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EXTERNAL DEBT AND UNEMPLOYMENT NEXUS: EVIDENCE FROM WEST AFRICA

*Elijah Abasifreke P. Udoh (PhD) and Anthony O. Onah (PhD)**

Abstract

This study examines the dynamic relationship between external debt and unemployment in West Africa, employing the Panel Autoregressive Distributed Lag (P-ARDL) method with the Pooled Mean Group (PMG) estimator. Annual data from 16 West African countries (1991-2021) were analysed. The results reveal a critical duality where external debt has a positive and marginally significant short-run impact on unemployment, but no statistically significant long-run relationship. This indicates that while debt accumulation may create immediate labour market pressures, its long-term effect on structural unemployment is conditional on institutional factors and debt utilisation efficiency. Control variables show inflation has a significant negative long-run relationship with unemployment, while GDP growth shows a positive long-run association, suggesting patterns of "jobless growth" in the region. The findings imply that West African governments have not consistently harnessed external borrowing for sustainable job creation. We recommend institutional reforms to explicitly link debt governance to employment outcomes, strategic investment in labour-intensive sectors, and enhanced regional coordination to transform external debt into a catalyst for inclusive growth.

Keywords: *External Debt, Unemployment, Output, GDP Growth, Population Growth, Inflation, Autoregressive Distributed Lag (ARDL), Pooled Mean Group (PMG).*

JEL Classification : *E24, F34, H63, J21, J64.*

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1. INTRODUCTION

Generally, countries work towards achieving some broad macroeconomic goals such as a low inflation rate, low unemployment, high gross domestic product (GDP or output) growth, a viable balance of payments, a stable exchange rate and a stable financial system, among others. In the pursuit of these goals, monetary and fiscal policies are deployed. Public borrowing or debt is often part of the fiscal policy actions deployed to manage the economy towards its set macroeconomic goals.

Debates on the long-term effects of borrowing or public debt (both external and domestic) abound. Some analysts view public debts as a burden on future generations following the theory of Ricardian equivalence (Otaki, 2015). On the other hand, some claimed that there is no burden on either the current or forthcoming generations if the public borrowing is created during a time of recession or an elevated level of unemployment. The assumption is that the rise in output, employment, and domestic income from public borrowing would help improve the living conditions of current and future generations. From this perspective, it could be asserted that borrowing as a fiscal policy action has the potential to grow the domestic economy, increase employment, and ensure stability in the financial and external sector. This policy has been most effective in pulling countries out of recession by providing the necessary stimulus for investment, growth, and improvement in the living conditions of countries (Hassan & Mamman, 2013).

However, for developing economies, the outcomes of borrowing have been mixed. Public debt, especially from external sources, rather than being a blessing, dragged some economies into a debt trap and overhang with minimal positive impact on employment, GDP growth and inflation. In West Africa, increasing external debt and unemployment have become major concerns for economies in the region. In aggregate terms, data spanning 2006 to 2021 from the World Development Indicators (WDI) revealed that the unemployment rate for the Economic Community of West African States (ECOWAS) declined from 4.89 per cent in 2006 to 4.02 per cent in 2017. The external debt stock as a percentage of GDP increased from 41.6 per cent in 2006 to 43.8 per cent in 2017. These trends appear to suggest that external debt was somewhat moderately helping in the reduction of unemployment. However, the theoretical notion that external debt can be used to grow the economy, create employment, and improve living conditions to lift people out of poverty breaks down when data spanning 2018 to 2021 are considered. From 2018 to 2021, the unemployment rate for the sub-region increased, rising

on average from 3.89 per cent to 4.48 per cent, even as external debt as a percentage of GDP rose sharply from 41.5 per cent to 51.9 per cent. In other words, more recent data show that both external debt and unemployment rates were rising across the countries in the sub-region. The economic implication is clear, as countries' borrowing trajectories reach unsustainable levels, debt servicing obligations increase and limit resources available for investment in productive and job-creating economic activities.

The trends in the major economies of the sub-region leave us with no consensus concerning the relationship between external debt and unemployment. For instance, Nigeria's data shows that external debt consistently increased from 5.6 per cent in 2006 to 17.98 per cent in 2021. The unemployment rate for the corresponding period rose from 3.8 per cent to 5.94 per cent. On the contrary, Ghana and Senegal's data show that as external debt rose from 18.21 per cent and 16.64 per cent in 2006 to 47.84 and 106.99 per cent in 2021, respectively, the unemployment rate declined from 4.64 and 10.03 per cent in 2006 to 3.92 and 3.50 per cent in 2021. Thus, the relationship between external debt and unemployment rate is clearly an important issue for empirical study.

Within the West African sub-region, the relationship between external debt and unemployment has been gauged as a fundamental macroeconomic issue given the pivotal roles of these two variables in the living standard of the citizenry. The low level of savings within the region justifies the need to complement domestic resources with borrowing from external sources. In addition, the poor state of public infrastructure calls for substantial public investment to boost aggregate demand and create jobs, which would in turn improve the living conditions of the people and alleviate the lingering poverty in the sub-region. However, it is not clear what the relationship between the unemployment rate and external debt has been over the past two to three decades. Therefore, this paper aims to examine the impact of external debt and other macroeconomic indicators on the unemployment rate in West African economies.

This study contributes to the understanding of the dynamics of external debt accumulation and labour market outcomes in the sub-region, adding to the existing body of knowledge. To further distinguish it from other studies, additional variables such as inflation, GDP, and population growth were included in the work. Moreover, using the analysis of a panel of 16 nations of West Africa makes it novel and unique. Section two review the literature to assess relevant theoretical and empirical findings on how foreign debt impacts

unemployment. Methods and techniques are covered in Section three, the findings of the study are discussed in Section four, while Section five concludes with policy recommendations.

