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Panel Analysis of the Impact of Unemployment on Sustainable Economic Growth in West Africa

Wpływ bezrobocia na zrównoważony wzrost gospodarczy w Afryce Zachodniej. Analiza panelowa

Abstract

Insufficient employment opportunities in West Africa continue to weaken and potentially hamper growth sustainability. Previous studies have underexplored the interrelationships between unemployment and economic growth. This study examines the relationship between unemployment and sustainable economic growth in West Africa. The core of the study lies in the neoclassical growth model while incorporating endogenous growth theory. The study combines descriptive analysis with the application of econometric estimations. The annual panel data covering the period of 1991 to 2023 were collected from United Nations Development Programme (UNDP) and the World Bank (WB) World Development Indicators (WDI) databases. The estimation technique employed is panel Autoregressive Distributed Lag (p-ARDL), covering all the sixteen countries of West Africa. The analysis revealed that unemployment has a significant positive impact on long-term economic growth in West Africa.

Keywords: Unemployment, Sustainable Economic Growth, Remittance, Inflation.

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Streszczenie

Niewystarczające możliwości zatrudnienia w Afryce Zachodniej w dalszym ciągu osłabiają, a potencjalnie także utrudniają utrzymanie trwałego wzrostu gospodarczego. Dotychczasowe badania w niewystarczającym stopniu analizowały wzajemne powiązania między bezrobociem a wzrostem gospodarczym. Niniejszy tekst podejmuje analizę zależności między bezrobociem a zrównoważonym wzrostem gospodarczym w Afryce Zachodniej. Podstawę analizy stanowi neoklasyczny model wzrostu, uzupełniony o elementy teorii wzrostu endogenicznego. Badanie łączy analizę opisową z zastosowaniem metod ekonometrycznych. Roczne dane panelowe obejmujące lata 1991–2023 pochodzą z baz Programu Narodów Zjednoczonych ds. Rozwoju (UNDP) oraz World Development Indicators (WDI) Banku Światowego. Do estymacji zastosowano panelowy model p-ARDL, obejmujący wszystkie szesnaście krajów Afryki Zachodniej. Wyniki analizy wskazują, że bezrobocie wywiera istotny dodatni wpływ na długoterminowy wzrost gospodarczy w regionie.

Słowa kluczowe: bezrobocie, zrównoważony wzrost gospodarczy, przekazy pieniężne, inflacja.

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1. Introduction

The pursuit of economic growth is globally acknowledged as one of the fundamental goals within the realm of macroeconomics. However, it is imperative to recognize that mere attainment of economic growth does not guarantee equitable prosperity across societies. Consequently, there is a growing emphasis on the importance of sustainable economic growth (SEG). SEG is a concerted effort aimed at meeting human needs in a manner that preserves natural resources and safeguards the environment for the benefit of generations to come. The significance of SEG extends beyond conventional economic metrics, such as Gross Domestic Product (GDP), to encompass a multifaceted approach that includes enhancement of overall quality of life and the equitable distribution of opportunities across present and future generations (Opoku & Yan, 2018). It is quantitatively assessed by the rate of increase in per capita output (GDP), with a strong emphasis on improving the standard of living over time.

A critical component of SEG is the creation of decent work opportunities for the labor force. This aligns with the broader global discourse on sustainable development, a paradigm championed by the United Nations through its Sustainable Development Goals (SDGs) (Garcia *et al.*, 2014). *Decent work* encompasses factors like job security, fair wages, safe working conditions, and opportunities for personal and professional development (Giua *et al.*, 2022). Therefore, achieving SEG while reducing unemployment is essential for ensuring that economic progress is sustainable and that it benefits all segments of society (Siddikee *et al.*, 2022).

In West Africa, despite notable economic growth, persistently high levels of unemployment, particularly among the youth population, remain a significant issue (Adegboye & Ighodaro, 2020). These high unemployment rates lead to reduced consumer spending, diminished tax revenues, and decreased productivity, stifling investment and hindering economic diversification efforts. Additionally, widespread unemployment exacerbates poverty, inequality, and social unrest, posing substantial challenges to social cohesion and political stability in the region. In 2023, the global unemployment rate was 5.1 percent, showing a slight decrease from the 5.3 percent recorded in 2022. Similarly, as of 2022, the global employment gap stood at 473 million people, reflecting a 12.3% gap rate. This encompasses 205 million individuals classified as unemployed (with a 5.8% unemployment rate), and an additional 268 million people facing unmet employment needs outside the labor force. Notably, women and those in developing countries encounter a larger gap, with a 15.0% rate for women compared to 10.5% for men. Various factors, such as personal responsibilities and limited training opportunities, contribute to this gap, which is more pronounced in low and lower-middle-income countries (13–20%) compared to upper-middle-income (11%) and high-income countries (8%). Despite possessing basic skills and education, a significant number of young people West Africa region struggle to secure decent job opportunities (International Labour Organization, 2023).

The unemployment rate is further worsened by the insufficient institutional capacity to absorb this skilled workforce (Sumaworo, 2020). These challenges persist, hindering economic recovery and development. Despite policies aimed at promoting

employment such as Critical Technical Skills and Private Sector Development, the region grapples with high levels of unemployment, particularly among young people (ACBF *et al.*, 2018). The problem of *brain drain* exacerbates the situation, as skilled individuals leave in search of better opportunities abroad. According to Adeosun and Popogbe (2021), the depletion of human capital through *brain drain* poses a more significant threat to the overall advancement of African economies. Although the informal sector offers employment opportunities, it is marked by diminished productivity and inadequate regulation, contributing to the intricacies of the economic landscape (Smith, 2023; Iloabuchi, 2019).

