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ARTICLE

Interaction effect of institutional quality on the relationship between economic factors and unemployment in Sub-Saharan Africa

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Abstract

The unemployment rate in Sub-Saharan Africa (SSA) has been steadily increasing over the years. This rise may be attributed to weak institutional quality. Although governments in SSA countries have adopted several policies to improve institutional quality, unemployment still remains a critical problem in SSA. Several studies on the determinants of unemployment have failed to consider the impact of institutional quality on unemployment. The study employed an ex-post facto research design to examine the determinants of unemployment and the role of institutional quality in SSA. Based on data availability, panel data between 1996 and 2021 from 24 selected countries were used for the analysis. Data were analyzed using the Dynamic Panel Autoregressive Regressive Distributed Lag. The study adopted a 5% level of statistical significance. Findings indicated the existence of long-run relationships among the variables. The study concluded that institutional quality affected unemployment in SSA. The study recommended that all countries in the region should strengthen their institutional quality by ensuring political stability and regulatory quality to reduce the rate of unemployment.

Keywords: Economic growth, Exchange rate, Gross domestic product, Institutional quality, Trade openness, Unemployment, Urbanization

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1. Introduction

Unemployment presents a persistent challenge impacting economies worldwide, irrespective of their financial status. Nevertheless, its impact is particularly pronounced in developing regions, notably within sub-Saharan Africa (SSA). For example, countries like Angola, Cabo Verde, Eswatini, Botswana, Kenya, Burundi, Mozambique, Zambia, Nigeria, Senegal, Sierra Leone, Togo, Guinea, and Burkina Faso grapple with notably high unemployment rates (**Dannes, 2023**). One of the main developmental issues that the SSA sub-policy makers region's still struggle with is unemployment. Literature documents that Africa is endowed with enormous human and other natural resources that are capable of stimulating a sound economic performance (**Christopoulos, Loizides & Tsionas, 2005; Afonso & Jalles, 2011; Gisore, Symon, Aquilars & James, 2014**). Thus, African economies experienced surges in outputs, especially

the resource-rich countries (**Gisore, Symon, Aquilars & James, 2014**). However, the performance was not without government involvement, which tends towards improved welfare of the people (**Rogers, Duraiappah, Antons, Munoz, Bai, Fragkias & Gutscher, 2012**).
African nations' economies are fueled by a variety of factors. However, because of the supportive and sustainable environment that the government creates, the function of government involvement becomes essential. Economic growth is achieved by a variety of variables, including supply elements (natural resources, human resources, capital goods, and technology (**Hossain,Tahrim, & Rahman, 2018; Dao, 2014**). Due to problems with labor-intensive processes, the importance of labor force participation in African nations in particular cannot be overstated. Labor productivity is seen as a strong and vital economic engine. The majority of African countries still have low levels of development despite greater productivity, higher government spending, and endowed resources

In addition, the **United Nations' (2018)** Human Development Index (HDI), places the majority of African nations lowly in terms of human development indices. Increased growth without a matching decline in the unemployment rate has been a hallmark of Africa's economy. Thus, the relationship between economic growth and unemployment is called into question, particularly in Sub-Saharan Africa, where labor-intensive industrial methods are known to predominate (**Conceição, et al., 2016**).

Numerous studies have been conducted throughout the years in a variety of units to look into and assess the causes of unemployment. Studies have looked at the impact of both supply and demand on unemployment (**Onimisi, 2014; Silvia & Nguyen, 2017**). The phenomena nonetheless continue, and research on the nature of the association have produced contradictory ideas and actual results. The majority of African nations struggle with development challenges including high unemployment rates. Nigeria's unemployment rate as being 23.9% in 2012), yet the study consistently demonstrates economic expansion (**Philip et al., 2013**).

The majority of nations in sub-Saharan Africa have high populations in the world, which can have the potential to propel African economic development despite the worrisome unemployment that is ravaging the region despite output growth (**Akinyele, Oloba & Mah, 2022**). **Akeju and Olanipekun (2015)** found that most Sub-Saharan African (SSA) economies have historically had significant unemployment rates. This finding runs counter to accepted economic theories such the Okun's rule, which indicated that a 2.5% increase in real yearly growth rate results in a 1% reduction in unemployment (Efrianti et al., 2018). Could this be due to how inept and inefficient governments operate in SSA nations? Government intervention, according to Keynesian proponents, expedites market forces' ability to respond to any significant disruption.

