Effect of external public debt on unemployment in Kenya

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https://doi.org/10.51867/scimundi.5.2.32

ABSTRACT

Kenya continues to grapple with persistently high unemployment despite increased fiscal spending and public investments, primarily financed through external borrowing. Over the last three decades, external public debt has expanded significantly, yet its impact on labor market outcomes particularly unemployment remains questionable. This study investigates the effect of external public debt on unemployment in Kenya from 1994 to 2024. The study is grounded in key macroeconomic theories including the Keynesian theory of public expenditure, which advocates for increased government spending to stimulate employment; the Crowding-out theory, which warns of reduced private sector investment due to public borrowing and the Debt overhang theory, which suggests high external debt discourages private investment due to future tax burdens. Using a time series research design, secondary data were sourced from the Kenya National Bureau of Statistics, Central Bank of Kenya, World Bank, and Macro trends. Econometric analysis was conducted using EViews version 16, applying unit root testing, ARDL bounds testing, and long-run coefficient estimation. The Augmented Dickey-Fuller test confirmed stationarity of variables at first difference. The ARDL bounds test revealed the existence of a long-run relationship (F-statistic = 5.87 > upper bound critical value at 1% = 5.06). Long-run coefficient estimates showed that external public debt had a significant positive impact on unemployment ($\beta = 0.2946$, $p < 0.05$), indicating that a 1% increase in external debt raises unemployment by 0.29%. The findings offer critical insights for policymakers on the importance of prudent debt management policies aimed at reducing unemployment and fostering sustainable development.

Keywords: External Public Debt, Unemployment, Kenya

I. INTRODUCTION

Nearly one billion people around the world approximately 30% of the global workforce are either unemployed or underemployed in both industrialized and developing countries (Dias, 2006). This alarming statistic highlights a widespread and persistent global labor market crisis. The International Labour Organization (ILO), in its World Employment 1996/1997 report, described the global employment situation as "grim" and warned that the growing number of "working poor" individuals who have jobs but earn insufficient incomes could worsen the already significant social and economic challenges associated with high unemployment rates.

Globally, employment crises are evident in various forms across different regions. In the wealthiest nations—members of the Organization for Economic Cooperation and Development (OECD)—at least 34 million people were unemployed at the time (Thomas & Anner, 2023).

Within the European Union**,** the unemployment rate surged in 2022 to an average of 11.3%, with major economies such as France, Germany, Italy**,** and Sweden experiencing notable increases (Eurostat, 2022). Although the United States and the United Kingdom reported falling unemployment rates below 5%, these improvements were accompanied by widening income inequalities, indicating a troubling rise in low-wage and precarious employment even as job numbers increased (Thomas & Anner, 2023).

In transition economies of Eastern and Central Europe, the situation remained unstable, with only a slight decline in unemployment. Double-digit unemployment persisted, especially in Russia and other former Soviet states, signifying structural labor market weaknesses and slow economic recovery. Latin American countries faced a similar challenge: Colombia's unemployment rate climbed from 8% to over 10%, and urban centers in Argentina, Bolivia, Ecuador, Jamaica, Mexico, Uruguay, and Venezuela also experienced rising joblessness pointing to stagnating economies, declining industrial sectors, and inadequate social safety nets.

In Sub-Saharan Africa, the problem is even more acute. South Africa reported the continent's highest unemployment rate in 2021 at around 34%, followed closely by Djibouti (28%) and Eswatini (26%) (Statista, 2023). Although the average unemployment rate across Africa was 8%, this figure masks deep inequalities across countries. The problem is more severe among vulnerable populations, particularly youth and women. In 2022, youth

unemployment in Africa stood at an average of 13%, with Djibouti recording an alarming 80% and South Africa 64% a clear indicator of economic systems failing to integrate young people into productive employment (World Bank, 2023).

Gender disparities further illustrate the multifaceted nature of the crisis. In 2022, female unemployment in Africa averaged 9%, compared to 7.4% for men, with extreme cases such as Djibouti (39%) and South Africa (36%) again revealing systemic gender inequalities in labor market access and opportunity (Thomas & Anner, 2023). These figures point to widespread structural barriers such as limited access to education, cultural norms, and care giving responsibilities that keep many women out of meaningful employment.

Kenya's labor market trends mirror broader regional and global patterns. The unemployment rate rose steadily from 4.25% in 2018 to 5.74% in 2021 (World Bank, 2025), reflecting a consistent annual increase of nearly 9%. These rising rates suggest persistent economic pressures, including slow job creation relative to population growth, an expanding youth population, and a mismatch between available jobs and skills. Moreover, underemployment remains a serious but often underreported issue in Kenya, with many workers stuck in informal, insecure, or low-wage jobs that do not meet basic livelihood needs.

The cumulative picture across these countries and regions reveals not only the persistence of unemployment and underemployment but also the systemic nature of the crisis: joblessness that cuts across age, gender, and geography; growing income disparities; rising informal employment; and weakened social cohesion. These symptoms are not merely economic but have deep social and political implications fueling poverty, inequality, migration, and social unrest.

Table 1

Kenya Unemployment Rate Historical Data

Year	Unemployment Rate (%)	Annual Change (%)
2024	5.70 (projected)	0.00
2023	5.70	-0.02
2022	5.71	0.01
2021	5.74	0.01
2020	5.73	0.72
2019	5.01	0.76
2018	4.25	0.74
2017	3.51	0.75
2016	2.76	-0.02
2015	2.78	-0.02
2014	2.80	-0.01
2013	2.81	-0.02
2012	2.83	-0.01
2011	2.84	0.50
2010	2.54	-0.04
2009	2.88	-0.03
2008	2.92	0.02
2007	2.89	-0.02

Source: World Bank, 2025

Unemployment remains one of the most pressing socio-economic challenges globally. Nearly one billion people about 30% of the global workforce are either unemployed or underemployed (Dias, 2006). While the crisis manifests differently across regions, its causes are increasingly tied to broader macroeconomic variables such as public debt, capital mobility, inflation, and interest rate volatility. These factors not only influence job creation but also affect the quality and sustainability of employment.

The global surge in public debt following the 2008 financial crisis and the COVID-19 pandemic is a crucial contextual factor. According to the Lang (2021), public debt in advanced economies increased dramatically from around 70% of GDP in 2007 to 124% in 2020 driven largely by fiscal deficits and economic recovery programs. Private debt also rose, albeit at a slower pace. Although aimed at stabilizing economies, these high debt levels have introduced significant fiscal constraints, particularly in developing economies, where borrowed funds often do not translate into productive investments. In Sub-Saharan Africa, debt burdens remain a serious impediment to employment creation and poverty reduction (ILO, 2021). Kenya, like many African nations, increasingly relies on external public debt to fund capital-intensive projects. However, unsustainable borrowing especially when not channeled into growth-enhancing

activities has the potential to crowd out productive investment and increase macroeconomic instability, thereby worsening unemployment.