The individual and potentially reinforcing impacts of unemployment on sustainable long-term growth in West Africa remain unclear. Conceptually, lack of jobs may undermine productivity, exacerbate inequality, increase economic vulnerability to external shocks, and trigger social tension – potentially hampering growth sustainability (ACBB, 2018). Meanwhile, the true empirical relationship has been insufficiently studied in the existing literature on West African economies. The causal mechanism and direction of influence between unemployment and sustainable growth in West Africa may be complex. The literature presents conflicting empirical results. The complexity of this relationship is further exacerbated by variations in skill levels, policy responses, and labor market structures across different regions. Hence, employing more robust empirical strategies to determine the direction of causality between these factors would provide valuable insight. This study therefore addresses this gap by investigating the effect of unemployment on SEG in West Africa.

This study has significant implications and relevance to the West African subregion. West Africa has faced persistent challenges in achieving sustained and productive employment growth, and the demographic shifts in the region have exacerbated these issues. This study is relevant because it delves into these challenges and offers insights into how they impact the region's well-being and socioeconomic development. Even though existing literature acknowledges the multifaceted challenges of unemployment, the studies failed to provide a comprehensive understanding of the intricate relationship between unemployment and SEG. This study bridges this knowledge gap by exploring the complex interplay between these variables, shedding light on how unemployment affects SEG. The remaining parts of this study are divided into literature review, methodology, findings and discussion, conclusion and recommendations.

2. Literature Review

SEG has emerged as a central concept in discussions about the long-term viability of economic systems worldwide. It is conceptualized as a pattern of economic expansion that prioritizes the well-being of future generations (Siddikee *et al.*, 2022). It goes beyond traditional measures of growth by emphasizing a balanced approach that integrates economic, social, and environmental considerations. This involves ensuring inclusivity, equity, and environmental responsibility in the development process. Such a definition places sustainability at the core of economic progress,

highlighting the interconnectedness of economic, social, and environmental factors. SEG requires the effective use of all available resources, particularly human capital. This involves investing in education, skill development, and innovation to enhance productivity and ensure that economic growth is not only robust but also sustainable in the long run (Chepel *et al.*, 2021).

In essence, SEG is a multifaceted concept. It involves not only the fair distribution of the benefits of economic development but also the continuous enhancement of the well-being of all individuals within a society. Koczan *et al.* (2021) underscores this by expanding the scope of sustainable growth to include social aspects such as education, healthcare, social protection, and decent work. By addressing these broader issues, sustainable growth aims to build a more equitable, just, and cohesive society. This is a question of ensuring that economic progress does not come at the expense of social and environmental health, but rather integrates these elements to create a sustainable future for all. As societies grapple with the challenges of the 21st century, the imperative is not merely economic expansion but growth that is sustainable, environmentally responsible, and a socially equitable paradigm that safeguards the well-being of current and future generations.

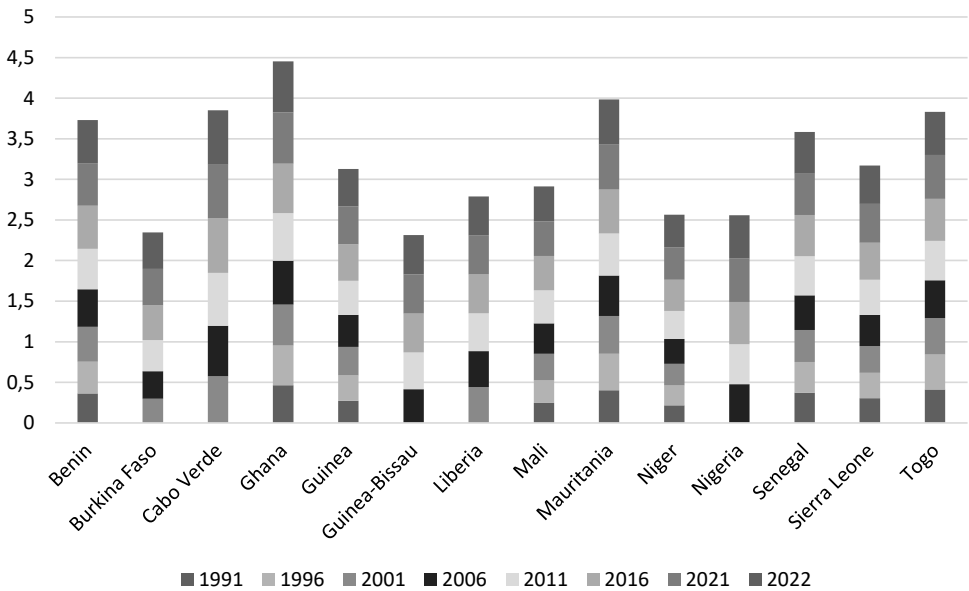
The term *unemployment* (UNP), however, refers to the state of being without a job despite actively seeking employment. It is a multifaceted concept with various dimensions and implications for individuals, societies, and economies. The International Labour Organization (ILO) defines unemployment as *the condition of individuals who are willing to work, actively seeking employment, but unable to find suitable jobs within the labour market* (Ihensekhien & Ovenseri-Ogbomo, 2017). It underscores the inability of an economy to provide gainful employment opportunities (Rahmaningtyas & Adianita, 2023). Unemployment is a socio-economic problem with far-reaching implications, affecting individuals, families, and societies at large. It refers to the condition where individuals who are of working age and are actively seeking employment are unable to secure jobs (Leonardi, *et al.*, 2018). Unemployment can be likened to a situation where individuals who are willing and able to work are unable to find employment (Nolte-Troha *et al.*, 2023). It is a situation where individuals who are willing and able to work are unable to find employment opportunities. High unemployment rates, especially among young people, is a significant concern in the Sub-Saharan African (SSA) region and can lead to social unrest and political instability (Mtiraoui, 2024).