2. LITERATURE REVIEW

Numerous scholars from diverse schools of thought have varying opinions on this subject matter. Buchanan (1982), based on his theory of debt, posits that the public borrowing principle is commonly associated with the idea that debt liability permits the transfer of the cost of community (public) activities to subsequent generations. The generation is viewed as a single, functioning entity in this claim. The estimation of public debt's incidence serves as the basis for Buchanan's inquiry into its financing. When he poses the query, "Who pays the cost of public debt, and how?" His response implies that future taxpayers will be burdened by public debt, and it permits the cost of current expenditure projects to be postponed. Thus, public debt delays the requirement for handing over control of resource service to the treasury for the benefit of taxpayers (Alnaa & Matey, 2023). This can also lead to the problem of debt overhang.

Debt overhang occurs when the expected amount of debt repayment exceeds the actual amount for which it was committed over time (Eme & Olugboyega, 2012). The theory describes a scenario in which a nation's debt exceeds its capacity to repay (Reinhart et al., 2012). According to Asogwa et al. (2018), the "Debt Overhang Effect" occurs when a build-up of debt scares away investors from the private sector out of concern that they will be subjected to high taxes from the government, which is termed tax disincentive. In addition, when the debtor nation's debt servicing obligations become increasingly significant, relative to the little gains from future investment returns, a debt overhang occurs. This can be better seen as a situation where a country's future investment is wiped out due to a recurring debt burden, thereby hampering growth and increasing unemployment (Igberi et al., 2016; Eduardo, 2009; IMF, 1989).

Furthermore, a link between public borrowing and financing budget deficits was established with the aid of the Keynesian theory, and it was concluded that the government can borrow for purposes such as promoting investment, reducing unemployment, and lessening poverty. This would boost the economy's effective demand, resulting in higher output and employment. Keynes' theory on public debt propounds that a surge in public debt would have a positive impact on the economy, such as raising national income (Reinstadler & Ray, 2010)

and reducing unemployment and poverty (Igberi et al., 2016; Okoro & Egbunike, 2017). Therefore, the Keynesian ideology gradually replaced the conventional wisdom that a steady, unbalanced budget and rapidly rising governmental debt threatened international stability (Keynes, 1936).

Theoretically, a lack of demand could result in extended periods of high unemployment; however, this can be removed by increasing demand as postulated by the Keynesian Theory of Unemployment. Hence, he posits that with increased demand, production rises, thereby increasing output over time. However, Varian (1976) asserts that Keynes' theory may result in unemployment. Thus, Keynesian unemployment is a form of unemployment that develops when there is insufficient aggregate demand to provide jobs for all those who are available and willing to work. However, this theory was also critiqued by the classical school of thought.

The Classical Theory of Unemployment proposes an argument examined by McDonald & Solow (1981) and Pigou (1968), which suggests that the labour market comprises supply and demand for labour. The positive and diminishing segment of the marginal product of labour (MPL), derives labour demand. Thus, when real wages increase, labour demand will fall, though the converse is factual as reflected in a demand curve. The decision of a worker to work part-time or not (engage in leisure) determines the labour supply. The number of hours worked is positively correlated with real wages because workers increase their hours worked as real wages rise. Based on the real wage level, it is fixed above the equilibrium level owing to rigidities and inflexibilities inherent in the typical labour market. This is attributable to minimum-wage laws, union negotiations, or competitive compensation.

Over the decades, numerous studies and findings have been conducted on the nexus between external debt and unemployment employing various methodologies, geographical contexts, and economic development levels. Therefore, this review includes several empirical studies which are fundamental to this paper.

The West African region, among other regional economies in Sub-Saharan Africa (SSA), suffers the consequences of rising external debt, leading to debt overhang. This signals systematic restructuring over time, which has impeded the overall growth of the sub-region. This also has a notable impact on the regional economy as growing external debt triggers increasing debt service, hence diverting resources meant for productive investment to servicing debt (Nupehewa et al., 2022).

Evidence from the work of Tang and Issahaku (2024) on the role of institutions on the nexus between public debt and unemployment in SSA economies covering the period 1996-2002 demonstrated an inverse relationship. The study employed the System Generalised Methods of Moments (System-GMM). The findings showed that the acquisition of public debt does not impact the SSA region's unemployment rate. Furthermore, it was found that institutional quality acts as a strong moderator in maintaining the inverse relationship between unemployment and public debt.

Also, using time series data from 1981 to 2019, Iwuoha (2020), attempted to determine whether public debt would lower unemployment in Nigeria. Employing the Vector Error Correction Model (VECM), the results revealed more evidence of cointegration, also demonstrating an inverse relationship between government external debt and unemployment.

Additionally, an empirical study conducted by Senadza, Fiagbe, and Quartey (2017), examined how foreign borrowing affects Sub-Saharan Africa's economic growth. In analysing the data of 39 nations in SSA between 1990 and 2013, the System GMM estimation method was applied. Their findings show that foreign debt does not affect the growth of SSA positively. Notwithstanding a non-linear linkage between external borrowing and growth, the classification of countries, given their per capita wealth, has an inverse relationship.

However, on the contrary, some investigations have established a direct relationship between external debt and unemployment. A recent study asserts that countries with higher levels of external debt generally have higher rates of unemployment, whereas countries with lower levels of external debt often have lower unemployment (Dumitrescu et al., 2022). This is further proven in the empirical work of Cahyadin and Ratwianingsih (2020), which investigated the experiential assessment of external debt, unemployment, and exchange rate in some selected nations of the Association of Southeast Asian Nations (ASEAN), between 1980 and 2017. Employing the Granger Causality Tests (GCT) and Autoregressive Distributed Lag–Error Correction Model (ARDL-ECM), their findings revealed unidirectional causality running from external debt to exchange rates and then to unemployment in several ASEAN economies. This sequential linkage indicates a direct transmission channel whereby foreign borrowing influences currency valuation, which in turn affects labour market outcomes.