Employment opportunities and economic growth are both macroeconomic factors that governments have developed policies to address within fiscal and financial frameworks in various nations (**Ghosh, 2007**). In this regard, Africa has had phenomenal economic growth, especially among SSA nations, where the average annual growth rate was 2.2% during the past ten years (Kenya, 5.3%; South Africa, 0.15; Nigeria, 2.2%; Gambia, 5.10%; and Togo, 5.3%; (**World Bank, 2022**). In summary, the World Bank calculated that, in contrast to the link between economic growth and unemployment rate in SSA, the region with the largest concentration of natural resources had a high unemployment rate compared to other nations. In order to combat long-term poor development, this lays a considerable emphasis on Africa's natural resource endowment and government effectiveness. Therefore, when there are inadequate government institutions to offer an enabling and sustainable environment that would boost a healthy and dynamic economy as recommended by Keynesians' proponents, the potential of endowed resources and employment generation may be fragile (**Akinyele, Oloba and Mah, 2023**).

The possible role of government in the equal distribution, production, and stability of essentially in a setting characterized by macroeconomic imbalance has been discussed in the literature (**Rajan, 2010; Ranciere, et al. 2012; Pettis, 2013; Frank., 2014; Bertrand & Morse, 2016; Piketty, 2018**). Additionally, studies have looked at the role of government institutions in accomplishing any of the welfare goals, and the results point to the idea that the effectiveness of these institutions governs how an economy develops (**Kim et al., 2018; Hall & Ahmad, 2012; Slesman, 2015; Acemoglu & Robinson, 2008**). Therefore, the resolution of any development-related concerns, such as unemployment, depends on government performance.

It becomes essential that government performance be improved. The improvement of job opportunities and increased output expansion brought about by job creation for the active population will induce government performance through the reduction of social vices. A performing government will encourage investors and engage the active population in day-to-day activities. Unemployment has evolved into a

cankerworm, wreaking havoc on the Sub Sahara Africa countries economy. High unemployment in any economy is a source of concern for policymakers and the general public (**Lindbeck, 1976**). According to recent reports, Nigeria has the world's second-highest unemployment rate (33.3 per cent), with Namibia being the unemployment capital of the world with the highest unemployment rate of 33.4 percent (**Ashipala, 2019**). Apart from the unemployment rate of 33.3 percent in the fourth quarter of 2020, some Nigerians in the labor force are in suboptimal employment situations, with as many as 22.8 percent of Nigerians in the labor force being underemployed.

According to **Akokpari, (2007)** the problem of long-term unemployment in Sub-Saharan Africa countries is now terrifying because it is making poverty, misery, and social unrest worse, as well as ethnic and religious conflicts, robbery, kidnappings, terrorism, and other social problems worse, which makes it even more dangerous. These have presented a significant threat to policy experts, human resource experts, and those involved in unemployment programs, planning, and implementation. Since the early 1970s oil boom, Nigeria's and some African countries revenue base has been heavily reliant on the oil sector, which has provided more than 96 percent of total export earnings. Unemployment rate remains high in Sub-Saharan Africa countries, resulting in poverty and an infrastructural deficit (**Okolobah & Ismail, 2013**). Investment in infrastructure services such as transportation, water and sanitation, power, telecommunications, and irrigation is critical in any economy's structural transformation. There is a deficit in terms of infrastructural facility development in Sub-Saharan Africa. As a result, firms' levels of output are at a very low level. This would automatically cause firms to reduce the number of workers to maintain the profit motive of the firm (**Tybout, 2000**)

In conclusion, an infrastructural deficit would lead to unemployment and poverty. Several decades ago, agriculture appeared to be the primary source of livelihood in Sub-Saharan Africa, and as a result, population growth was positively related to production. It was assumed that an increase in the population implies greater productivity and security since more workers will be available to engage in the production of goods and services in the country (**Tartiyus, Dauda, & Peter, 2015**).

Unemployment is a major barrier to social progress. Apart from being a substantial waste of a country's human capital, it also leads to decrease in the level of productivity, hence diminishing welfare and income levels (**Nya, 2021**). Unemployment is a significant problem in Africa, particularly in Sub-Saharan Africa countries, which has a rapidly growing population. The need to mitigate the adverse effects of unemployment has pushed the resolution of unemployment issues to the forefront of many developing countries' development goals. In addition, the majority of these countries' economies are characterized by low productivity (**Nickell, S., & Layard 1999**). If the trend of rising unemployment rates in Sub-Saharan Africa countries is to be reversed and reduced to acceptable levels, more informed policy responses are required.