The concept of unemployment is commonly understood in economic terms. Its consequences extend beyond financial implications to encompass broader aspects of health, well-being, and societal functioning (Leonardi *et al.*, 2018). It is a multifaceted problem influenced by economic, social, and psychological factors. Unemployment rates indicate the proportion of the labor force that is jobless but actively seeking work within an economy. However, beyond economic implications, unemployment has profound effects on individuals' mental and physical well-being, social integration, and overall quality of life. According to Nolte-Troha *et al.* (2023), unemployment is not merely an economic condition but a social determinant of health, influencing access to healthcare, housing, and social support networks. It can contribute to social exclusion, poverty, and increased risk of various health problems,

including mental disorders, substance abuse, and physical ailments. It represents not only an economic inefficiency but also a social and psychological burden on individuals and communities. It leads to income loss, reduced consumption, social exclusion, and psychological distress. Persistent unemployment can have long-term consequences, such as skill depreciation, reduced productivity, and entrenched poverty (Ihensekhien & Ovenseri-Ogbomo, 2017). Unemployment rates are often disaggregated by demographic characteristics such as age, gender, education level, and geographical location to discern differential impacts and formulate targeted interventions (Zhong, 2024).

Figure 1 below shows the trend of SEG (Human Development Index – HDI) in West Africa (1991–2022). The available data revealed various patterns of growth and development across different countries. Some countries had achieved better HDI status, while the state of others is not encouraging over the years.

Figure 1.
Trend of Sustainable Economic Growth (HDI) in West Africa (1991–2022)



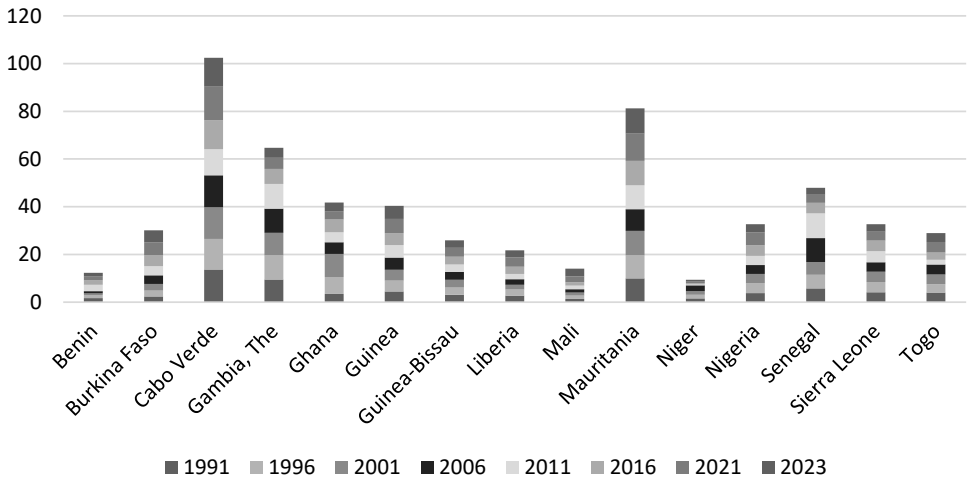
Source: United Nations Development Programme.

The trend analysis of the HDI in West Africa from 1991 to 2022 shows various patterns of growth and development across different countries. Many countries in West Africa have shown an overall improvement in HDI over the years. This is evident from the generally increasing values of HDI for most countries from 1991 to 2022. However, the rate of improvement varies among countries. Some countries have experienced steady growth in HDI, while others have shown fluctuations or slower progress. The leading performing countries are Cabo Verde, Ghana, Mauritania, and Senegal. These countries have consistently shown higher HDI values

compared to other countries in the region. Despite the overall improvement, challenges remain in achieving SEG and human development. Countries like Niger, Guinea, and Mali continue to have relatively low HDI values. Within the surveyed period, some countries experienced a plateau or slight decrease in HDI values compared to previous years. This could be attributed to various factors such as economic slowdowns, political instability, or environmental challenges. Overall, while there is progress in human development across West Africa, sustained efforts and targeted interventions are necessary to address persistent challenges and ensure inclusive and sustainable growth for all countries in the region.

In a similar development, figure 2 clearly shows the unemployment rate in West Africa (1991–2023). The rates of unemployment across West African countries revealed variations of outcomes across the year under review. As presented in the tale and graph below, West African countries performed differently in the management of their unemployment rate.

Figure 2.
The Unemployment Rate in West Africa (1991–2023)



Source: World Bank Development Indicator, 2023.

The trend analysis of the unemployment rate in West Africa from 1991 to 2023 reveals several important insights: The unemployment rates across West African countries have shown fluctuations over the years. While some countries have experienced a decrease in unemployment, others have seen increases or stability. Different countries exhibit varied performances in managing unemployment. For instance, countries like Gambia, Liberia, Niger, and Togo have had generally low unemployment rates throughout the years, indicating relative stability in their labor markets. On the other hand, countries like Burkina Faso, Cabo Verde, Mauritania, and Senegal have faced higher unemployment rates with greater fluctuations. In recent years, some countries have shown improvements in their unemployment

rates (2016–2023), indicating positive developments in their labor markets. However, challenges remain in achieving sustained reductions in unemployment, especially in countries with historically high rates. In conclusion, while there are signs of progress in managing unemployment in West Africa, concerted efforts and targeted policies are needed to address persistent challenges and promote inclusive economic growth and employment opportunities across the region.