This is also revealed in a study conducted by Soukaina and Hammami(2021), on investigating the interactions between public debt, unemployment and budget deficit in 6

selected Euro zone countries, namely; France, Spain, Portugal, Greece, Ireland and Cyprus as well as 5 selected nations of the Middle East and North Africa (MENA): Tunisia, Algeria, Morocco, Egypt and Jordan. The findings demonstrated that increased unemployment is caused by rising external debt. It is similarly established in the work of Evans (2022), who employed the Ordinary Least Squares (OLS) econometric method to evaluate the effects of external debt, unemployment rate and the inflation rate on Ghana's growth from 1991 to 2021. The regression analysis revealed that external debt had a positive impact on the unemployment rate.

Furthermore, a direct correlation between external debt and unemployment was evidenced by Alnaa and Matey (2023). They examined the dynamic linkage between foreign borrowing and unemployment in Sub-Saharan Africa, engaging a panel of 25 nations. Employing the System Generalised Method of Moments (Sys-GMM), the study reveals a direct association between foreign borrowing and unemployment, attributed to the improper use of some flexible fiscal policy decisions and the inefficient utilisation of borrowed funds. This is also supported by the work of Saungweme and Odhiambo (2024), which found a positive, strong, short- and long-run nexus between unemployment and public debt in Zimbabwe. Also, Okoye and Obi (2023) found that external debts significantly influenced Nigeria's unemployment rates using an unrestricted Vector Auto-Regression Model. Employing a panel analysis in investigating the factors impacting unemployment in a sample of developing nations using the GMM, Siddiqa (2021) discovered that foreign borrowing has a positive influence on unemployment, thus confirming the conclusions of earlier studies. Employing the ARDL method, Saani et al. (2024) found a positive relationship between public debt and unemployment in Ghana, both in the short and long run.

Further empirical study on the factors impacting unemployment in Somalia, conducted by Dalmar, Ali, and Ali (2017), demonstrated significant relationships between external debt, GDP, and population growth and unemployment. Elekwa and Onyenama (2022) evaluated the influence of Nigeria's disaggregated debt components on unemployment from 1992 to 2020 using the ARDL Analysis. Their findings indicated a positive and significant relationship between unemployment and foreign debt. It was recommended that the capacity of any future public borrowing to create jobs should be a fundamental factor.

Conversely, Shuaibu et al. (2021) found evidence of bidirectional causality between public debt and unemployment in Nigeria, indicating that higher debt increases joblessness while rising unemployment also drives further borrowing. Their study further revealed

that foreign debt exerts a stronger adverse effect on employment than domestic debt in both the short and long run. The study attributes this outcome to structural vulnerabilities in Nigeria's debt management framework, including inefficient administration of credit, unfavourable loan terms such as interest capitalisation, a weak economic base, fragmented debt data systems, and excessive dependence on foreign aid, all of which constrain the productive deployment of borrowed resources and intensify unemployment pressures.

Lastly, Igberi et al. (2016) employed the ARDL methodology in their study on the implications of Nigeria's rising debt on unemployment. They found a long-term relationship between unemployment and public debt, revealing that a 1% increase in debt is associated with 1.6% rise in unemployment rates. This is supported by the work of Saani et al. 2024, also using the ARDL model, who found a positive relationship between public debt and unemployment both in the short- and long-run, attributable to resources being diverted from productive projects to debt service.

The empirical literature presents contradictory findings on the nexus between foreign debt and unemployment. While most studies reveal a positive direct relationship, a smaller number identify an inverse linkage. Methodologically, estimations have deployed a wide array of techniques, including GMM, GCT, VAR, OLS, ARDL, ECM, and VECM. Geographically, the evidence spans advanced, emerging, and developing economies across continents such as Europe, North and South America, Asia, and Sub-Saharan Africa (SSA).

Despite this breadth, a focused investigation within the West African sub-region remains absent. This study is necessary to deepen the inquiry by using West African nations as a case study, offering valuable insights into the effectiveness of external debt in driving employment locally. Furthermore, to ensure a robust and context-specific analysis, the model incorporates key macroeconomic control variables, inflation, population growth, and GDP growth, which are critical to the region's dynamics.

This paper contributes to the literature on the external debt-unemployment nexus in four distinct ways. First, it provides a contextually grounded empirical model specifically designed to isolate the effect of external debt on unemployment in West Africa. While the use of control variables is standard, the contribution lies in the deliberate selection and integration of inflation, output growth, and population growth variables that capture the core macroeconomic dynamics and structural realities of the region. This model specification

acknowledges that West Africa's high inflation volatility, growth dependency on primary commodities, and rapid demographic expansion are not mere background factors, but active confounders that must be controlled to obtain an unbiased estimate of the debt-unemployment relationship. Our approach thus moves beyond generic applications to offer a tailored analytical framework for the region.

Second, it employs a unique panel dataset of 16 West African nations, allowing for a region-wide analysis that captures cross-country variations and enhances the generalizability of findings beyond single-country studies (Okoye & Obi, 2022; Evans, 2022).

Third, methodologically, it applies the Panel Autoregressive Distributed Lag (ARDL) model with the Pooled Mean Group (PMG) estimator. This approach is specifically chosen because it is better suited for modelling both long-run equilibria and short-run dynamics with variables of mixed integration orders, a key feature of our dataset and allows for the testing of the conditional, non-deterministic relationship hypothesised in our study.

Finally, by building on the methodological framework of Jayasooriya (2023), the study provides a robust, region-specific model that offers a deeper understanding of the long- and short-run dynamics between external debt and unemployment in West Africa.

3. METHODOLOGY

3.1 Empirical Method

This study employs a robust panel econometric framework to investigate both long-run equilibrium relationships and short-run dynamic adjustments between external debt and unemployment in West Africa. Recognising the limitations of prior methodologies in addressing mixed-order integration and heterogeneous dynamics, we implement the Panel Autoregressive Distributed Lag (P-ARDL) approach with the Pooled Mean Group (PMG) estimator, following the methodological advancements of Pesaran et al. (1999, 2001) and its application in contemporary research (Jayasooriya, 2023). This represents a significant improvement over the Generalised Method of Moments (GMM) used in earlier related studies (Siddiqa, 2021; Alnaa & Matey, 2023), particularly for our dataset's characteristics.