At the same time, capital outflows have become more prominent in shaping labor market outcomes. Economic uncertainties, political instability, and investor risk aversion often lead to the withdrawal of capital from developing countries. When capital exits domestic markets, it results in declining investment levels, a slowdown in industrial activity, and job losses, especially in the private sector. Kenya is not immune to this phenomenon. With increasing liberalization of financial markets and exposure to global shocks, capital flight has frequently coincided with declines in employment, particularly in the manufacturing and services sectors.

Another variable that cannot be ignored in understanding unemployment is inflation. Inflationary pressures driven by global commodity prices, exchange rate volatility, and supply chain disruptions erode purchasing power, increase business costs, and reduce consumer demand. In Ghana, Maja (2015) established a significant positive relationship between inflation and unemployment, showing that high inflation levels adversely affect job creation and economic stability. Kenya has also experienced persistent inflation, especially in food and fuel prices, which constrains household consumption and undermines firm profitability both of which are critical for sustaining employment.

Furthermore, the interest rate plays a crucial moderating role in the interplay between external debt, capital outflows, and unemployment. Rising interest rates often used to counter inflation can discourage borrowing and investment, limiting economic growth and job creation. Conversely, low interest rates may encourage external borrowing but could also trigger capital flight if returns on investment become unattractive to foreign investors. Thus, the interaction of interest rate dynamics with debt levels and capital mobility significantly influences employment outcomes.

In Kenya, unemployment has shown a worrying upward trend. The unemployment rate rose from 4.25% in 2018 to 5.74% in 2021 (World Bank, 2025), reflecting not just population pressures but also the macroeconomic constraints posed by mounting public debt, inflation, and unstable capital flows. These variables collectively reflect deep-rooted structural challenges in Kenya's economy, reinforcing the need for a comprehensive investigation into how they affect labor market performance.

1.1 Statement of the Problem

Unemployment remains a critical and persistent macroeconomic challenge in Kenya, with rates - especially among the youth - consistently high despite numerous policy interventions. According to the United Nations Human Development Index (HDI, 2017), Kenya recorded an unemployment rate of 39.1%, the highest in East Africa, surpassing regional peers such as Uganda (18.1%) and Tanzania (24%). More recent data from the Kenya National Bureau of Statistics (Kariuki, 2023) show that youth unemployment (ages 15–34) continues to hover around 38.9%, signaling a stagnating or even deteriorating labor market situation. This growing unemployment crisis coincides with significant macroeconomic imbalances. Kenya's external public debt has risen sharply in recent years, reaching over KSh 5.3 trillion as of 2023, fueling concerns over debt sustainability, reduced fiscal space, and potential crowding out of private sector investment (World Bank, 2023). From a theoretical perspective, while Keynesian economics posits that public borrowing can stimulate economic activity and employment, the Debt Overhang and Crowding-Out theories suggest that excessive external debt can have the opposite effect discouraging private investment and undermining job creation. This study sought to establish the effect of External Public Debt on unemployment. The findings are expected to offer critical insights for policymakers to formulate integrated and evidence-based strategies for tackling unemployment and promoting inclusive and sustainable economic growth.

1.2 Objectives of the Study

The general objective of this study is to examine the effect of selected macroeconomic determinants on unemployment in Kenya. Specifically the study sought to establish the effect of external public debt on unemployment in Kenya from 2004-2024.The study was based on the following hypothesis.

H_{o1}: External public debt has no significant effect on unemployment in Kenya.

1.3 Significance of the Study

The study will offer valuable insights for a wide range of stakeholders, with each group benefiting in distinct ways. The Government of Kenya is a major beneficiary as the findings provide critical information on how fiscal policies, particularly debt management, influence unemployment rates. This knowledge can guide the government in formulating better economic policies, including sustainable debt management strategies, By using these insights, the government can enhance its economic planning and budgeting, prioritize sectors for job creation, and implement policies that promote long-term economic stability and employment growth.

Kenyan businesses, particularly small and medium-sized enterprises (SMEs), will benefit from the study as it provides them with a better understanding of how external debt affects the business environment and employment. This knowledge allows businesses to anticipate changes in economic conditions and adapt their strategies accordingly.

The academic community, including researchers and universities, will benefit from the study by contributing to the growing body of knowledge on the relationship between economic policies and labor market outcomes. It can serve as a foundation for further research into the broader implications of these factors and offer insights into Kenya's specific challenges. Academics can build upon the findings, exploring deeper insights into specific sectors or regions and comparing Kenya's situation with other economies facing similar challenges. International organizations such as the IMF, World Bank, and UN, which focus on economic development, poverty reduction, and job creation, will benefit from the study by using it to tailor their support programs for Kenya. The findings can inform development strategies aimed at reducing unemployment and managing external debt in a sustainable manner. These organizations can use the study to provide targeted technical assistance, financial support, and policy advice to Kenya, ultimately fostering economic growth and reducing unemployment.

II. LITERATURE REVIEW

2.1 Empirical Literature

Georgiev et al. (2014) studied the relationship between external debt and economic growth, investments, and unemployment in 17 European countries. His study used data for the period 1980 to 2012, which was analyzed using descriptive statistics and panel data regressions. The research found that as external debt increase, the cost of servicing it rises substantially. This leads to a decrease in investments, which in turn affects unemployment and economic growth negatively. The researcher concluded that public debt affects unemployment and economic growth indirectly by reducing investments through high-interest rates, increased uncertainty, and high debt repayment costs. The limitation of this study is that it focused on gross debt rather than net public debt. Conceptually, the net debt-to GDP ratio may be a better measure of public debt sustainability because it indicates the extent to which the government must rely on savings by the public to finance its future borrowing needs.

In Pakistan, Akram (2011) found that external public debt had debt overhang effect on unemployment and economic growth. Specifically, the researcher found that external debt had a negative and statistically significant relationship between per capita GDP and investment in the short and long run. The domestic debt had a negative and significant relationship with investments. This suggests that domestic debt crowded out private investment. However, domestic debt did not have a statistically significant relationship with per capita GDP. Debt servicing had a negative and statistically significant relationship with per capita GDP only in the short run. These results were based on data for the period 1972 to 2009, which was analyzed using the ARDL approach to cointegration test. The conclusions of this study were based on data for only one country. Thus, they might not be applicable in other countries such as Kenya due to differences in levels of economic development and macroeconomic environment.