Regarding the link between UNP and SEG, the theoretical underpinnings of the study derive from Okun's law and human capital theory. Okun's law, introduced in 1962, is central to the study. It posits an inverse relationship between economic growth and unemployment. Okun's law suggests that when an economy experiences higher economic growth, unemployment tends to decrease, and vice versa. This law further revealed the inverse connection between these two key economic indicators. This law provides a rule of thumb for policymakers, allowing them to estimate how changes in economic growth might influence unemployment rates and vice versa. Despite its simplicity, Okun's law has remained a useful tool for assessing the health of an economy and the effectiveness of economic policies. The Human Capital Theory (HCT), framed by Gary Becker, sheds light on the role of education and skills in migration decisions. In the African context, where a substantial youth population acquires education and skills, the theory underscores a paradox- the migration of skilled individuals seeking avenues that match their qualifications. The theory posits that individuals invest in education to enhance their human capital, making them more attractive to employers. However, the mismatch between acquired skills and available job opportunities within Africa propels individuals to seek employment abroad. Unemployment, therefore, becomes a consequence of the disjuncture between skill acquisition and the job market's demands (Sumaworo, 2020).

The empirical literature on unemployment (UNP) and sustainable economic growth (SEG) in West Africa reveals a categorized pattern of inquiry, with significant emphasis on the determinants and developmental consequences of unemployment. In this context, Rakauskienė and Ranceva (2014) investigated the dynamics of youth unemployment and emigration trends, particularly focusing on the relationship between the two phenomena. The study revealed that youth unemployment rates globally have exceeded 12.5%, affecting a greater number of young individuals. Furthermore, the detrimental impact of unemployment on young people's prospects, including increased social unrest and the risk of extremism, was emphasized. Additionally, the study underscored the correlation between youth unemployment and emigration, noting that economic and financial factors predominantly drive emigration among young people. Zhong (2024) investigated the relationship between real GDP growth rates and unemployment rates in the United States, especially in the context of the post-COVID-19 era. The study found a negative correlation between real GDP growth rates and unemployment rates, consistent with economic theory.

Başol *et al.* (2023), examined the impact of the Digital Economy and Society Index (DESI) on youth unemployment across 27 European Union (EU) countries from 2018 to 2021. The findings revealed a significant negative relationship between

DESI and youth unemployment across the EU countries examined. Nolte-Troha et al. (2023), provided an updated review of the relationship between unemployment and substance use disorders (SUDs), with a focus on North America and Europe. This revealed significantly higher rates of SUDs among unemployed individuals, indicating unemployment as a risk factor for SUD. The analysis also suggested a bidirectional relationship between unemployment and SUD, with evidence supporting both causal directions. However, the correlation between unemployment and relapses or smoking cessation showed inconsistency. Leonardi *et al.* (2018), identified the factors related to unemployment in a sample of individuals aged 18–64 from Finland, Poland, and Spain. The study identified several factors significantly associated with unemployment. Health status indicators such as physical disability, self-rated health, inpatient care, and difficulties with daily activities were strongly correlated with unemployment.

Agbarakwe and Bredino (2024) explored how Cuba, despite facing significant economic sanctions and internal challenges, maintains one of the lowest unemployment rates globally. The study revealed that Cuba employed a significant portion of its labor force in state-owned enterprises, which stabilizes employment levels. Abdul-Khaliq *et al.* (2014) empirically investigated the relationship between unemployment rates and economic growth, as measured by GDP, across nine Arab countries over a period from 1994 to 2010. The study found a statistically significant negative relationship between economic growth and unemployment, consistent with Okun's law. The study indicated that population growth in these Arab countries may exacerbate unemployment issues.

Eshun (2020) examined the link between economic growth and unemployment in ten West African countries from 2004 to 2017 using fixed effects regression models. Data from the World Bank Indicators covered nations such as Ghana, Nigeria, Liberia, and Côte d'Ivoire. The study employed fixed effects to mitigate omitted variable bias, while random effects and time-fixed effects regressions ensured result consistency. The findings supported Okun's law, revealing that a one-unit rise in unemployment led to a 0.311% annual decline in economic growth. This underscores the significant impact of unemployment on economic performance.

Akinyele *et al.* (2023), investigated the drivers of unemployment intensity in SSA with findings that there is a low level of government efficiency in increasing the objective of human development in Africa. Baah-Boateng (2016), conducted an empirical assessment of the main sources of youth unemployment in Africa. The empirical analysis revealed several key drivers of youth unemployment in Africa, prominent among which are demographic youth bulge and poor economic growth from both supply and demand sides of the market, employment-to-population ratio and the prevalence of vulnerable employment. Iloabuchi (2019) estimated the impact of unemployment on the economic growth of Nigeria using time series data from 1999 to 2017. The findings underscore the need for development in other economic sectors to diversify the economy and create jobs for unemployed young people in Nigeria.

The summary of the reviewed literature with global findings highlights that unemployment is multifaceted in nature, linking it to youth emigration, economic

growth, digitalization, SUDs, and health conditions, emphasizing the need for targeted policy interventions. On the other hand, those studies on West Africa collectively revealed that unemployment negatively impacts economic growth, with factors such as weak governance, demographic pressures, and limited economic diversification exacerbating joblessness. While state intervention can stabilize employment, SEG and structural reforms are necessary for long-term employment solutions.

3. Methodology

The study employs a panel dataset on West African countries to assess the impact of UNP on SEG following an *ex-facto* research design, combining descriptive analysis with the application of econometric estimations. Covering the period from 1991 to 2023, this study is anchored on the neoclassical growth model, a theoretical framework that elucidates the dynamics of economic growth driven by exogenous factors. The mathematical representation of this model can be encapsulated in the Cobb-Douglas production function:

$$Y = A.K^{\alpha}L^{1-\alpha}$$

Where:
Y – output or production;
A – technological progress or total factor productivity;
K – capital stock;
L – the labor force;
α – the share of capital in total income.