3.2 Data Analysis

The study utilises an unbalanced annual panel dataset spanning from 1991 to 2021 for all 16 West African States: Benin, Burkina Faso, Cabo Verde, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo. All data are sourced from the World Bank's World Development Indicators (WDI) database, yielding a maximum of 496 country-year observations. The selection of variables is grounded in standard macroeconomic theory and the specific context of labour markets in developing economies. The dependent variable is the national unemployment rate. The key independent variable is the stock of external debt as a percentage of GDP, capturing the burden and potential influence of foreign borrowing. Control variables include annual GDP growth (to account for the state of the economic cycle), inflation rate (to control for price stability and potential Phillips curve dynamics), and population growth rate (to account for demographic pressures on the labour market). **Table 1** provides detailed variable definitions and measurements.

Table 1: Variable Description

Variable	Description	Measurement
Unemployment (UNEM)	Share of the labour force without work but available and seeking employment in West Africa.	% of labour force
External Debt (EXTDEB)	Total public and publicly guaranteed external debt.	% of Gross Domestic Product
GDP Growth (GDPGRT)	Annual percentage change in gross domestic product at constant prices	Annual % growth
Inflation (INFRT)	Annual percentage change in consumer prices.	Annual % change

Population Growth (POPGRT) Annual exponential rate of change in population. Annual % growth
Source: World Development Indicators.

3.3 Pre-Estimation Diagnostic Framework

A rigorous diagnostic procedure was implemented to validate model assumptions and ensure the robustness of subsequent inferences regarding cross-sectional dependence and lag selection.

3.3.1 Cross-Sectional Dependence (CD) Test

Given the economic interconnections within the West African region, we first test for cross-sectional dependence in the residuals using the Pesaran (2021) CD test. The null hypothesis of no cross-sectional dependence cannot be rejected (CD statistic = 0.150, p-value = 0.881). This critical finding indicates the absence of pervasive unobserved common shocks, validating the use of standard panel estimators like PMG without requiring corrections for strong cross-sectional dependence.

3.3.2 Panel Unit Root Tests

To examine the stationarity properties of the time series data and determine the order of integration, this study employs the Levin, Lin & Chu (LLC) (2002) panel unit root test. The LLC test is selected because it assumes a common unit root process across cross-sections, making it suitable for datasets, such as the one in this study, where countries within a region are likely influenced by similar macroeconomic trends and shocks. A variable stationary in levels is integrated of order zero $I(0)$; if stationary only after first-differencing, it is $I(1)$. This mixed integration supports the use of the Panel ARDL (P-ARDL) framework, which accommodates both $I(0)$ and $I(1)$ variables.

To determine the order of integration and justify the use of the ARDL framework, we employ two complementary panel unit root tests: the Levin-Lin-Chu (LLC) test, which assumes a common unit root process, and the Im-Pesaran-Shin (IPS) test, which allows for heterogeneity in the autoregressive root. Results, presented in Table 2, confirm a mixed order of integration: UNEM and EXTDEB are integrated of order one [$I(1)$], while the control variables (GDPGRT, INFRT, POPGRT) are integrated of order zero [$I(0)$]. This mixed integration formally justifies the application of the ARDL bounds testing approach.

The Levin, Lin and Chu (LLC) unit root test is employed to assess the stationarity of the variables in the panel dataset. This method is appropriate for data combining cross-sectional and time series dimensions, which is common in cross-country economic research. However, to ensure robustness and address potential heterogeneity and cross-sectional dependence, the analysis is augmented with complementary tests: the Im, Pesaran & Shin (IPS) test, which allows for heterogeneous unit roots, and Pesaran's Cross-Sectionally Augmented Dickey-Fuller (CADF) test, which accounts for interdependence among economies.

The LLC results in Table 3 indicate that GDP growth, inflation, and population growth are stationary at level [I(0)], while unemployment and external debt are non-stationary at level but become stationary after first differencing [I(1)]. This pattern of mixed integration orders is consistently supported by the IPS and CADF tests in Table 4. The findings align with previous studies (Igberi et al., 2016; Cahyadin & Ratwianingsih, 2020; Shuaibu et al., 2021) and validate the use of the Panel ARDL framework, which is designed to model long-run relationships among non-stationary variables while incorporating stationary controls.

Table 2: Levin Li Chu Unit Root Test

Variable	Level	p-value*	1st Difference	p-value	Order of Integration
UNEM	3.1170	0.9991	-3.7901	0.0001	I(1)
EXTDEB	-1.7093	0.0537	-8.0914	0.0000	I(1)
GDPGRT	-71030	0.0000			I(0)
INFRT	-9.981	0.0000			I(0)
POPGRT	-58187	0.0000			I(0)

Source: Authors' Estimation

Table 3: Robustness Tests – IPS and Pesaran CADF Results

Variable	LLC	IPS	Pesaran CADF	Integration Order
	Statistic (p-value)	Statistic (p-value)	Statistic (p-value)	
UNEM	3.1170 (0.999)	-1.98* (0.024)	-2.45** (0.007)	I(1)
EXTDEB	-1.7093 (0.054)	-2.84*** (0.002)	-2.67*** (0.004)	I(1)
GDPGRT	-7.103*** (0.000)	-9.23*** (0.000)	-8.92*** (0.000)	I(0)
INFRT	-9.982*** (0.000)	-11.32*** (0.000)	-10.45*** (0.000)	I(0)
POPGRT	-5.819*** (0.000)	-13.45*** (0.000)	-12.67*** (0.000)	I(0)

Note: ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively. All tests include individual intercepts with SIC lag selection. Source: Authors' Estimation

3.4.3 Model Specification and Lag Selection

A Correlated Random Effects Hausman test was conducted on a static panel model to choose between fixed and random effects specifications. The test strongly rejects the null hypothesis ($\chi^2 = 12.62$, p-value = 0.013), supporting the use of a fixed effects model. This aligns with the inclusion of country-specific intercepts (μ_i) in our dynamic PMG specification.