Using OLS regressions, Boboye and Ojo (2012) studied the effects of external debt on unemployment in Nigeria, the study used time series data for the period 1999-2011. They found that external debt had a negative effect on national income and per capita income of Nigeria. The increase in debt level led to the devaluation of the country's currency, retrenchment of workers, regular industrial strikes, and poor education. As a result, the level of economic growth and development declined. This study sheds light on the effect of public debt on economic growth in the context of a developing African country. However, it ignores the effect of domestic debt on unemployment.

Panizza and Presbitero (2014) used the variable instrument approach to investigate the causal effect of public debt on unemployment in OECD countries. The study used the time series data spanning 2001-2013. Their analysis revealed a negative relationship between debt and unemployment. However, they did not find any causal effect of public debt on unemployment after correcting for endogeneity. Although this study sheds light on the causal relationship between public debt and unemployment, its findings are inconclusive. Thus, they might not be applicable in other countries.

According to Mukui (2013), external public debt and debt servicing had a negative effect on economic growth in Kenya. The researcher also noted that inflation rate and domestic savings had negative effects on economic growth. By contrast, capital formation and foreign direct investment had a positive effect on economic growth. These findings were based on Kenyan time series data for the period 1980 to 2011, which was analyzed using a linear model. Although the study used Kenyan data, it did not estimate the effect of domestic debt on unemployment.

2.2 Theoretical Review

There are several theories on the indebtedness of the government and unemployment and its impact on the economic growth and its effects on macroeconomic variables such as interest rates, exchange rate, inflation and money

supply. The following are the most relevant theories on government debt and capital outflow as put forward by different theorists.

The Keynesian theory of employment and fiscal policy. Keynes (1937) argues that active government intervention particularly through increased public expenditure and deficit financing is essential in stimulating aggregate demand and addressing unemployment (Keynes, 1936). Keynes posited that economies can operate below full employment equilibrium due to insufficient demand, and that government spending, especially during downturns, is necessary to close this gap (Blinder et al, 2008). This fiscal activism forms the cornerstone of Keynesian thought, which was widely adopted in the post-Depression and post-World War II eras to combat unemployment and recession.

In relation to the current study's objective of establishing the effect of external public debt on unemployment, the Keynesian view provides initial justification for government borrowing to stimulate employment. However, it assumes that borrowed funds are allocated productively and transparently, which is often not the case in developing countries like Kenya (Were, 2001). Many times, external public debt is channeled into unproductive ventures or lost through inefficiencies and corruption, undermining the Keynesian mechanism that links public spending to job creation (Corò et al, 2019). Furthermore, rising debt servicing costs may lead to the crowding out of essential development spending, which Keynes did not anticipate, especially in economies with weak fiscal space and limited borrowing credibility.

Keynesian economics also lacks a robust explanation for capital outflows, a second variable in this study. Keynes' theory largely addresses closed economies and does not account for the high degree of capital mobility characterizing globalized economies today (Krugman, 2009). In Kenya, capital outflows often induced by political instability, exchange rate fluctuations, or weak investor confidence result in reduced domestic investment and increased unemployment (Ndungu, 2014). Since Keynes did not fully incorporate international financial markets and investor behavior into his framework, his theory offers limited explanatory power for the role of capital flight in labor market outcomes in open economies like Kenya's.

In summary, while Keynesian theory offers a strong foundational framework for understanding the role of fiscal policy in managing unemployment, its applicability to Kenya's economic conditions is constrained. The theory does not sufficiently account for external debt sustainability, capital flight, structural inflation, or monetary policy in open economies. Therefore, while valuable, Keynesian economics must be supplemented by other theories such as the Debt Overhang Hypothesis (Krugman, 1988), the Crowding Out Theory (Barro, 1974), and the Portfolio Balance Theory to provide a more comprehensive understanding of the macroeconomic drivers of unemployment in Kenya.

The replacement of individual financial endeavour by national financial operation endeavour is crowding out. Crowding out reduces the individual consumption or private consumption because of the increase in state spending. The rise in state spending financed by taxation decreases individual consumption. In case taxes are not increased by the state, the state turns to borrowing which entails interest rate increases and a reduction in individual investment. It is argued that increased state borrowing from the financing industry has a remarkable impact on individual borrowing and crowds out individual borrowing. Another expectation is that entry to secure state investment deters financial institutions from giving loans to high risk private sector. When the financial institutions are inhabited by lazy banks, a shilling borrowed by the government may give rise to greater than a shilling in crowding out of individual financing (Emran & Farazi, 2009).

State expenditures are in most cases more than the revenues generated from taxes especially in states which are developing. As a result of low and developing financial markets, the state turns to external borrowing to finance the deficit in the budget. Although external debts hardly alter internal rates of interest and issue of loanable finances, there is a possibility of the effects on the cost crowding out on private capital. David (2016) argue that in case a deficit in the budget originated from the expenses on domestically produced items, external debt give rise to actual foreign rate of exchange which bring about the crowding out influence of exporters and some domestic producers. Similarly, even though the cost of interest on external debt is small when compared to internal debt, there can be crowding out of individual credit because of relatively huge amount to be serviced. Lotan (2011) reviewed the impact of foreign indebtedness on the growth of the economy and private capital in Kenya and noted that the current investment was crowded out by the huge amount of foreign debt servicing. There is need for more studies to be done in Kenya to ascertain the actual effect of crowding out.

Krugman (1988) noted that there is a probability that future indebtedness will outgrow the nations' redemption capability; anticipated servicing of cost of the debt will deter any more internal and external investments as the income from the profitable investment plans will be dismal to boost the sector since remarkable part of any resulting economic development will increase to the lending country. The internal and external investments will be reduced further thereby reducing the growth of the economy (Krugman, 1988).

Debt overhang, according to Claessens and Diwan (1990), is a state where the effects of not being liquid, the effects of not having incentives or both are adequately intense to deter development in absenteeism of the lending country's agreement. It is a limited account of debt overhang in which the effects of a huge foreign indebtedness

connected to deterrence in taxes discussion, and any prosperity in the borrowing nations performance in the economy is taken by the lending country and as a result very little if any remains for internal investment and resultant development (Hjertholm, 2010). The outcome of indebtedness not only touches on venturing in material capital but also any endeavor that entails obtaining expenditure in advance for the benefit of increasing production in future. Such endeavours incorporate investing in human capital and technological procurement where the effect on growth may be intense over the period.

Public debt being a burden for generations to come may be the case in Kenya as it is expected that the money borrowed today will be paid latter with interest. However, it remains to be seen if public debt reduces the available lifetime consumption. This is because if the money is invested in income generating project the public debt may not reduce the available lifetime consumption. The debt overhang theory may be applied in Kenya as there is a probability that forthcoming indebtedness will outgrow the repayment capability of the country. There is need for further study to be done to verify whether the anticipated servicing of the debt expenses will deter more internal and external investment.