In line with the theoretical framework, this study adopted the model used in the study conducted by Chepel *et al.* (2021), and Komguep and Nembot (2021). The relationship between UNP and SEG can be presented in the following functional model:

$$SEG_{it} = \left(UNP_{it}, KA_{it}, REM_{it}, INFL_{it}\right) \tag{1}$$

where i is the cross-sectional identifier and it stands for the ith country and t is the time identifier for the ith year. The functional model of the relationship between UNP and SEG can be rewritten as follows:

$$SEG_{it} = \beta_1 + \beta_2 UNP_{2it} + \beta_3 KA_{3it} + \beta_4 REM_{4it} + \beta_5 INFL_{5it} + u_{it} \tag{2}$$

Where:
SEG – sustainable economic growth,
UNP – unemployment,
KA – capital stock,
REM – remittance inflows,

INF – inflation,
β_1 – intercept parameter,
$\beta_1 \ldots \beta_5$ – slope coefficients,
i – 1, 2, 3, 4 … 16,
t – 1, 2 … 33,
u_{it} – stochastic disturbance term.

Based on the assumption that all the variables on the right-hand side of the model explain SEG, some of these variables may still be endogenous, meaning that reverse causality could occur. Hence, the effect of the causality relationship between UNP and SEG is presented in the following functional model:

$$\Delta SEG_t = \beta_1 + \sum_{t=1}^{n} \beta_2 \Delta UNP_{t-1} + e_t \tag{3}$$

$$\Delta UNP_t = \beta_3 + \sum_{t=1}^{n} \beta_4 \Delta SEG_{t-1} \tag{4}$$

β_1 – intercept parameter,
$\beta_1 \ldots \beta_4$ – slope coefficients,
u_{it} – stochastic disturbance term.

In the equations, the variables on the left-hand side of each equation are expressed in their first difference, those on the right-hand side are optimum lagged differences of six variables with one period lagged error term, while is e_t is the disturbance term.

This study utilized the Human Development Index (HDI) to measure SEG. HDI was chosen because it considers not only income but also health and education, thereby addressing issues of equity and inclusivity. This broader perspective aligns well with the principles of SEG, emphasizing human well-being over just economic numbers (Chepel *et al.*, 2021; Sánchez *et al.*, 2020; Jansen *et al.*, 2024). Similarly, the unemployment rate was used to capture unemployment, because it offers a comprehensive view of employment dynamics, accounts for underemployment and skill mismatches, is versatile and comparable, andhas policy relevance (Brunow *et al.*, 2015; Chepel *et al.*, 2021; Komguep & Nembot, 2021).

The data for this analysis were collected from the United Nations Development Programme (UNDP) database, 2023 and the World Bank (WB) World Development Indicators (WDI) database, 2024. With the focus on the 16 West African countries, *i* covers the first to the last country, while *t* is the period from the first year to the last year of the scope of the study (1991 to 2023).

In the analysis of the data, the study applied pre-estimation tests comprising of normality, multicollinearity, and unit root tests. The estimation techniques employed are panel Autoregressive Distributed Lag (p-ARDL) with a Kao cointegration test and cross-section short-run coefficient. The panel Autoregressive Distributed Lag (p-ARDL) was adopted because of its ability to include variables that are in a different order of integration. It is also useful because it estimates both short-term and long-term relationships at the same time, giving a more complete understanding

of how variables interact over time. Another strength of the p-ARDL model is its ability to account for differences in how individual units (like countries or regions) respond in the short term, while still assuming a common long-term relationship.

4. Result and Discussion

The results of the descriptive statistics are presented in table 1.

Table 1.
Descriptive statistics

	SEG	KA	UNP	REM	INF
Mean	0.439346	21.15917	5.475900	4.242956	7.480915
Median	0.442500	19.82896	4.229000	2.338530	4.147253
Maximum	0.668000	52.66984	31.31300	26.83710	69.58364
Minimum	0.214000	–2.424358	0.317000	0.000000	–7.796642
Std. Dev.	0.093965	9.820166	3.846256	4.616592	10.40709
Skewness	0.144960	1.010405	1.797575	1.691285	2.468830
Kurtosis	2.934504	4.103702	10.47450	6.285592	10.35104
Jarque-Bera	1.693255	101.6185	1318.538	426.2072	1503.016
Probability	0.428859	0.000000	0.000000	0.000000	0.000000
Observations	460	460	460	460	460

Source: authors' computation, 2024, based on UNDP and WDI data.

The descriptive statistics above revealed that SEG exhibits a moderate mean of 0.439, bounded between 0.214 and 0.668, with a low standard deviation (0.094), indicating limited dispersion. Its positive skewness (0.145) and kurtosis (2.934) imply a slightly right-skewed and moderately peaked distribution. The Jarque-Bera (JB) statistic of 1.693 ($p = 0.429$) suggests SEG is normally distributed at the 5% significance level. Unemployment shows a mean of 5.476, with substantial dispersion (SD = 3.846) and extreme values between 0.317 and 31.313. The high skewness (1.798) and kurtosis (10.475) point to frequent high unemployment episodes, with the JB statistic (1318.538, $p < 0.01$) indicating strong deviation from normality.

Capital stock records a mean of 21.160, ranging from –2.424 to 52.670, with a standard deviation of 9.820, denoting moderate variability. A right-skewed (1.010) and leptokurtic (4.104) distribution is evident, indicating occasional large capital inflows. The JB statistic of 101.619 ($p < 0.01$) confirms non-normality. Remittances have a mean of 4.243 and vary widely (0 to 26.837), with a high standard deviation (4.617). The distribution is positively skewed (1.691) and leptokurtic (6.286), reflecting occasional surges in remittance inflows. The JB test (426.207, $p < 0.01$) confirms non-normality. Inflation averages 7.481, but spans from –7.797 to 69.584, with substantial variability (SD = 10.407). Its high skewness (2.469) and kurtosis

(10.351) suggest frequent inflation spikes, and the Jarque-Bera statistic (1503.016, $p < 0.01$) further confirms non-normal distribution.

The pairwise correlation coefficients were computed and the results of the pairwise association of each pair of variables in the study are reported in table 2.