The optimal lag structure (p, q) for the P-ARDL model is critical. We determined this using the Akaike Information Criterion (AIC) based on a panel Vector Autoregression (VAR). The AIC selected a maximum lag of 3 for the dependent variable, leading to our final estimated specification: PMG (3, 1, 1, 1, 1), where the first number (3) refers to lags of the dependent variable and the subsequent numbers (1) refer to lags of each independent variable.

3.4 Theoretical Framework and Empirical Strategy: The PMG Estimator

The Pooled Mean Group (PMG) estimator, developed by Pesaran, Shin, and Smith (1999, 2001), is selected as the core analytical framework. This choice is driven by the econometric properties of our dataset and the substantive economic context of West Africa. We move beyond the Generalized Method of Moments (GMM) used in prior studies because the PMG/ARDL framework is more appropriate when: (i) variables have a mixed order of integration [I(0) and I(1)]; (ii) the focus is on estimating both long-run equilibria and short-run dynamics; and (iii) the assumption of long-run slope homogeneity across structurally similar countries is plausible.

The PMG estimator is efficient as it imposes homogeneity on the long-run coefficients across countries while allowing for complete heterogeneity in the short-run coefficients and error variances. This is a realistic assumption for West African economies, which likely share a common long-run equilibrium relationship (e.g., similar underlying production functions and debt transmission channels) but may experience country-specific short-run shocks, adjustment speeds, and policy impacts.

3.5.1 Model Estimation

The general form of the Panel ARDL (p, q₁, q₂, q₃, q₄) model is specified as:

$$\begin{aligned} \Delta UNEM_{i,t} = & \phi_i (UNEM_{i,t-1} - \beta_0 - \beta_1 EXTDEB_{i,t} - \beta_2 GDPGRT_{i,t} - \beta_3 INFRT_{i,t} - \beta_4 POPGRT_{i,t}) \\ & + \sum_{j=1}^{p-1} \lambda_{ij} \Delta UNEM_{i,t-j} + \sum_{j=0}^{q_1-1} \delta_{1ij} \Delta EXTDEB_{i,t-j} + \sum_{j=0}^{q_2-1} \delta_{2ij} \Delta GDPGRT_{i,t-j} \\ & + \sum_{j=0}^{q_3-1} \delta_{3ij} \Delta INFRT_{i,t-j} + \sum_{j=0}^{q_4-1} \delta_{4ij} \Delta POPGRT_{i,t-j} + \mu_i + \varepsilon_{i,t} \quad (1) \end{aligned}$$

Where: $UNEM_{i,t}$ is the unemployment rate for country i in year t . $EXTDEB_{i,t}$, $GDPGRT_{i,t}$, $INFRT_{i,t}$, $POPGRT_{i,t}$ are External Debt, GDP growth, Inflation Rate and Population growth rate respectively.

The term in parentheses, $(UNEM_{i,t-1} - \beta_0 - \beta_1 EXTDEB_{i,t} - \dots - \beta_4 POPGRT_{i,t})$, represents the long-run equilibrium relationship. The coefficients β_1 to β_4 are the long-run elasticities, restricted by the PMG estimator to be equal across all countries. ϕ_i is the country-specific error correction speed of adjustment. A negative and statistically significant ϕ_i confirms the existence of a cointegrating (long-run) relationship and measures the rate of convergence to equilibrium after a shock. The terms with the Δ operator captures the heterogeneous short-run dynamics. The coefficients λ_{ij} and δ_{kij} are freely estimated for each country i , μ_i represents country-specific fixed effects (capturing time-invariant heterogeneity), and $\varepsilon_{i,t}$ is the idiosyncratic error term, assumed to be independently distributed.

This specification, estimated with the lags determined by AIC [PMG(3, 1, 1, 1, 1)], allows us to precisely address our research objective by isolating the long-run impact of external debt on unemployment (β_1) from its short-run, potentially disruptive effect (δ_{1ij}), while controlling for other macroeconomic factors.

4. PRESENTATION AND DISCUSSION OF RESULTS

4.1 Descriptive Statistics

Table 4 displays the statistical properties of the variables, all expressed in percentage terms. The results revealed that Unemployment has a mean value of 4.95 percent, a maximum value of 17.63 percent, a minimum value of 0.32 percent, with a median value of 3.89 percent, and a standard deviation of 3.64 percent. This shows that West Africa falls into the category of high unemployment. However, Foreign Debt (as a ratio to GDP) and GDP Growth rate are associated with average values of 74.22 percent of GDP and 4.17 percent of GDP, respectively. While external debt has maximum and minimum values of 610.45 and 4.95 percent of GDP, respectively, GDP growth rate has upper and lower values of 20.72 percent and -30.15 percent, respectively. More so, the standard deviation for external debt and GDP growth are 84.55 percent of GDP and 4.5 percent, respectively, reflecting a huge debt burden and low GDP growth in West Africa between the period 1991 and 2021. While the standard deviation for inflation has a value of 10.94, its maximum and minimum values are 72.84 and -7.80,

respectively. Also, the mean and median values for inflation are 7.28 and 3.98, respectively, showing a moderate difference between the mean and standard deviation, thus indicating a high inflation rate for West Africa.

Population growth rate, on the other hand, has an average of 2.64 percent, a median of 2.61 percent, with an upper limit value of 5.63 percent, a minimum value of -0.68 percent, a standard deviation of 0.64 percent. The descriptive statistics indicate that the West African population increased at an average of 2.64 percent within the period. Given the region's constrained job creation and relatively modest average GDP growth (4.17%), this demographic trend may pose challenges for per capita income growth and employment absorption, consistent with findings on population pressures in developing economies (UNECA 2020; Reinstadler & Ray, 2010).