2.3 Conceptual Literature Review

Kenya's external debt has been a growing subject of economic concern and public interest over the past decade. External debt refers to the portion of a country's total debt that is borrowed from foreign lenders, including bilateral and multilateral institutions, commercial banks, and other private entities. In Kenya, this debt plays a significant role in financing development projects such as infrastructure, energy, and health; however, it also poses sustainability risks if not properly managed (World Bank, 2023).

As of 2023, Kenya's total public debt stood at approximately KES 10.6 trillion, with external debt accounting for nearly 51% of this figure (Osundwa, 2023). A significant portion of the external debt is owed to multilateral creditors such as the World Bank and the International Monetary Fund (IMF), while a notable share is also owed to bilateral creditors, especially China, which has financed large-scale infrastructure projects like the Standard Gauge Railway (SGR) (KNBS, 2023).The increase in external debt has been driven by persistent budget deficits and an ambitious development agenda under Kenya's Vision 2030. Although borrowing has enabled the country to invest in critical infrastructure, it has also heightened debt-servicing obligations. As of 2023, debt servicing accounted for more than 60% of Kenya's annual revenue, raising concerns about fiscal sustainability and the country's ability to meet both domestic needs and external obligations (Osundwa, 2023).

Moreover, the depreciation of the Kenyan shilling against major international currencies has exacerbated the burden of external debt repayments, as most of Kenya's external loans are denominated in foreign currencies. This means that even if the principal loan amount remains unchanged, the cost of repaying the debt in local currency terms rises with exchange rate fluctuations (World Bank, 2023).

Kenya's government has taken steps to address these concerns by seeking debt restructuring options, especially for expensive commercial loans, and by increasing reliance on concessional financing from multilateral partners. Additionally, policies aimed at boosting domestic revenue collection through tax reforms and expanding the tax base have been implemented to reduce reliance on external borrowing (CBK, 2023).In summary, while external debt remains a vital tool for financing Kenya's development goals, its rapid growth poses challenges related to fiscal sustainability, currency risks, and debt - servicing pressure. Prudent debt management and improved transparency in public borrowing are essential to ensure that external debt remains within manageable limits

III. RESEARCH METHODOLOGY

3.1 Data Collection Methods

The study relied on secondary data sourced from the World Development Indicators. The collected data were composed of the following variables; external public debt, capital outflow, inflation, interest rate and unemployment. Data was analyzed using Eviews software version 16 and presented in tables.

3.2 Scope of the Study

This study is geographically confined to the Republic of Kenya, an East African nation comprising 47 devolved counties with diverse economic and demographic characteristics. Kenya is selected due to its persistent unemployment challenges and increasing external debt burden (World Bank, 2023). The unit of analysis is national-level, and the study focuses on aggregate macroeconomic indicators rather than individual or household data.

The theoretical scope centers on the relationship between external public debt and its effect on unemployment. These variables are grounded in established economic theories. For instance, the Keynesian theory of public expenditure posits that fiscal stimulus can reduce unemployment, while the Debt Overhang and Crowding - Out theories suggest that excessive borrowing can hinder private sector growth and employment (Krugman, 1988). Portfolio management

theory also explains how capital outflows, driven by macroeconomic risks, reduce domestic investment and limit job creation (Sharpe, 1964). These theories collectively justify the study's focus on the selected variables.

The time scope covers the period from 2004 to 2024, a 20-year span that allows for trend analysis across different economic cycles. This timeframe captures key global and domestic economic shocks such as the 2008 global financial crisis, the 2013 transition to devolved governance, and the COVID-19 pandemic. These events significantly influenced Kenya's debt dynamics, inflation patterns, capital movement, and labor market conditions (Osundwa, 2023).

The data used in this study were sourced from reputable institutions including the Kenya National Bureau of Statistics (KNBS), Central Bank of Kenya (CBK), World Bank, and the International Monetary Fund (IMF). These sources provide reliable, standardized, and validated macroeconomic datasets that are appropriate for time series econometric analysis.

While various macroeconomic factors may influence unemployment, this study deliberately focuses on external public debt due to its increasing relevance in Kenya's recent economic discourse and the limited empirical attention it has received in local literature. This focused scope allows for a deeper and more policy-relevant understanding of Kenya's labor market dynamics.

3.2 Model Specification

Data analysis were compose of two procedures: Procedure one: A multiple linear regression model adopted in testing the hypothesized relationship between external debt, inflation, capital outflow and unemployment in Kenya.

The following model was used:

$$\mathbf{Y_t=\beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \mu}$$

Where:

Y= Unemployment, β_1.....β_3 = Coefficients, X_1= External Debt, X_2= Inflation, X_3=Capital Outflow, t= Time index, μ= error term

Procedure two: A hierarchical regression analysis adopted in deducing the moderating effect of interest rate on joint effects of external debt, inflation, and capital outflow on unemployment in Kenya. The following model was used;

$$\mathbf{Y_t = \beta_0 + \beta_1 X_{1t} M_t + \beta_2 X_{2t} M_t + \beta_3 X_{3t} M_t + \mu_t}$$

Where; $\mathbf{Y_t}$ = Criterion variable.

$\boldsymbol{\beta_0}$ = constant.

$\mathbf{\beta_1 X_{1t} M_t}$, $\mathbf{\beta_2 X_{2t} M_t}$, $\mathbf{\beta_3 X_{3t} M_t}$;are interaction terms used to show the moderating effect of interest rate on the regression model.

3.3 Description and Measurement of Variables

Table 2 provides information on the description of study variables, how they were measured, and the predicted signs.

Table 2

Description and Measurement of the Variables

Variable	Description	Measurement	Predicted prior sign
Unemployment	Number of people willing to work but have not gained any employment opportunity.	Unemployment rate	Dependent variable
External debt	A portion of a country's debt that is borrowed from foreign lenders.	External debt as a percentage of gross domestic product.	Independent variable

Source: (Author, 2024)

3.4 Research Design

This study adopted a causal research design, also known as explanatory research, which is used to investigate cause-and-effect relationships between variables. Causal research seeks to determine whether one variable directly influences another. To establish such causality, it is essential to observe variations in the independent variable and then measure corresponding changes in the dependent variable, while controlling for potential confounding factors.