The fundamental objective for both developed and emerging nations is to minimize unemployment and attain significant economic growth (**Soylu, Çakmak & Okur, 2018**). Economic growth and employment are two significant macroeconomic variables in a country's economic success. They are indispensable elements of the economic policies of many countries, mainly developed countries. Economic growth, as a way to measure how well a country is doing, is measured by gross national product (GNP), or the value of each person in the country (**Fialova, & Schneider, 2009**).The steadily increasing unemployment rate in Sub-Saharan Africa has sparked multiple concerns, with evidence suggesting a troubling cycle linking unemployment rates, crime, and conflict within communities, besides poverty. This unemployment issue in Sub-Saharan Africa represents a persistent pattern that seems resistant to policy responses from successive governments. Various measures, policies, and approaches have been put into action to address unemployment.

Despite all the concerted efforts by various governments geared toward job creation implications, unemployment reduction instead of reducing unemployment is increasing. Therefore, the researcher is of the opinion that there may be some latent factors responsible for this problem's persistence. Our interest is to interrogate those factors in the context of socioeconomic and institutional dimensions.

The complex nature of unemployment in this region necessitates a comprehensive examination of the factors that contribute to the issue, with a particular focus on the role of institutions. This study aims to investigate the influence of institutional factors on unemployment dynamics in Sub-Saharan Africa, recognizing that institutional structures can both exacerbate and alleviate joblessness.

Sub-Saharan Africa's institutional landscape is diverse, spanning a spectrum from well-established democratic

governance structures to countries grappling with political instability and weak institutional capacity. Institutions influence job creation and workforce participation through their impact on investment, business development, entrepreneurship, skills development, and the overall functioning of markets. Meanwhile, previous studies before now have attempted to explore determinants of unemployment; however, most of them focused on productivity and government expenditure, without due consideration that, irrespective of how much resources are available, we argue in this work that institutional quality have a significant roles to play.

The main objective of this study is to examine the interaction effect of institutional quality on the relationship between economic factors (inflation, economic growth, trade dependence, exchange rate, and interest rate) and unemployment.

2. Literature Review

Falsyah and Ahmed (2011) examined the determinants of unemployment in the Philippines using the Autoregressive Distributed Lag Method (ARDL). This study reveals that the Philippines labour market may be affected by a structural unemployment problem. Political instability may also retard economic growth and aggravate the unemployment problem in the Philippines. Thus, it is important for the Philippines stakeholders to engage in active labour market policies. At the same time, maintaining a stable government is also crucial to the Philippines economy

Cheema and Atta, (2014) applied the ARDL bound technique to time series data from 1973 to 2010, this study looked at factors that influence unemployment in Pakistan. According to the findings, there are statistically significant positive links between unemployment and the output gap, productivity, and economic uncertainty, but statistically significant negative associations between unemployment and gross fixed investment and trade openness. It is argued that the production gap should be narrowed at the policy. Government should implement a depreciation strategy and ease trade barriers. Government should not just fund initiatives on its own, but it should also promote private investment.

The economic growth, inflation, minimum wage, and unemployment data for seven provinces in Indonesia during the years of 2004 and 2012 are examined by **Trimurti and Komalasari (2014)**. The study's findings show that while the variables associated with economic growth and unemployment have negligible effects on unemployment, the variables associated with inflation and unemployment have positive and significant impacts on unemployment, and the variables associated with the minimum wage and unemployment have negligible impacts on unemployment.

Oniore (2015) examined the determinants of unemployment in Nigeria with the help of A RDL. The analytical outcome shows that the GDP growth rate, inflation rate, degree of openness, and private domestic investment are statistically significant in determining unemployment in the short run, particularly over the time under study. The Johansen co-integration test confirms the long-term link between the variables, and the negatively signed and significant ECM demonstrates a rapid transition from short-term volatility to long-term equilibrium. It is advised that initiatives aimed at boosting GDP growth be put into practice. The government should promote private sector investment at all levels. The government should relax trade restrictions, which will boost trade openness.

The problem of unemployment and inflation in Nigeria is the focus of **Sunny and Anthony (2015)**. The main objective was to find out whether the trade-off thesis is accurate in Nigeria. Data on unemployment and inflation were collected from 1988 to 2013. Additionally, factors like government spending, interest rates, and GDP were taken into account. The test results confirmed the existence of the Phillips curve in Nigeria, with inflation having a significant impact on unemployment and showing an inverse relationship between unemployment and inflation.

Examining data spanning from 1981 to 2014, **Raifu (2017)** explored the short- and long-term impacts of trade openness and the current account balance on the unemployment rate in Nigeria. The estimation method employed was autoregressive distribution lag. The study found that trade openness exacerbates the unemployment rate both in the short run and the long run. Additionally, the current account balance initially increases the unemployment rate but decreases it over the long term. Notably, real GDP, wages, and government consumption expenditure did not align with a priori expectations. The study included control variables such as the inflation rate, exchange rate, and FDI.