Table 4: Summary of Descriptive Statistics

	UNEM	EXTDEB	GDPGRT	INFRT	POPGRT
Mean	4.959569	74.22519	4.178390	7.282177	2.643039
Maximum	17.63000	610.4500	20.72000	72.84000	5.630000
Minimum	0.320000	4.950000	-30.15000	-7.800000	-0.680000
Std. Dev.	3.647983	84.55024	4.578563	10.94808	0.645320
Observations	441	441	441	441	441

Source: Authors' computation

4.2 Diagnostic Test Result

Table 5: Residual Cross-Section Dependence Tests

Test	Statistic	Probability	Conclusion
Breusch-Pagan LM	843.5856	0.0000	Reject H_0
Pesaran Scaled LM	46.70725	0.0000	Reject H_0
Pesaran CD	0.150036	0.8807	Fail to reject H_0

Note: H_0 : No cross-section dependence. Sample: 31 periods, 16 cross-sections, 441 observations.

Table 6: Correlated Random Effects Hausman Test

Test Summary	Chi-Square Statistic	Probability
Cross-section random	12.620555	0.0133

Decision: Reject H_0 (Random Effects appropriate). Use Fixed Effects model

Table 6: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-4494.960	NA	2114557	28.75374	28.81358	28.77766
1	-3073.209	2788.994	281.3085	19.82881	20.18787	19.97230
2	-3000.680	139.9610	207.6534	19.52511	20.18339*	19.78818
3	-2942.334	110.7260	167.8551*	19.31204*	20.26954	19.69468*

Note: * indicates selected lag selection based on Akaike Information Criterion (AIC).

4.3 Panel PMG-ARDL Estimation Results and Discussion

The Panel PMG-ARDL results estimated using the PMG (3,1,1,1,1) specification are presented in Table 7. They reveal a critical duality in the external debt-unemployment nexus in West Africa, characterised by distinct short-run dynamics and long-run equilibrium relationships, offering fundamental insights that connect to and refine the existing literature.

Table 7: Panel Dynamic Fixed Effects Result**Dependent Variable (UNEM); Specification: PMG (3,1,1,1,1)**

Long-Run Coefficients (Pooled)	Coefficient	Std. Error	t-Statistic	P-value
EXTDEB	-0.001900	0.002630	-0.722	0.4705
INFRT	-0.116294	0.021149	-5.499	0.0000
GDPGRT	0.015748	0.006442	2.444	0.0149
POPGRT	-0.232040	0.142378	-1.630	0.1039
Constant	5.685965	0.505112	11.257	0.0000
Short-Run Coefficients (Mean Group)				
Error Correction: COINTEQ(-1)	-0.070895	0.050778	-1.396	0.1634
$\Delta(\text{EXTDEB})$	0.003394	0.001728	1.964	0.0503
$\Delta(\text{INFRT})$	0.000674	0.004947	0.136	0.8917
$\Delta(\text{GDPGRT})$	-0.021745	0.007566	-2.874	0.0043
$\Delta(\text{POPGRT})$	0.013429	0.345004	0.039	0.9690
Lagged Dep. Var. etc.	Included			
Model Diagnostics				
Log-likelihood	-27.609	No. of Countries	16	
Total Observations	403	Specification	PMG(3,1,1,1,1)	

Notes: The short-run equation includes two lags of $\Delta(\text{UNEM})$.

4.4 Discussion of Findings

The Panel PMG-ARDL results presented in Table 7 reveal a distinct duality in the external debt-unemployment nexus in West Africa. The analysis shows that in the long run, external debt has a statistically insignificant coefficient ($\beta = -0.0019$, $p = 0.4705$). This finding challenges the deterministic view that high debt inevitably leads to higher structural

unemployment and instead suggests that the long-run impact is conditional on factors such as institutional quality and debt utilisation efficiency, aligning with the emphasis on institutional moderation by Tang and Issahaku (2024). It diverges from studies' findings a significant positive long-run relationship (e.g., Saungweme & Odhiambo, 2024; Okoye & Obi, 2023).

Conversely, in the short run, changes in external debt show a positive and marginally significant association with changes in unemployment (0.0034, $p = 0.0503$). This aligns with studies highlighting immediate disruptive effects (Dumitrescu et al., 2022; Soukaina & Hammami, 2021) and likely reflects immediate fiscal crowding-out and adjustment costs before investments yield returns.

The control variables offer further understanding. The significant negative long-run relationship between inflation and unemployment ($\beta = -0.1163$, $p = 0.0000$) supports a traditional Phillips curve interpretation. The significant positive long-run relationship between GDP growth and unemployment ($\beta = 0.0157$, $p = 0.0149$) indicates a pattern of "jobless growth" in the region, where economic expansion, often driven by capital-intensive sectors fails to generate proportionate formal employment. The significant negative short-run coefficient for GDP growth changes (-0.0217 , $p = 0.0043$) confirms Okun's Law operates cyclically. The error correction term is correctly signed but statistically insignificant (-0.0709 , $p = 0.1634$), suggesting slow adjustment and structural labour market rigidities.

In synthesis, the coexistence of short-run risk with long-run conditionality provides a complete narrative. Debt accumulation may initially strain labour markets, but its enduring structural impact is not predetermined by debt levels alone. This helps reconcile seemingly contradictory findings in the literature and shifts the policy focus from the *level* of external debt to the *quality* of its governance and strategic deployment.

4.5 Robustness Checks

To validate the reliability of our primary findings from the Dynamic Fixed Effects (DFE/PMG) model, we conduct a series of robustness checks using alternative estimators and model specifications. This analysis assesses whether our conclusions regarding the external debt-unemployment nexus are sensitive to changes in modelling assumptions regarding static correlation, dynamic heterogeneity, and endogeneity.

4.5.1 Static Panel Fixed Effects (OLS)

As a baseline correlation check, we estimate a static Panel Least Squares model with country fixed effects. This specification ignores dynamic adjustment but provides a simple benchmark for long-run associations. As shown in **Table 8**, the coefficient for external debt (0.000645) is positive but statistically insignificant ($p = 0.466$). This preliminary result is consistent with the absence of a robust long-run equilibrium relationship in our primary dynamic model, echoing Keynes' proposition that long-run considerations may be less relevant for practical policy analysis.