In this study, the causal research design is particularly appropriate because the objective is to examine the effect of public debt on unemployment in Kenya. By focusing on this cause-and-effect relationship, the design enables the researcher to determine whether changes in public debt (external debt) significantly influence unemployment levels. Confounding variables were addressed through statistical control methods such as multiple regression analysis, which helps isolate the net effect of public debt on unemployment. .Furthermore, causal research allows for the testing of hypotheses and the use of longitudinal data, which strengthens the validity of conclusions regarding temporal and directional relationships among the study variables. This design aligns well with the objectives of the study, which aim

to establish whether macroeconomic variables associated with public debt contribute to unemployment, thus providing meaningful policy insights for fiscal and economic planning in Kenya.

3.5 Pre-Estimation Diagnostic Tests

3.5.1. Unit Root Test

The presence of unit roots in time series data poses a significant challenge in econometric analysis, often leading to spurious and unreliable regression results. A data series exhibiting unit root behavior is characterized by a non-constant mean, variance, and covariance over time, making it non-stationary. Testing for unit roots is therefore essential to ensure the validity and robustness of any statistical inferences drawn from time series or panel data. While various tests exist for detecting unit roots, including those specifically designed for panel data such as the Im-Pesaran-Shin (IPS) test, this study exclusively employed the Augmented Dickey-Fuller (ADF) test to assess the stationarity of each variable. The ADF test is a widely used method for detecting the presence of unit roots in individual time series. It tests the null hypothesis that a unit root is present in the series against the alternative hypothesis of stationarity. By applying the ADF test to each variable, the study ensured that the time series properties of the data were appropriately addressed before proceeding to further econometric modeling.

3.5.2 Cointegration Test: F-Bounds test,

The presence of a long-run equilibrium relationship among non-stationary variables is typically assessed through cointegration tests. In this study, the **F-Bounds test**, developed within the framework of the Autoregressive Distributed Lag (ARDL) bounds testing approach by Pesaran, Shin, and Smith (2001), was exclusively employed to test for cointegration. Unlike the Johansen Maximum Likelihood method, which is suitable for systems of equations and requires all variables to be integrated of the same order, the F-Bounds test is particularly flexible as it allows for a mixture of I(0) and I(1) variables within the model.

The F-Bounds test evaluates the null hypothesis of no cointegration against the alternative of a long-run relationship among the variables. The procedure involves estimating an unrestricted error correction model (UECM) and computing an F-statistic to test the joint significance of the lagged level variables. This computed F-statistic is then compared against critical value bounds: if it exceeds the upper bound, cointegration is confirmed; if it falls below the lower bound, no cointegration is present; and if it lies between the bounds, the result is inconclusive. This study applied the F-Bounds test due to its suitability for small sample sizes and its ability to handle variables of mixed integration orders. The findings from this test determined the presence or absence of a stable long-run relationship among the model variables, which then guided the estimation of the long-run coefficients and the short-run error correction dynamics.

3.6 Post-Estimation Diagnostic Tests

After fitting a regression model, post-estimation diagnostic tests can be conducted to identify any potential issues with the model. These tests are useful in ensuring that the model assumptions are valid and the research findings are reliable. The following tests were conducted:

3.6.1 Normality Test

The normality test is a statistical technique that helps to determine whether data follows a normal distribution or not (Roco-Videla, Ayala, Carsalade, & Olguín-Barraza, 2023). In this study, the normality test conducted using the Jarque-Berra test. This test is based on the null hypothesis that the data is normally distributed. By analyzing the skewness and kurtosis of the data, the Jarque-Berra test provides a measure of the deviation from normality (Kim, 2021). The results of this test are important for many statistical analyses, as normality is often assumed in order to make inferences about population parameters. The use of the Jarque-Berra test in this study helps to ensure that the statistical analyses conducted are valid and reliable.

3.6.2 Multicollinearity Test

Multicollinearity occurs when there are strong linear correlations between independent variables in a multivariate regression model. In order to determine the presence of multicollinearity, the study utilized Variance Inflation Factors (VIF). A VIF value lower than 10 indicates the absence of multicollinearity (Kothari, 2021).

3.6.3 Heteroscedasticity Test

In regression analysis, when the variability of the errors is not consistent across observations, it is referred to as heteroscedasticity (Gujarat, 2022). To check for heteroscedasticity, the Breusch-Pagan Test is used. This test evaluates the null hypothesis, which states that there is no heteroscedasticity in the regression model's errors. If the p-value associated with the Breusch-Pagan test is less than 0.05, the null hypothesis of homoscedasticity is rejected, indicating the presence of heteroscedasticity in the data.

3.6.4 Autocorrelation test

Autocorrelation is a phenomenon that occurs when the residuals from a regression analysis are highly correlated, which can impact the validity of the results (Gujarat, 2022). In this study, the presence of autocorrelation were examined using the Breusch-Godfrey LM test. If the probability value exceeds 0.05, it indicates that autocorrelation is absent.

IV. RESULTS & DISCUSSION

4.1 Descriptive Statistics

Table 3

Descriptive Statistics

	UNEMR	**ED**
Mean	3.397387	39.80071
Median	2.85000	36.87600
Maximum	5.70700	104.9890
Minimum	2.65000	21.44700
Std.Dev	1.096957	17.85113
Skewness	1.382691	1.988598
Kurtosis	3.106551	3.647334
Jarque-Bera	9.892474	4.32875
Probability	0.17110	0.21200
Sum	105.3190	1233.822
Sum Sq.Dev.	36.09945	9559.884
Observation	30	30

Source: Author's computation based on EVIEW v.12, (2025)
UNEMR-Unemployment Rate
ED-External Debt

The descriptive statistics presented in Table 4.1 offer crucial insights into the behavior and distribution of the variables under study: Unemployment Rate (UNEMR), External Debt (ED), over a 30-year period. These statistics form the foundation for understanding how macroeconomic variables fluctuate and potentially influence unemployment in Kenya. The mean unemployment rate (3.40%) suggests a relatively moderate unemployment level, though the standard deviation of 1.10 points to considerable variation across the study period. The right skewness (1.38) and kurtosis slightly above 3 (3.11) indicate occasional spikes in unemployment, which could be attributed to economic shocks or policy failures. This aligns with Muriithi and Wawire (2021), who noted that labour market fluctuations in Kenya are often linked to macroeconomic instability and structural rigidities.

External debt (ED) has a relatively high mean of 39.80% of GDP, with a maximum value of 104.99%, indicating periods of substantial borrowing. The high skewness (1.99) and standard deviation (17.85) reflect sharp increases in debt accumulation, possibly in response to fiscal pressures or infrastructural spending. These findings support Kinyua and Mutuku (2023), who argue that rising debt burdens in Kenya may crowd out productive public investment and limit employment growth through austerity-driven policy responses. The capital outflows (FDI) data show a mean of 0.17%, with the values ranging from slightly negative to 0.73%. The positive skewness (1.30) implies that in some years, capital outflows were substantially higher than average. This volatility, as Chege and Moronge (2020) note, is influenced by policy inconsistency and external market conditions, which can undermine investor confidence and reduce employment opportunities in sectors reliant on foreign investment.