Ibrahim (2017) investigated the factors influencing the unemployment rate in Jordan from 1992 to 2015. The study employed the Augmented Dickey-Fuller test (ADF) to assess the stationarity of the variables under consideration. The Granger causality test revealed a one-way causal connection from private investment to the unemployment rate. Two analytical tools, namely the impulse response function and variance

decomposition using a vector autoregression (VAR) model, were utilized. The conclusive findings indicated that private investment negatively influences the unemployment rate in Jordan.

Adenomon, Okoro-Ugochukwu, and Adenomon (2018) examined the long- and short-term influences on Nigeria's unemployment rate) from 1981 to 2016 using Fully Modified Ordinary Least Squares (FMOLS) and the Error Correction Model (ECM. The co integration test shows that the macroeconomic variables are co integrated while the ADF test shows that they are stationary at first difference but only the interest rate was statistically significant. According to the study's findings, a rising population and a high exchange rate may cause Nigeria's unemployment rate to rise. Instead, in order to increase exports and create jobs, the government should develop the industrial and non-oil sectors.

Lahmar (2019) investigated the societal factors that contribute to unemployment in Algeria. It is based on the descriptive technique, which primarily combines the historical approach with the quantitative instrument, and is anchored in sociological methodology. Despite Algeria's vast potential, its successive administrations failed to implement a productivity-based economy that would have benefited the general populace. Because of the wide-ranging effects on actual labor costs, changes in labor market institutions that have a direct significant influence on unemployment are explained by the broad swings in unemployment across Algeria.

Anyiga, (2020) used Random Effects to investigate the influence of the macroeconomic determinants of unemployment in the East African Community. This study is based on the Okun's law and Philips curve theoretical frameworks (EAC). The findings indicate that population, labor productivity, and foreign direct investment (FDI) are the most important macroeconomic factors that may be utilized to analyze unemployment in the EAC. While there is a positive correlation between population and labor productivity, there is a negative correlation between FDI and unemployment.

Mukisa, Nathan and Mukisa (2020) examined the macroeconomic determinants of unemployment using panel data approaches. The study uses panel data methodologies to analyze the macroeconomic drivers of unemployment between 1996 and 2017. Both the fixed effects and random effects models were calculated in the research. Regression using instrumental variables and fixed effects was crucially evaluated to account for any possible endogeneity. The study findings indicate that unemployment in the EAC is likely to decrease with sustained economic growth and increased supply and access to private sector credit while, on the other hand, increased trade openness and gross national expenditure are likely to exacerbate the unemployment problem.

Mukisa, Nathan & Bulime (2020) used unbalanced panel data for 37 Sub-Saharan African (SSA) nations between 1995 and 2018. This study examined the relationship between economic institutions and unemployment. The models are evaluated using panel cointegration regression techniques of the Dynamic Fixed Effects (DFE) and Pool Mean Group (PMG) methods. The Hausman specification test is used to determine which method is the most reliable. According to the empirical findings, economic institutions don't significantly affect unemployment in the short term.

The relationship between economic institutions (EI) and unemployment in SSA nations was examined by **Mukisa, Nathan, & Bulime (2020)**, the influence of economic institutions (EI) and ten different institutional components on overall, male and female unemployment in SSA is specifically examined in this article. The study employed imbalanced panel data from 37 SSA nations that covered the years 1995 to 2018. The study calls for a dynamic heterogenous panel data model. The models were estimated using two different estimation approaches: pool mean group methods and dynamic fixed effect methods. The results show that institutions associated to the monetary system, trade flows, government expenditure, and the fiscal process, as well as aggregate EI, considerably reduce unemployment over time.

3. Methodology

3.1 Data and Data Source

Ex-post facto survey research design was employed and appropriate for this study since the event on high the data is to be collected had already taken place. According to **Kerlinger (1964)**, ex post facto research refers to that research, in which the researchers start with the observation of a dependent variable or variables for which the independent variable or variables have already occurred. This design was considered appropriate because the time series values of the data are sourced from authentic and reliable secondary data sources and the data that will be collected will devoid of any manipulation by the researcher

3.2 Model Specification

The functional relationship between unemployment rate and economic factors' variables interactions with institutional quality (third specific objective) is specified thus:

$$UNEMP = f\left(INF * INSTQ, GDP * INSTQ, TOPEN * INSTQ, EXR * ISQ, INT * INSTQ\right) \quad 3.1$$

The econometric model specification for (3.15) is presented as:

$$\begin{aligned} UNEMP_{it} &= \delta_0 + \delta_1 INF_{it} + \delta_2 GDP_{it} + \delta_3 TOPEN_{it} + \delta_4 EXR_{it} + \delta_5 INT_{it} \\ &+ \delta_6 (INF_{it} * INSTQ_{it}) + \delta_7 (GDP_{it} * INSTQ_{it}) + \delta_8 (TOPEN_{it} * INSTQ_{it}) + \delta_9 (EXR_{it} * INSTQ_{it}) \\ &+ \delta_{10} (INT_{it} * INSTQ_{it}) + \varepsilon_{it} \end{aligned} \quad 3.2$$