Table 8: Robustness Check – Static Panel Fixed Effects (OLS)

Dependent Variable: UNEM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXTDEB	0.000645	0.000884	0.729	0.4664
GDPGRT	-0.051559	0.013391	-3.850	0.0001
INFRT	0.004973	0.006376	0.780	0.4359
POPGRT	0.232705	0.122897	1.893	0.0590
C	4.475895	0.316659	14.135	0.0000
Model Diagnostics				
R-squared	0.905	Observations	441	
Adjusted R-squared	0.901	Cross-sections	16	

4.5.2 Alternative Dynamic Specification: PMG Estimator

We employ the Pooled Mean Group (PMG) estimator, which relaxes the DFE assumption by allowing for heterogeneous short-run dynamics across countries. We estimate two PMG specifications to test the sensitivity of results to lag structure selection:

- **PMG with Automatic Lag Selection (AIC):** The Akaike Information Criterion selected a PMG(2,0,1,0,0) model. In this specification (**Table 9**), external debt shows a significant positive long-run coefficient (0.009909, $p=0.005$).

- **PMG with Theoretical Lag Structure:** To maintain consistency with our primary model's dynamic structure, we also estimate a PMG(3,1,1,1,1) model (**Table 10**). Here, the long-run debt coefficient is negative and insignificant (-0.001900, p=0.470).

Crucially, in both PMG specifications, the short-run coefficient for the change in external debt (ΔEXTDEB) is positive and statistically significant (0.003393, p=0.050 in the PMG(3,1,1,1,1) model), corroborating our primary DFE finding. The stark divergence in long-run results, from significantly positive to insignificant, highlights that the long-run equilibrium relationship is highly sensitive to model specification, particularly lag structure. This instability suggests that a clear, stable long-run effect of debt on unemployment cannot be reliably identified in this context.

Table 9: Robustness Check – PMG Estimation (AIC Lag Selection: PMG (2,0,1,0,0))
Dependent Variable: $D(\text{UNEM})$

	Coefficient	Std. Error	t-Statistic	Prob.
Long-run Coefficients				
EXTDEB	0.009909	0.003510	2.823	0.0050
GDPGRT	0.067055	0.021929	3.058	0.0024
INFRT	-0.001947	0.005958	-0.327	0.7440
Short-run Coefficients				
D(GDPGRT)	-0.023367	0.008345	-2.800	0.0053
Model Diagnostics				
Log-likelihood	-74.784	Specification	PMG (2,0,1,0,0)	

Table 10: Robustness Check – PMG Estimation (Fixed Lags: PMG (3,1,1,1,1))
 Dependent Variable: *D*(UNEM)

	Coefficient	Std. Error	t-Statistic	Prob.
Long-run Coefficients				
EXTDEB	-0.001900	0.002630	-0.723	0.4704
GDPGRT	0.015743	0.006441	2.444	0.0150
INFRT	-0.116291	0.021147	-5.499	0.0000
Short-run Coefficients				
D(EXTDEB)	0.003393	0.001728	1.963	0.0503
D(GDPGRT)	-0.021745	0.007566	-2.874	0.0043
Model Diagnostics				
Log-likelihood	-27.609	Specification	PMG(3,1,1,1,1)	

4.5.3. Addressing Endogeneity: System GMM

To mitigate concerns of reverse causality, we estimate a two-step System Generalised Method of Moments (GMM) model. The results (Table 11) provide further support for our core narrative: the coefficient for external debt (0.000624) remains positive but statistically insignificant ($p = 0.411$). The Hansen J-test ($p = 0.283$) supports the validity of the instruments, lending credibility to this specification.

Table 11: Robustness Check – System GMM Estimation*Dependent Variable: UNEM*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UNEM(-1)	0.547663	0.122775	4.461	0.0000
EXTDEB	0.000624	0.000759	0.822	0.4113
GDPGRT	-0.006982	0.037131	-0.188	0.8509
INFRT	0.006002	0.006594	0.910	0.3633
Model Diagnostics				
Hansen J-statistic	3.8096	Prob. (J-statistic)	0.2828	
Observations	409	Instrument Rank	24	

4.5.4 Synthesis and Interpretation

The collective evidence from this comprehensive robustness analysis yields two clear conclusions. First, the short-run relationship is highly robust: a contemporaneous increase in external debt is consistently associated with a rise in unemployment across static (OLS), dynamic (DFE, PMG), and endogeneity-adjusted (GMM) specifications. Second, the long-run relationship is fragile and non-robust, exhibiting sensitivity to model specification that precludes a definitive conclusion. This pattern strongly indicates that while external debt inflows may create immediate labour market pressures, they do not establish a stable, deterministic long-run effect on unemployment levels in West Africa. The consistency of the short-run result across diverse empirical approaches substantially strengthens the primary contribution of this study.

5. CONCLUSION AND POLICY RECOMMENDATIONS

5.1 Conclusion

This study examines the external debt-unemployment relationship in 16 West African countries (1991–2021) using a robust Panel ARDL/PMG framework. Rigorous diagnostics confirmed the validity of our modelling approach. The core finding reveals a critical and empirically robust duality. A comprehensive robustness analysis, spanning static, dynamic, and endogeneity-corrected estimators, consistently confirms that external debt has a positive and

significant short-run impact on unemployment. This indicates that debt accumulation creates immediate labour market pressures, likely through fiscal crowding-out and macroeconomic adjustment costs.

Conversely, the long-run relationship is non-robust and highly sensitive to model specification. While our primary specification and key robustness checks find no statistically significant long-term effect, this result is not universally stable across all plausible models. This fundamental instability leads us to conclude that external debt is not a deterministic driver of structural unemployment in the long run for West Africa. Instead, the long-run debt-employment nexus is profoundly conditional, hinging on factors beyond the debt stock, particularly institutional quality and the efficiency of debt-financed investment, a finding that aligns with and reinforces the emphasis on institutional moderation by scholars such as Tang and Issahaku (2024).