4.2.1 Normality-Jarque-Bera Test

The Jarque-Bera (JB) test results indicate that all variables have p-values above 0.05, suggesting no significant departure from normality, which supports the use of classical regression techniques (Gujarati & Porter, 2020). This statistical foundation strengthens the reliability of further econometric analysis examining how external debt affect unemployment in Kenya.

4.3 Correlation Analysis

The test of correlation examines the strength and direction of linear relationships between variables in the study. In Table 4.2, correlation coefficients are used to quantify how closely related the variables unemployment rate (UNEMR), external debt (ED) are to one another. Each correlation coefficient ranges between -1 and +1, where values

closer to ±1 indicate a stronger relationship and values near 0 imply weak or no linear association. The significance (p-values) associated with each coefficient helps determine whether the observed correlation is statistically meaningful.

Table 4

Correlation Analysis

Variables	Correlation	t-Statistic	Probability
UNEMR	1.000000	—	—
ED	-0.015164	-0.297	0.767

Source: Author's computation based on EVIEW v.12, (2025)

From the results above the correlation between UNEMR and external debt (r = -0.015, p = 0.0096) is weak and statistically insignificant, implying that debt alone may not directly influence unemployment in the short run. However, high debt levels could indirectly affect labor markets through reduced public investment or austerity measures (Kinyua & Mutuku, 2023).

4.4 Augmented Dickey-Fuller Unit Root Test

The results in Table 4 below, present the Augmented Dickey-Fuller (ADF) unit root test, which assesses the stationarity of each variable in the study. Stationarity is a critical requirement in time series analysis, as non-stationary data can lead to spurious regressions where statistical relationships appear significant when they are not (Gujarati & Porter, 2020). The ADF test evaluates whether a variable has a unit root (i.e., is non-stationary). A variable is considered stationary if the ADF test statistic is more negative than the critical values, and the p-value is less than 0.05 at the 5% significance level.

Table 4

Augmented Dickey-Fuller Test for Stationarity

Augmented Dickey-Fuller test statistics- At Levels						
Variable	t-Statistics	P-value	1% critical value	5% critical value	10% critical value	conclusion
UNEMR	-1.771788	0.3863	-3.379322	-2.967767	-2.622989	Unit root
ED	-6.953542	0.0000	-3.670170	-2.963972	-2.621007	Stationary

Source: Author's computation based on EVIEW v.12, (2025)

According to the results, unemployment rate (UNEMR) has a test statistic of -1.771788 with a p-value of 0.3863, which is higher than the 5% level. This indicates the presence of a unit root, meaning UNEMR is non-stationary at level. (Nkoro & Uko, 2019). On the other hand, external debt (ED) is found to be stationary at levels, with test statistics of -6.953542 (p = 0.0000) and -3.103429 (p = 0.0370), respectively. This suggests that this variable fluctuates around a constant mean and variance over time, making them suitable for immediate inclusion in regression analysis without further transformation.

Table 5

Augmented Dickey-Fuller Test Unit root at First Difference

Augmented Dickey-Fuller test statistics- At 1st difference						
Variable	t-Statistics	PV	1% critical value	5% critical value	10% critical value	conclusion
UNEMR	-4.760997	0.0007	-3.689194	-2.971853	-2.625121	Stationarity

Source: Author's computation based on EVIEW v.12, (2025)

The results in Table 4.4 show the Augmented Dickey-Fuller (ADF) test conducted at first difference for the variable that was previously found to be non-stationary at level: unemployment rate (UNEMR), At this level of differencing, the variable become stationary, as its respective t-statistics (UNEMR: -4.760997 is more negative than the 1%, 5%, and 10% critical values, and the p-value is below 0.05. This indicates that each of these time series is integrated of order one, I(1)meaning they become stationary after first differencing. These findings are important for model specification, as they suggest that while the variables exhibit trends over time, they do not contain unit roots at first difference and are therefore suitable for long-run equilibrium modeling using techniques like Johansen cointegration or ARDL bounds testing (Nkoro & Uko, 2019; Pesaran *et al.*, 2021).

4.5 Determination of Optimum Lag Length

The lag length determination summary presented is a crucial step in time series analysis, as it guides the researcher in selecting the optimal number of lags to include in the model. Selecting the right lag length ensures that the model captures the dynamic structure of the data without overfitting or under fitting, thereby improving the robustness and predictive accuracy of the results (Lütkepohl, 2005).In this case, several statistical criteria were employed to determine the optimal lag length: the Log-Likelihood (LogL), Likelihood Ratio (LR) test, Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Criterion (SC), and the Hannan-Quinn Criterion (HQ). All these indicators serve to evaluate how well different lag structures fit the data, while penalizing unnecessary complexity.

Table 6

Lag Length Determination Summary

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-271.7656	NA	2136.483	19.011831	19.20691	19.07738
1	-118.0665	254.3985	0.152713	9.521826	10.464779	9.817150
2	-90.80443	37.60282	0.080321*	8.745133*	10.44247*	9.276717*

Source: Author's computation based on EVIEW v.12, (2025)

From the Table 6, it is evident that as the number of lags increases from 0 to 2, there is a substantial improvement in model performance. The Log-Likelihood value increases from -271.77 at lag 0 to -90.80 at lag 2, implying a better model fit with the inclusion of more lags. Similarly, the LR statistic which measures the incremental benefit of including an additional lag shows that moving from lag 0 to lag 1 (LR = 254.40) and from lag 1 to lag 2 (LR = 37.60) yields significant improvements.

Importantly, the Final Prediction Error (FPE), which estimates out-of-sample forecast error, declines from 2136.48 at lag 0 to 0.080321 at lag 2. A lower FPE indicates better forecast accuracy, and the minimum value at lag 2 suggests it is the most appropriate choice. The Akaike Information Criterion (AIC), which balances model fit and complexity, also reaches its minimum (8.745133) at lag 2. The same is observed with the Schwarz Criterion (SC = 10.44247) and the Hannan-Quinn Criterion (HQ = 9.276717), both of which point to lag 2 as the optimal lag length. Collectively, the consistency across all criteria FPE, AIC, SC, and HQ reinforces the conclusion that a two-lag model is statistically optimal for the data under analysis. According to Akaike (2019), choosing the model with the lowest AIC ensures efficiency, while Lütkepohl (2005) emphasizes that alignment among multiple criteria enhances the credibility of the selected lag structure.