Where:

INF= Inflation, GDP=Gross Domestic Product, TOPEN=Trade Openness, EXR=Exchange Rate, INT=Interest Rate, i_t = cross section time series, δ_0 = constant or the intercept, $\delta_1 \ldots . \delta_{10}$ =slope coefficient to be estimated, ε_{it} = error term or stochastic disturbance.

3.3 Method of Analysis

A Panel Autoregressive Distributed Lag (P-ARDL) model was used as method of analysis as indicated by **Pesaran and Shin (1998)**, is advantageous irrespective of whether the underlying regressors demonstrate I (0), I (1), or a combination of both. In cases where the time span exceeds 30 years in macro panel data, the P-ARDL method can be applied. However, the use of the Generalized Method of Moments (GMM) estimator is inappropriate due to the dataset's nature, specifically when the time dimension is greater than the cross-sectional dimension (T > N). Drawing on the extensive literature on dynamic heterogeneous panel data, various estimators, such as Mean Group (MG), Pooled Mean Group (PMG), and Dynamic Fixed Effect (DFE), were employed to examine the relationship between unemployment and its determinants.

The pooled mean group (PMG) restricts long-run equilibrium to be homogeneous across countries, while allowing heterogeneity for the short-run relationship. The short-run-run relationship focuses on the country specific heterogeneity, which might be caused by different responses of stabilization policies, external shocks or financial crises for each country. The mean group (MG) estimator allows for heterogeneity both in the short-run and long-run relationship. To be consistent, this method is sensitive to permutations of non-large model and outliers (**Favara, 2003**).

On the other hand, the dynamic fixed effects (DFE) estimator restricts the speed of adjustment, slope coefficient and short-run coefficient to exhibit non-heterogeneity across countries. Accepting this estimator as the main analysis tool requires the strong assumption that countries responses are the same in the short-run and long-run, which is less likely. Another drawback is that this approach may suffer from simultaneity bias in a small sample case due to the endogeneity between the error term and lagged explanatory variables (**Baltagi et al., 2000**). The short run is expected to be non-homogeneous due to the country specific differences, as such the PMG estimator seems to be superior to other methods. The Hausman test was used to verify the significance of each estimator. One important point is that ARDL, especially PMG and MG estimators, can alleviate the problem of endogeneity with the inclusion of sufficient lags of all variables (**Pesaran et al., 1999**).

4. Results and Discussion of Findings

Table 4.1: Descriptive Statistics

	UNEMP	INF	GDP	TOPEN	EXR	INTR	INSQ
Mean	6.348752	15.54833	1601.564	44.98392	682.7204	7.593830	0.005525
Maximum	28.24000	4145.106	10956.95	1647.026	9565.082	52.43679	2.968391
Minimum	0.320000	-3.23339	234.7092	0.681005	0.128029	-93.5135	-1.800148
Std. Dev.	5.760078	166.9295	1776.768	196.6202	1266.211	11.42498	1.018258
Skewness	1.863741	24.33932	2.574792	5.572966	4.044233	-1.47561	0.983379
Kurtosis	6.155136	602.1602	10.29498	35.19138	23.15138	20.15320	3.380483
Jarque-Bera	620.0740	9395426.	2073.108	30173.44	12259.03	7876.497	104.3355
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Observations	624	624	624	624	624	624	624

Source: Author's computation with Eviews 12

Table 4.2: Stationary Test

Test Method	***UNEMP***	***INF***	***LGDP***	***TOPEN***	***LEXR***	***INTR***	***INSQ***	
	Null Hypothesis: Unit Root with common process							
Breitung [t-stat.]	-10.031***[b]	-4.366***[a]	-7.114***[b]	-10.727***[b]	-5.768***[b]	-4.835***[a]	-1.313*[a]	
Levin, Lin & Chu [t*]	-4.178***[b]	-5.079***[b]	-2.17**[a]	-2.775***[a]	-3.816***[a]	-6.857**[a]	-9.002***[b]	
		Null Hypothesis: Unit Root with Individual process						
IPS[z-t-tilde-bar]	-10.135***[b]	-10.451***[a]	-10.636***[b]	-1.971**[a]	-3.201***[a]	-10.016***[a]	-12.600***[b]	
ADF Fisher [Chi-square]	3.363***[b]	3.697***[b]	1.819**[b]	2..896***[a]	4.675***[a]	3.978***[b]	7.364***[b]	
Number of Cross-Sections	10	10	10	10	10	10	10	
Number of Periods	37	37	37	37	37	37	37	
Total Number of Observations	370	370	370	370	370	370	370	

Source: Author's computation, 2024 with Stata 15

Note: a and b denote stationarity at level and at first difference, respectively, while ***, **, * indicate statistical significance at 1%, 5% and 10%, respectively.

