public debt and growth in developing countries. *European Journal of Development Research*, 24(4), pp. 606-626, <<https://doi.org/10.1057/ejdr.2011.62>>

- Sánchez-Juárez, I. and García-Almada, R., 2016. Public debt, public investment and economic growth in Mexico. *International Journal of Financial Studies*, 4(2), (6), <<https://doi.org/10.3390/ijfs4020006>>
- Selassie, A.A., 2018. The Debt Challenge to African Growth, <<https://www.projectsyndicate.org/commentary/sub-saharan-africa-rising-debt-levels-by-abebe-aemro-selassie-2018-05>>
- Senadza, B., Fiagbe, A.K. and Quartey, P., 2017. The effect of external debt on economic growth in Sub-Saharan Africa. *International Journal of Business and Economic Sciences Applied Research*, 11(1), pp. 5917-5929, <<https://doi.org/10.25103/ijbesar.111.07>>
- Singh, H. and Kumar, S., 2014. Population growth, poverty, and unemployment in India: a contemporary state level analysis. *European Academic Research*, 1(12), <<http://euacademic.org/UploadArticle/409.pdf>>
- Sköld, E. and Tesfay, K., 2020. The relationship between inflation and unemployment in Sweden, thesis submitted to Mälardalen University, NAA305, <<https://www.divaportal.org/smash/get/diva2:1438547/FULLTEXT01.pdf>>
- The World Bank, 2022. Global growth to slow through 2023, adding risk of ‘hard landing’ in developing economies, <<https://www.worldbank.org/en/news/pressrelease/2022/01/11/global-recovery-economics-debt-commodity-inequality>>
- UN Report, 2020. Half a billion unemployed or underemployed world, <<https://www.dw.com/en/half-a-billion-unemployed-or-underemployed-worldwide-un-report/a-52081744>>
- UN Statistics, 2020. Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work. COVID-19 has led to massive job losses particularly among youth and women, <<https://unstats.un.org/sdgs/report/2021/goal-08/>>
- World Bank Development Indicators, 2022. International Labour Organisation, ILOSTAT database, <<https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS>>