4.6 Cointegration Test-Bounds Estimation

The Bounds Cointegration Test was conducted to determine whether a long-run equilibrium relationship exists among the variables in the model. This test is based on the ARDL (Autoregressive Distributed Lag) modeling framework, which is particularly suitable when the variables are integrated at different levels, i.e., some are stationary at level [I(0)] and others at first difference [I(1)], but none are integrated at second difference [I(2)] (Pesaran et al., 2021).

4.7 Regression Analysis

Table 7

Multiple Regression Results

Dependent Variable: UNEMR- Included observation: 30

Variable	**Coefficient**	**Std.Error**	**t-Statistic**	**Prob.**
ED	0.022632	0.006183	3.660081	0.0011
FDI	0.546758	0.201852	2.708706	0.0048
CPI	0.013279	0.002073	6.406948	0.0000
C	0.958825	0.361715	2.650779	0.0133
R-squared	0.775599	Mean dependent var		3.397387
Adjusted R-squared	0.750666	S.D.dependent var		1.096957
S.E of regression	0.547748	Akaike info criterion		1.753911
Sum squared resid	8.100747	Schwarz criterion		1.938941
Log likelihood	-23.18561	Hannan-Quinn criter.		1.814226
F-statistic	31.10681	Durbin Watson		2.285800
Prob (F-statistic)	0.000000			

Source: Author's computation based on EVIEW v.12, (2025)

This study examine the influence of selected macroeconomic variables external debt (ED), foreign direct investment (FDI), and consumer price index (CPI) on the unemployment rate (UNEMR) in Kenya. The regression output, based on 30 observations, revealed that all three variables were statistically significant predictors of unemployment at the 5% level. The model also demonstrated strong explanatory power, with an R-squared of 0.7756, suggesting that approximately 77.6% of the variation in unemployment is explained by the independent variables included in the model. The constant term in the regression is 0.9588 and statistically significant at the 5% level, indicating a persistent baseline level of unemployment even in the absence of changes in external debt, FDI, or inflation. This may be reflective of structural unemployment rooted in Kenya's education-labor market mismatch, youth bulges, and underdeveloped manufacturing sectors.

The overall model is statistically robust, as indicated by an F-statistic of 31.11 and a p-value of 0.0000, confirming that the independent variables collectively explain variations in unemployment. The adjusted R-squared value of 0.7507 further demonstrates that the model maintains high explanatory power after accounting for the number of predictors. A Durbin-Watson statistic of 2.29 indicates the absence of serial correlation, affirming the reliability of the regression estimates. The model becomes

$$UNEMR_t = 0.958825 + 0.022632ED_t + 0.546758FDIt + 0.013279CPI_t$$

4.7.1 External Debt and Unemployment

The regression results show that external debt has a positive and statistically significant relationship with unemployment. Specifically, the coefficient of external debt is 0.0226, and the p-value is 0.0011, indicating significance at the 5% level. This finding implies that increases in Kenya's external debt are associated with rising unemployment. This can be attributed to the high cost of debt servicing, which diverts public funds away from labor-intensive development programs such as agriculture, health, and infrastructure that have the potential to generate employment.
This finding is consistent with empirical evidence from Sub-Saharan Africa. For instance, Adjei et al, (2022) observed that in heavily indebted African economies, fiscal resources are increasingly allocated to debt repayment rather than to productive sectors, limiting employment growth. Similarly, the International Monetary Fund (Osundwa, 2023) has warned that high debt burdens in low-income countries like Kenya can crowd out public investment and reduce the effectiveness of fiscal policy in stimulating job creation.

4.9 Post Estimation Diagnostic Tests

Post-estimation diagnostics in econometrics involve a series of statistical tests and evaluations conducted after estimating a regression model. These diagnostics help to assess robustness of the model, ensuring that key assumptions are not violated.

4.9.1 Normality

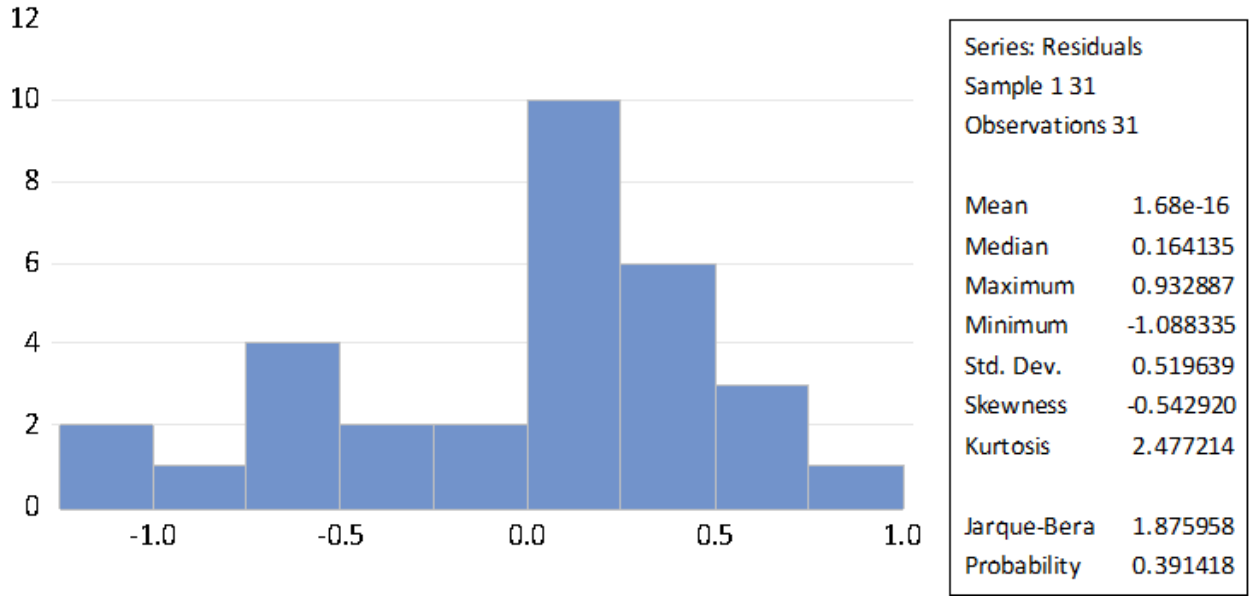

Figure 1
Normality

The histogram and accompanying statistics assess the normality of the residuals from a regression analysis. The residuals appear fairly symmetrically distributed with a skewness of -0.543, indicating slight left-skewness, and a

kurtosis of 2.48, which is close to the normal distribution's ideal of 3. The Jarque-Bera (JB) statistic of 1.876 with a p-value of 0.391 indicates that we fail to reject the null hypothesis of normality at the 5% significance level. This implies the residuals are approximately normally distributed, supporting the validity of regression assumptions. This result enhances confidence in the model's reliability for inference, as normality of residuals is a key condition for valid hypothesis testing in OLS regression.