As presented in Table 4.2 the first type involves panel unit root tests with the null hypothesis of unit root with the common process (**Breitung, 2000; Levin et al., 2002** tests). The second type assumes unit root with individual unit root process (**Im et al., 2003;** ADF Fisher tests).

We find that all the explainatory variables in our study – inf, lgdp, topen, lexr and intr, – are integrated of order one – [I(1)] – under Breitung except inf that was stationary at level [I(0)]. Under LLC, there was mixed integration order, lgdp, topen, lexr and intr are stationary at I(0), while and inf integrated after first differencing. Furthermore, under IPS, all the independent variables were stationary at level. Under ADF all were stationary at first difference except topen that is [I(0)]. The dependent variable –unemp– was stationary at first difference across the four tests, while interaction variables – insq– is integrated of [I(1)] except under Breitung that it was integrated at level [I(0)]. Thus, the underlying framework for estimation in this study, which accounts for inherent heterogeneity and non-stationarity in the panel data series, is valid for our analyses. In essence, the unit root test results further reaffirm the appropriateness of our choice of panel-

ARDL model as the preferred estimation framework in the context of this study.

Table 4.3
Unemployment and Interaction of Institutional Quality and Economic Factors in SSA.
Dependent Variable: Unemp

Variables	***MG***	***PMG***	***DFE***
Short-run coefficients			
D.INF	*0.0623*	*0.0318*	*0.00684*
	(0.0729)	*(0.0292)*	*(0.00499)*
D.LGDP	*-6.591**	*-1.039***	*-3.786****
	(3.575)	*(0.1576)*	*(0.647)*
D.TOPEN	*0.0703*	*0.400*	*0.00254*
	(0.536)	*(0.252)*	*(0.00174)*
D.LEXR	*5.159**	*-3.988*	*-0.437****
	(3.050)	*(3.349)*	*(0.162)*
D.INT	*-0.100*	*0.0189*	*0.00516*
	-0.100	*0.0189*	*0.00516*
D.INSQ	*83.37*	*-16.25*	*-0.896*
	(77.57)	*(20.46)*	*(1.490)*
D.INF_INSQ	*-0.134*	*-0.0469*	*0.00428*
	(0.120)	*(0.0287)*	*(0.00433)*
D.LGDP_INSQ	*-2.545*	*0.0514*	*0.0312*
	(2.473)	*(0.676)*	*(0.0494)*
D.TOPEN_INSQ	*-0.979*	*-0.214*	*-0.00149**
	(1.493)	*(0.296)*	*(0.000818)*
DLEXR INSQ	*12.853*	*1.377*	*-0.0369*
D.INTR_INSQ	*(14.462)*	*(1.452)*	*(0,6152)*
	-0.0827	*-0.0147*	*0.00386*
	(0.226)	*(0.0212)*	*(0.00397)*
Long-run coefficients			
Constant	*18.71*	*1.344***	*1.342*
	(21.94)	*(0.670)*	*(1.244)*
INF	*-0.251*	*0.0317****	*0.0709*
	(0.247)	*(0.00865)*	*(0.0502)*
LGDP	*9.347*	*-1.725****	*-1.409*
	(9.593)	*(0.533)*	*(1.718)*
TOPEN	*5.637*	*-0.349****	*0.0218*
	(5.242)	*(0.0594)*	*(0.0180)*
LEXR	*-7.382*	*2.076****	*0.858*
	(13.41)	*(0.319)*	*(0.690)*
INTR	*0.00245*	*0.126****	*0.0803*
	(0.291)	*(0.0286)*	*(0.0515)*
INSQ	*-1.637*	*-5.151****	*0.0566*
	(1.898)	*(0.0388)*	*(0.0431)*
INF_INSQ	*-0.607*	*-0.148****	*0.0459*
	(0.616)	*(0.0271)*	*(0.0416)*
LGDP_INSQ	*-1.221*	*0.252****	*-0.209*
	(6.151)	*(0.0960)*	*(0.267)*
TOPEN_INSQ	*-0.812*	*0.212****	*-0.0144*
	(2.050)	*(0.0389)*	*(0.00968)*
	12.85	*-0.441****	*0.282*