Table 2.
Correlation matrix

	SEG	KA	UNP	REM	INF
SEG	1.000	0.495	0.420	0.415	−0.089
KA	0.495	1.000	0.333	0.311	0.012
UNP	0.420	0.333	1.000	0.353	−0.038
REM	0.415	0.311	0.353	1.000	−0.202
INF	−0.089	0.012	−0.038	−0.202	1.000

Source: authors' computation, 2024, based on UNDP and WDI data.

The correlation analysis presented in table 2. provides a comprehensive understanding of the interrelationships between the variables.

The relationship between SEG and UNP exhibits a moderate positive correlation (0.420), which might seem counterintuitive, as economic growth is generally expected to reduce unemployment. However, in the context of West Africa, this relationship could be explained by structural changes in the economy. As economies grow with appropriate reforms, there might be a shift from agriculture to more capital-intensive industries, which could initially increase unemployment rates before the job market adjusts. SEG and KA are moderate and positive (0.495), reflecting the importance of capital stock in driving economic growth. This moderate correlation indicates that increases in capital stock are associated with higher levels of sustainable economic growth. This is consistent with economic theories that place emphasis on the role of capital accumulation in fostering growth and development.

The correlation between SEG and REM is also moderate and positive (0.415), suggesting that remittances contribute to economic growth. The negative correlation between SEG and INF (–0.089) is very weak, indicating that inflation has little direct impact on SEG in this dataset.

KA and REM also show a moderate positive correlation (0.311), suggesting that increased capital stock is associated with higher remittance inflows. The correlation between KA and INF is 0.012, indicating no meaningful relationship between capital stock and inflation. UNP and REM exhibit a moderate positive correlation (0.353), suggesting that higher unemployment is associated with higher remittances.

UNP and INF have a very weak negative correlation (–0.038), indicating that inflation does not significantly affect unemployment rates. The relationship between inflation and unemployment is complex and can vary depending on the economic context. In the short term, inflation might reduce unemployment by stimulating demand, but in the long term, it can lead to economic instability and job losses.

REM and INF have a weak negative correlation (–0.202), suggesting that higher remittances are associated with lower inflation.

To test for cross dependence, the Breusch-Pagan Lagrange Multiplier (LM) test was used. This is used to assess cross-sectional dependence in panel data models. It is particularly effective when the time dimension (T) is larger than the number of cross-sectional units (N), as it evaluates whether variations in residuals are systematically influenced by explanatory variables (Lee & Robinson, 2016).

Table 3.
Residual Cross-Sectional Dependency Test

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	47.17046	91	1.0000
Pesaran Scaled LM	–3.248861	–	0.0012
Pesaran CD	1.785596	–	0.0742

Source: authors' computation, 2024, based on UNDP and WDI data.

The computed LM statistic of 47.170, with 91 degrees of freedom, yields a p-value of 1.000. As this p-value exceeds conventional significance thresholds (0.10, 0.05, and 0.01), the null hypothesis of no cross-sectional dependence cannot be rejected. This implies that residuals across cross-sectional units are not significantly correlated, confirming the absence of spatial dependence in the panel dataset.

In the test for the unit root of the variables in the study, for the purpose of robustness, three major methods of unit root testing, comprising of Levin, Lin & Chu (LLC), Augmented Dickey-Fuller Test (ADF) and Phillips-Perron (PP) under three different level of specifications (i.e. none, individual intercept and individual intercept and trend) were applied. The results of these tests are reported in table 4.

Table 4.
Unit Root Test (Summary for LLC, ADF, and PP Tests)

Variable	LLC Test	ADF Test	PP Test	Order of Integration
SEG	Non-stationary at level; stationary at 1st difference	Stationary at 1st difference (5%)	Stationary at 1st difference	I(1)
KA	Non-stationary at level; stationary at 1st difference	Stationary at 1st difference (1%)	Stationary at 1st difference	I(1)
UNP	Non-stationary at level; stationary at 1st difference	Stationary at 1st difference (1%)	Stationary at 1st difference	I(1)
REM	Weakly non-stationary at level; stationary at 1st difference	Stationary at 1st difference (1%)	Stationary at 1st difference	I(1)
INF	Stationary at level (1%); confirmed at 1st difference	Stationary at level and 1st difference	Stationary at level and 1st difference	I(0)

Source: authors' computation, 2024.

The unit root tests indicate that SEG, KA, UNP, and REM are I(1), while INF is I(0). This implies that most of the variables exhibit persistence and require differencing to achieve stationarity, except for inflation, which is already stationary. Similarly, the analysis was conducted using the Panel Autoregressive Distributed Lag (ARDL) estimation technique, and prior to the estimation the panel cointegration test was conducted to test for the presence or otherwise of long-term cointegrating relationships between the variables in the model to justify using the ARDL approach.

Table 5.
Kao cointegration test of the effect of unemployment on sustainable economic growth

Test Statistics	Value	Prob.
P – Value	–2.080	0.019
Residual Variance	0.000	
Hac Variance	0.000	

Source: authors' computation, 2024, based on UNDP and WDI data.

The Kao cointegration test examines the long-term relationship between UNP and SEG. Based on the test results provided in table 5, the test statistic value is –2.080, with a probability (P-value) of 0.019. Since the P-value is less than the 0.05 significance level, we reject the null hypothesis of no cointegration. This indicates that there is a statistically significant long-term cointegrating relationship between UNP and SEG in the dataset. The residual variance and the HAC variance are both reported as 0.000. This implies that the residuals from the cointegration regression have very low variance, indicating a good fit of the model to the data. Economically, the significant cointegration result suggests that changes in unemployment have a long-term impact on SEG in West Africa.