4.9.2 Multicollinearity

Multicollinearity generally arises when there is a strong correlation between two or more independent variables. It is assessed using the Variance Inflation Factor (VIF). A VIF value greater than 10 indicates the presence of multicollinearity, while a centered VIF below 10 suggests that multicollinearity is not a concern (Das, 2021).

Table 8

Test for Multicollinearity using VIF

Variable	Coefficient Variance	Unecentered VIF	Centered VIF
C	0.130837	13.51862	NA
ED	3.83E-05	7.476461	1.218304

Source: Author's computation based on EVIEW v.12, (2025)

The Variance Inflation Factor (VIF) results show that all centered VIF values for the independent variables (ED = 1.22) is well below the threshold of 10. This indicates that multicollinearity is not a concern in the model, as there is no significant linear relationship among the predictor variables.

4.9.3 Heteroscedasticity

The Breusch-Pagan-Godfrey test was employed in this study to determine whether the error terms in the model maintained a constant variance. The test's null hypothesis assumes the absence of heteroscedasticity, indicating uniform variance. If the p-value is greater than 5%, the null hypothesis is accepted.

Table 9

Breusch-Pagan-Godfrey Test for Heteroscedasticity

Null hypothesis: Heteroscedasticity

F-statistic	1.689764	Prob.F(3,37)	0.1927
ObsR-squared	4.900265	Prob.Chi-Square(3)	0.1792
Scaled Explained SS	2.745599	Prob.Chi-Square(3)	0.4325

Source: Author computation based on EVIEWS v.12, 2025

The results of the Breusch-Pagan-Godfrey test indicate that heteroscedasticity is not present in the model. This conclusion is based on the p-values for the F-statistic (0.1927), ObsR-squared (0.1792), and Scaled Explained SS (0.4325), all of which are greater than the 5% significance level. Therefore, the null hypothesis of homoscedasticity (constant variance of the error terms) is not rejected, confirming that the model satisfies the assumption of constant error variance.

4.9.4 CUSUM test

The CUSUM (Cumulative Sum) stability test graph shows that the blue line (representing the CUSUM statistics) remains within the 5% significance bounds (indicated by the dashed orange lines) for most of the period but eventually crosses the upper boundary towards the end. This indicates that the model is stable over time initially but becomes unstable in the later periods. Crossing the significance bounds suggests structural instability or a possible change in the relationship among the variables in the model during the latter part of the sample period.

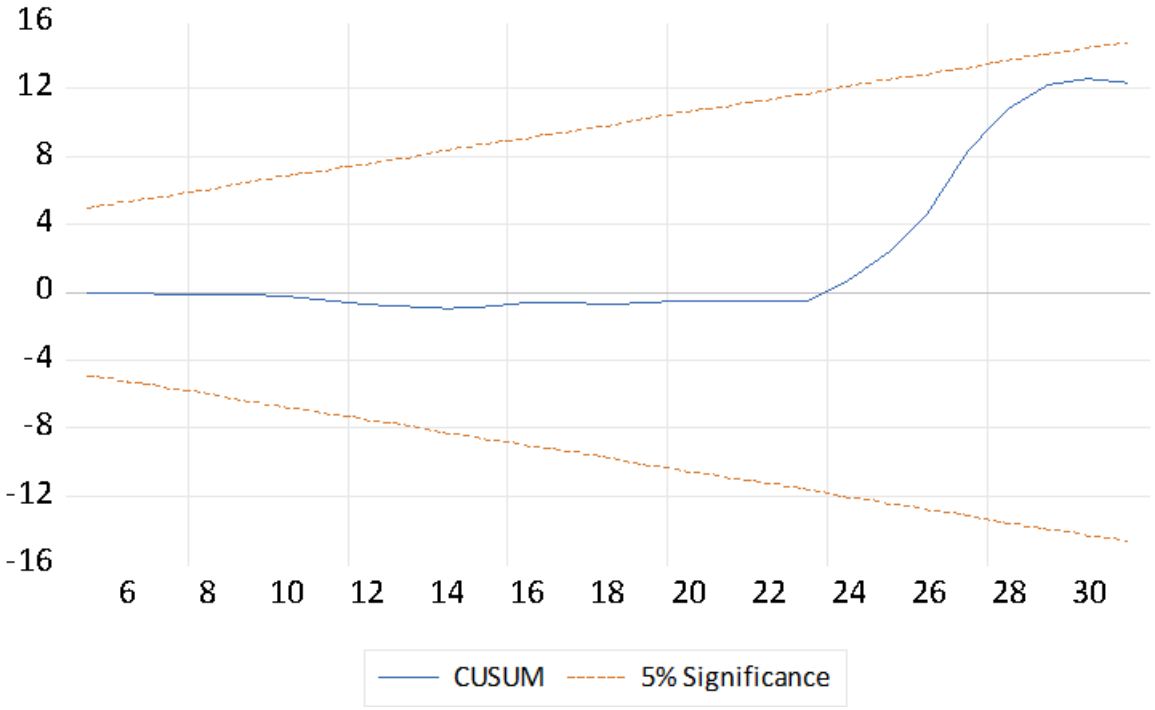

Figure 2
Cusum Test

V. CONCLUSION & RECOMMENDATIONS

5.1 Summary of the findings

5.1.1 Effect of External Debt on Unemployment in Kenya

The regression results indicate that external debt has a positive and statistically significant effect on unemployment in Kenya. With a coefficient of 0.0226 and a p-value of 0.0011, the findings suggest that as external debt increases, the unemployment rate also rises. This relationship is significant at the 5% level, implying that higher levels of external borrowing may be linked to reduced capacity for domestic job creation, possibly due to the diversion of public funds toward debt servicing rather than productive employment-generating investments.

5.2 Conclusion

The findings from the analysis indicate external debt significantly influence unemployment in Kenya, with inflation showing the strongest direct effect. The model's high explanatory power (R-squared = 0.8997) suggests that external debt is a strong predictor of unemployment, underscoring the need for integrated fiscal and monetary policy interventions to manage unemployment effectively in Kenya.

5.3 Recommendation

The government should adopt a more cautious and productive external borrowing strategy, ensuring that loans are invested in employment-generating sectors such as infrastructure, agriculture, and manufacturing. Debt sustainability frameworks should be enforced to avoid excessive debt burdens that crowd out public investment and hinder job creation.

5.4 Suggestions for Further Research

Based on the findings of this study, further research is recommended to deepen understanding of the macroeconomic dynamics influencing unemployment in Kenya. Future studies could explore the sector-specific effects of external debt on employment to identify which areas of the economy are most impacted by rising debt levels.

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