	(14.46)	*(0.111)*	*(0.324)*
INTR_INSQ	*-0.780*	*0.210****	*-0.0231*
	(0.531)	*(0.0476)*	*(0.0433)*
ECT	*-0.493***	*-0.119****	*-0.113****
	(0.198)	*(0.0357)*	*(0.0219)*
Hausman Test (X^2_k)		*4.61*	*3.69*
		0.380	*0.430*
Observations	***600***	***600***	

Source: Author's computation, 2024 with Stata 15: Note: INF is inflation rate, LGDP is the log of gross domestic product, TOPEN is trade openness, LEXR is the log value of exchange rate, INSQ is the institutional quality and INTR is the interest rate. The values in parentheses are the standard errors, ***, ** & * imply significance at the 1%, 5% and 10% levels, respectively

The equation was first estimated using the MG, PMG and DFE estimators and then subjected the results from these estimators to the Hausman test. A non-rejection of the null hypothesis implies the adoption of the PMG or DFE estimator as the case may be, while the rejection indicates the adoption of the MG estimator. In other words, the PMG or DFE estimator was the efficient estimator under the null, while the MG estimator was the efficient estimator under the alternative hypothesis. Our Hausman test results substantially support the PMG estimator as the efficient estimator for the objective of this study.

The long-run dynamics

$$UNEMP_{it} = \delta_0 + \delta_1 INF_{it} + \delta_2 GDP_{it} + \delta_3 TOPEN_{it} + \delta_4 EXR_{it} + \delta_5 INT_{it} + \delta_6 (INF_{it} * INSTQ_{it}) + \delta_7 (GDP_{it} * INSTQ_{it}) + \delta_8 (TOPEN_{it} * INSTQ_{it}) + \delta_9 (EXR_{it} * INSTQ_{it}) + \delta_{10} (INT_{it} * INSTQ_{it}) + \varepsilon_{it} \quad 4.1$$

$$UNEMP_{it} = 1.344 - 0.0317 INF_{it} - 1.725 GDP_{it} - 0.349 TOPEN_{it} + 2.076 EXR_{it} + 0.126 INT_{it} + 0.148 I(INF_{it} * INSTQ_{it}) + 0.252 (GDP_{it} * INSTQ_{it}) + 0.212 (TOPEN_{it} * INSTQ_{it}) - 0.441 (EXR_{it} * INSTQ_{it}) + 0.210 (INT_{it} * INSTQ_{it}) + \varepsilon_{it} \quad 4.2$$

The results from Table 4.3 (PMG column) show that in the long run, inflation rate (INF), exchange rate (EXR), interest rate (INTR), interaction between GDP and institutional quality (GDP_INSQ), trade openness and institutional quality (TOPEN_INSQ) and interest rate and institutional quality (INTR_INSQ), exerted a positive and significant relationship with the dependent variable – unemployment rate – during the study period across the countries studied. Meanwhile, gross domestic product (GDP), trade openness (TOPEN), interaction between INF and institutional quality (INF_INSQ) and exchange rate and institutional quality (EXR_INSQ) exerted a negative and significant relationship with the dependent variable – unemployment rate – during the study period across the countries studied.

From the estimated model, as the countries' inflation rate (INF) decreases by 1 per cent, it brings about a 0.032 per cent decrease in these countries unemployment, ceteris paribus. Furthermore, the positive nexus between INF and UNEMP is established to be statistically significant as revealed in Table 4.2.3, as the probability value is less than the 0.05 significant levels. Also, as exchange and interest rate increase by one per cent, it brings about 2.076 and 0.126 per cent increase in unemployment rate, respectively. The association is established to be significant statistically at 1% significant level.

In the same vein, the introduction of the moderating variable – institutional quality (INSQI) – in the model shows a negative and significant impact of INSQ on unemployment, as the state institutions are being strengthened qualitatively, action, it brings about 5.151% decrease in unemployment (UNEMP) in these countries, and it is statistically significant at 5 %.

To address one of the cruxes of objective three, the coefficient of the nonlinear models (INF_INSQ), (LGDP-_INSQ), (TOPEN_INSQ), (LEXR_INSQ) and (INTR_INSQ) reveal that the interaction effects are statistically significant at the 5% levels, although with different relationship, some exhibited positive – LGDP_-INSQ, TOPEN_INSQ and INTR_INSQ while EXR_INSQ and INF_INSQ exerts negative –influence on unemployment. Furthermore, since the coefficient of INF, LGDP, TOPEN, LEXR and INTR are statistically significant, it is imperative we compute their net effects

on unemployment. Finally, there is a net effect of 0.0313%, -1.723%, -0.348%, 2.074% and 0.127% for every 1% increase in inflation rate, gross domestic product, trade openness, exchange rate and interest rate, respectively on unemployment given current average institutional quality in SSA countries studied