Table 6.
Panel ARDL results of the effect of unemployment on sustainable economic growth

Dependent variable: SEG				
Variance	Co-efficient	Standard Error	T - Statistics	P – Value
Short-run coefficient				
Cointeq01	–0.015	0.007	–2.098	0.036
D(UNP)	–0.000	0.001	–0.563	0.574
D(KA)	0.098	0.097	1.007	0.315
D(REM)	0.000	0.000	1.143	0.254
D(INF)	0.000	0.000	0.006	0.995
Long-run coefficient				
UNP	0.008	0.003	2.967	0.003
KA	0.003	0.001	4.436	0.000
REM	–0.011	0.003	–3.306	0.001
INF	0.001	0.001	0.723	0.470

Diagnostic tests				
Test Statistics	Test Types	Values	Prob.	Decision
Normality Test	Jarque-Bera test	4211.347	0.100	
Wald Test	F – Statistics	7.920	0.000	

Source: authors' computation, 2024, based on UNDP and WDI data.

Table 6. presents the Panel ARDL estimates, revealing both short-term and long-term dynamics between UNP and SEG, alongside the roles of capital stock, remittances, and inflation. The error correction term (ECT = –0.015; t = –2.098; p = 0.036) is negative and significant at the 5% level, confirming long-term convergence at an adjustment speed of 1.5% per period. This indicates a slow but steady correction toward equilibrium following short-term disequilibria, highlighting the necessity for sustained policy efforts.

In the short term, unemployment exhibits an insignificant negative effect on growth (β = –0.000; t = –0.563; p = 0.574), implying limited immediate impact of labor market fluctuations on growth. In contrast, the long-run coefficient is positive and significant (β = 0.008; t = 2.967; p = 0.003), suggesting that higher unemployment may reflect structural transformation processes, such as sectoral labor shifts or technological realignment, potentially enhancing long-term productivity.

Capital stock shows no significant short-term impact (β = 0.098; t = 1.007; p = 0.315), likely due to infrastructural and investment bottlenecks in West Africa. However, its long-term effect is positive and highly significant (β = 0.003; t = 4.436; p < 0.001), underscoring the importance of long-term capital formation and infrastructure development for sustainable growth.

Remittances have a statistically insignificant short-term effect (β = 0.000; t = 1.143; p = 0.254), indicating limited immediate economic productivity impact, likely due to consumption-driven use. Conversely, the long-term impact is significantly negative (β = –0.011; t = –3.306; p = 0.001), implying that persistent reliance on remittances without productive reinvestment may hinder long-term growth. This underscores the need for policy frameworks that channel remittance inflows into investment and entrepreneurship.

Inflation shows no significant impact in either the short term (β = 0.000; t = 0.006; p = 0.995) or long term (β = 0.001; t = 0.723; p = 0.470), suggesting price level changes exert negligible influence on sustainable growth across the panel. This may reflect effective monetary controls or inflation-tolerant economic structures.

Diagnostic tests support model validity: while the Jarque-Bera statistic (4211.347; p < 0.001) indicates non-normal residuals, the Wald test (F = 7.920; p < 0.001) confirms joint significance of regressors, validating the explanatory strength of the model.

To summarize, the divergence between short-term insignificance and long-term significance of unemployment implies that transitional dislocations may obscure beneficial structural transformations. These findings stress the importance of long-term strategies to harness structural changes for sustainable growth, particularly through expanding capital and productive remittance utilization.

Table 7.
Cross-section short-run coefficients of the effect of unemployment on sustainable economic growth

Country	DUNP	DKA	DREM	DINF	COINTEQ
Benin	0.000 (0.000) [161.844]	−0.000 (0.000) [−3254.777]	0.000 (0.000) [161.844]	−0.000 (0.000) [−12805.640]	−0.042 (0.000) [−141.287]
Burkina Faso	−0.000 (0.000) [−323.358]	0.000 (0.000) [3825.113]	0.004 (0.000) [563.679]	−0.000 (0.000) [−9894.989]	−0.002 (0.007) [−6.527]
Cabo Verde	−0.000 (0.000) [−17329.131]	−0.006 (0.000) [−15062.470]	0.000 (0.000) [357.268]	0.000 (0.000) [8588.915]	−0.045 (0.000) [−172.605]
Côte d›Ivoire	−0.001 (0.000) [−3229.109]	0.000 (0.000) [4944.070]	−0.002 (0.000) [−153.430]	−0.000 (0.000) [−7874.001]	0.026 (0.007) [77.856]
Gambia	0.000 (0.000) [395.036]	−0.000 (0.000) [−1568.921]	−0.000 (0.000) [−8829.759]	0.000 (0.000) [3226.248]	−0.017 (0.000) [−452.456]
Ghana	−0.001 (0.000) [−3765.721]	−0.000 (0.000) [−5064.792]	0.001 (0.000) [6088.048]	−0.000 (0.000) [−6578.280]	−0.014 (0.000) [−336.463]
Guinea	−0.001 (0.000) [−216.601]	0.000 (0.000) [26721.520]	−0.000 (0.000) [−282.999]	0.000 (0.000) [1904.239]	−0.031 (0.000) [−229.576]
Guinea-Bissau	−0.009 (0.000) [−28.349]	0.000 (0.000) [3569.385]	−0.000 (0.000) [−748.170]	−0.000 (0.000) [−1635.640]	0.010 (0.000) [163.299]
Liberia	−0.002 (0.000) [−212.808]	1.554 (0.537) [0.694]	−0.000 (0.000) [−481.334]	0.000 (0.000) [1433.263]	−0.012 (0.000) [−29.503]
Mali	−0.000 (0.000) [−1502.701]	0.000 (0.000) [3564.385]	−0.000 (0.000) [−75.511]	−0.000 (0.000) [−196.776]	−0.053 (0.000) [−551.911]
Mauritania	0.001 (0.000) [6231.454]	−0.000 (0.000) [−11123.970]	0.000 (0.000) [181.906]	−0.000 (0.000) [−2685.564]	−0.064 (0.000) [−192.895]
Niger	−0.000 (0.000) [−4656.490]	0.000 (0.000) [−21763.080]	0.001 (0.000) [3561.731]	−0.000 (0.000) [−28374.920]	−0.022 (0.000) [−368.314]
Nigeria	0.000 (0.000) [3010.713]	0.009 (0.000) [306.715]	0.000 (0.000) [2152.822]	0.000 (0.000) [227.879]	0.031 (0.000) [261.651]
Senegal	−0.000 (0.000) [−1956.649]	−0.000 (0.000) [−1464.008]	0.004 (0.000) [1176.380]	−0.000 (0.000) [−441.799]	0.008 (0.000) [109.965]
Sierra Leone	0.000 (0.000) [395.777]	0.000 (0.000) [800.329]	−0.000 (0.000) [−313.271]	−0.000 (0.000) [−1010.774]	−0.014 (0.000) [−35.044]
Togo	0.003 (0.000) [1414.846]	0.001 (0.000) [11190.630]	−0.000 (0.000) [−772.360]	−0.000 (0.000) [−7087.574]	0.010 (0.000) [−86.505]