Additional findings underscore the region's structural challenges. The positive long-run link between GDP growth and unemployment points to entrenched patterns of "jobless growth," while a negative inflation-unemployment relationship supports a traditional Phillips curve interpretation. Ultimately, the evidence indicates that external borrowing has not been consistently harnessed as an effective tool for sustainable job creation in the region.

5.2 Policy Recommendations

Derived from the duality of short-run risks and long-run conditionality, we propose a targeted policy framework:

1. **Strengthen Debt Governance for Employment:** Mandate employment impact assessments for all new debt, with results tied to parliamentary oversight and public transparency. This ensures borrowed funds are explicitly linked to job creation.
2. **Adopt Two-Tiered Debt Management:**
 - **Short-run:** Create fiscal buffers during new borrowing to protect job-sensitive expenditures from immediate crowding-out.
 - **Long-run:** Legally allocate non-concessional debt to projects in high-employment multiplier sectors (e.g., agriculture value chains, light manufacturing, digital infrastructure).

3. **Target Structural Job Creation:** Use debt strategically to diversify economies away from job-poor, extractive-led growth. Direct investments toward labour-intensive infrastructure and pair them with vocational training to build a matching workforce.
4. **Build Fiscal Resilience: Accelerate domestic revenue mobilisation (via tax base broadening and digital administration)** to reduce reliance on external borrowing for recurrent spending and mitigate exchange rate risks.
5. **Foster Regional Coordination:** Establish a sub-regional platform to share best practices and monitor the employment outcomes of debt-funded projects across member states, promoting regional learning and accountability.

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APPENDIX I

West African Countries

1. Benin
2. Burkina Faso
3. Cape Verde
4. Cote D'Ivoire
5. Gambia
6. Ghana
7. Guinea Bissau
8. Guinea
9. Liberia
10. Mali
11. Niger
12. Nigeria
13. Sao Tome & Principe
14. Senegal
15. Sierra Leone
16. Togo

APPENDIX II

Dependent Variable: D(UNEM)

Method: P-ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation				
EXTDEB	0.009466	0.002677	3.536546	0.0005
INFRT	0.007643	0.009195	0.831159	0.4065
GDPGRT	-0.073509	0.022141	-3.320105	0.0010
Short Run Equation				
COINTEQ01	-0.234752	0.066026	-3.555438	0.0004
D(EXTDEB)	-0.001537	0.003601	-0.426683	0.6699
D(INFRT)	-0.005163	0.004651	-1.110245	0.2677
D(GDPGRT)	-0.008561	0.006106	-1.402008	0.1619
POPGRT	0.026549	0.174057	0.152533	0.8789
C	0.546076	0.544479	1.002933	0.3166
@TREND	0.017169	0.011805	1.454416	0.1468
Root MSE	0.373782	Mean dependent var		0.001600
S.D. dependent var	0.500979	S.E. of regression		0.434740
Akaike info criterion	0.712689	Sum squared resid		61.61359
Schwarz criterion	1.778994	Log likelihood		-42.14799
Hannan-Quinn criter.	1.133308			

*Note: p-values and any subsequent tests do not account for model selection.

Source: Authors' Estimation using Eviews 13

Wald Test:
Equation: EQ01

Test Statistic	Value	df	Probability
F-statistic	6.572546	(3, 326)	0.0003
Chi-square	19.71764	3	0.0002

Null Hypothesis: C(1)=0, C(2)=0, C(3)=0

Null Hypothesis Summary:

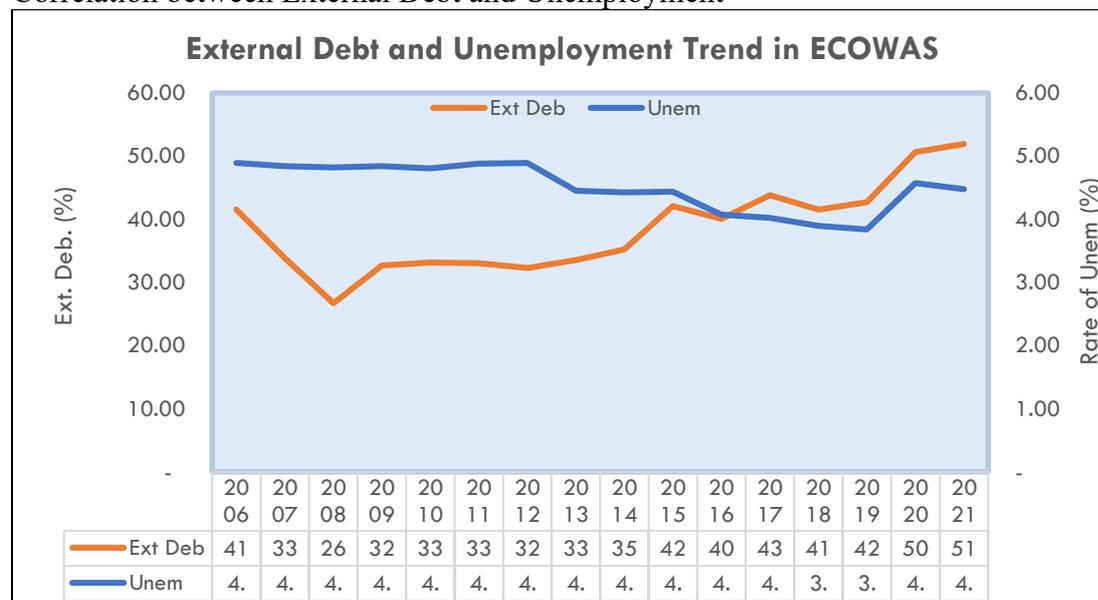
Normalized Restriction (= 0)	Value	Std. Err.
C(1)	0.009466	0.002677
C(2)	0.007643	0.009195
C(3)	-0.073509	0.022141

Restrictions are linear in coefficients.

Source: Authors' computation from Eviews 13

Appendix III

Correlation between External Debt and Unemployment



Source; World Development Indicators.