Note: Table entries report coefficient estimates. P-values are given in parentheses ( ), and t-statistics are reported in square brackets [ ].
Source: authors' computation, 2024, based on UNDP and WDI data.

The cross-section short-run coefficients in table 7. offer a detailed view of the effect of UNP on SEG across different West African countries.

In countries like Côte d'Ivoire, Ghana and Guinea, unemployment exerts a statistically significant negative effect, suggesting that short-term increases in unemployment reduce sustainable growth. This supports the Keynesian view of underutilized labor resources reducing output potential.

Interestingly, Nigeria and Mauritania report positive though negligible coefficients on unemployment, indicating that minor short-term unemployment spikes may not immediately harm growth, possibly due to structural shifts or informal sector absorption. However, these coefficients are extremely small, and their economic significance is limited.

The capital accumulation variable showed mixed outcomes. While countries like Côte d'Ivoire, Burkina Faso, and Nigeria exhibited positive capital accumulation coefficients, indicating that capital investment contributes positively to short-term growth, countries like Cape Verde and Ghana reported negative or near-zero effects, potentially reflecting inefficiencies or capital misallocation in those economies.

Remittances showed positive and significant effects in several economies, notably Burkina Faso, Senegal and Ghana. This suggests that remittance inflows act as a financial buffer that can spur consumption and investment in the short term. Conversely, negative coefficients in countries such as Côte d'Ivoire and Guinea imply that remittances may disincentivize labor supply or be used for non-productive consumption.

Inflation mostly demonstrated negative short-term effects, particularly in Benin, Burkina Faso, Ghana, and Niger, implying that inflationary pressures reduce real incomes and hinder sustainable growth in the short term. This reinforces classical macroeconomic theories regarding the distortionary effect of price instability on output.

The error correction term is negative and statistically significant in most countries, consistent with economic theory. For instance, Mali, Mauritania and Cape Verde display large negative coefficients, suggesting strong convergence to long-term equilibrium. Conversely, positive or weakly negative coefficients in countries such as Nigeria and Côte d'Ivoire may indicate slow or unstable adjustment paths, perhaps due to structural rigidities or policy lags.

Overall, the results highlight significant cross-country differences in the short-term dynamics of unemployment and its macroeconomic transmission mechanisms. While most countries experience a detrimental effect of unemployment on sustainable growth, the magnitude and direction of the influence of other covariates vary according to institutional efficiency, economic structure and macroeconomic stability.

5. Conclusion and Recommendations

This study examined the dynamic relationship between UNP and SEG in West Africa using the Panel ARDL estimation method, supported by the Kao cointegration test. The empirical results confirm the existence of a significant long-term relationship, indicating that unemployment has a persistent influence on economic performance in the region. Interestingly, while unemployment shows no significant short-term effect, it exhibits a positive long-term impact on SEG, suggesting potential structural labor market inefficiencies or informal sector dynamics that may mask the adverse effects of unemployment. Additionally, capital stock exerts a robust positive effect on long-term growth, underscoring the importance of sustained investment. In contrast, remittances negatively influence economic growth in the long run, likely

due to their predominant use for consumption rather than productive ventures. Inflation shows no statistically significant impact in either the short or long term. Country-specific analyses further reveal heterogeneity in unemployment-growth dynamics, with some countries experiencing negative impacts, while others registered moderate or positive effects. These variations highlight the complexity of the effect of unemployment across different national contexts.

Based on these findings, several targeted policy recommendations are proposed. First, to mitigate the long-term structural effects of unemployment, West African governments should prioritize human capital development through vocational training, entrepreneurship support and public-private partnerships aimed at creating decent jobs. Labor market reforms should also focus on better ways to integrate informal sector activities into the formal economy. Second, given the negative impact of remittances on long-term growth, fiscal and financial policies should be designed to encourage the productive use of remitted funds. Governments and financial institutions should develop tailored investment vehicles and offer tax incentives or matching schemes to redirect remittances toward small and medium-sized enterprises (SMEs), education and infrastructure development. Furthermore, enhancing financial literacy among remittance recipients can foster more efficient allocation of funds. Lastly, regional institutions such as ECOWAS should coordinate labor mobility strategies and support member states in designing context-sensitive employment policies that promote inclusive and sustainable growth.

Future research should explore the impact of the COVID-19 pandemic on labor market dynamics and SEG within the region, as the crisis likely induced both temporary disruptions and structural shifts. Given the divergence between short and long-term unemployment effects observed in this study, analyzing the post-pandemic period could offer policy direction about how labor reallocation, digital transformation and sectoral adjustments have influenced growth trajectories.

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