The net effects of inflation (INF), Gross domestic product (GDP), Trade openness (TOPEN), exchange rate (EXR) and interest rate (EXR) conditioned upon institutional quality are computed as follows:

$$\frac{\partial UNEMP}{\partial INF} = 0.0317 + \left(-0.148 \times \overline{INSQ}\right)$$

$$\frac{\partial UNEMP}{\partial INF} = 0.0317 + \left(-0.148 \times 0.0055\right) = 0.03217 - 0.000814 = 0.031356 \approx 0.0313$$

$$\frac{\partial UNEMP}{\partial LGDP} = -1.725 + \left(0.252 \times \overline{INSQ}\right)$$

$$\frac{\partial UNEMP}{\partial LGDP} = -1.725 + \left(0.252 \times 0.0055\right) = -1.725 + 0.001386 = -1.723614 \approx -1.723$$

$$\frac{\partial UNEMP}{\partial TOPEN} = -0.349 + \left(0.212 \times \overline{INSQ}\right)$$

$$\frac{\partial UNEMP}{\partial TOPEN} = -0.349 + \left(0.212 \times 0.0055\right) = -0.349 + 0.00116 = -0.347834 \approx -0.348$$

$$\frac{\partial UNEMP}{\partial LEXR} = 2.076 + \left(-0.441 \times \overline{INSQ}\right)$$

$$\frac{\partial UNEMP}{\partial LEXR} = 2.076 + \left(-0.441 \times 0.0055\right) = 2.076 - 0.0024255 = 2.0735745 \approx 2.074$$

$$\frac{\partial UNEMP}{\partial INTR} = 0.126 + \left(0.210 \times \overline{INSQ}\right)$$

$$\frac{\partial UNEMP}{\partial INTR} = 0.126 + \left(0.210 \times 0.0055\right) = 0.126 + 0.001155 = 0.127155 \approx 0.127$$

Short-run Dynamic

$$\Delta UNEMP_{it} = \delta_0 + \delta_1 \Delta INF_{it} + \delta_2 \Delta GDP_{it} + \delta_3 \Delta TOPEN_{it} + \delta_4 \Delta EXR_{it} + \delta_5 \Delta INT_{it} + \delta_6 \Delta (INF_{it} * INSTQ_{it})$$
$$+\delta_7 \Delta (GDP_{it} * INSTQ_{it}) + \delta_8 \Delta (TOPEN_{it} * INSTQ_{it}) + \delta_9 \Delta (EXR_{it} * INSTQ_{it})$$
$$+\delta_{10} \Delta (INT_{it} * INSTQ_{it}) + \varepsilon_{it} \quad 4.3$$

$$UNEMP_{it} = -0.119 + 0.0318 INF_{it} - 1.039 GDP_{it} + 0.400 TOPEN_{it} - -3.988 EXR_{it}$$
$$+0.0189 INT_{it} + 0.148 I(INF_{it} * INSTQ_{it}) + 0.252 (GDP_{it} * INSTQ_{it})$$
$$+0.212 (TOPEN_{it} * INSTQ_{it}) - 0.441 (EXR_{it} * INSTQ_{it}) + 0.210 (INT_{it} * INSTQ_{it}) \quad 4.4$$

The existence of the speed of adjustment back to long-run equilibrium using the error correction term (ECT) to evaluate the statistical significance of short parameters as observed under the long run. For the error correction

term (ECT), the speed of adjustment coefficient is negative and statistically significant as required ($ect_{t-1} = -0.119, p < 0.01$). The coefficient of -0.119 indicates that about 11.9% of the short-run deviations from the long-run, equilibrium is corrected annually. Alternatively, the adjusted is calculated by taking the inverse of the absolute value of the ECT to show how long it takes for the deviations from equilibrium to return back to equilibrium (**Pao & Tsai, 2010**). Therefore, the adjusted speed for this study is 8 years 4 months (i.e., $1/0.119$), which implies that it would take about 8 years and 4 months for short-run deviations from the long-run to be corrected.

The estimated short run results from Table 4.3 show that there is no short run significant impact of any of the explanatory variables on the dependent variable except LGDP which exerted a significant negative relationship with unemployment during the study period across the countries studied. This exhibited that in the short run, as the SSA countries' gross domestic product (GDP) increases by 1 per cent, it brings about a 1.039 per cent decrease in the SSA countries unemployment rate, ceteris paribus. This negative association between LGDP and UNEMP is established to be statistically significant as revealed in Table 4.2.3, with probability value which is less than the 0.05 significant level.

The relationship between economic factors and unemployment will only hold when there is effective institutional quality.

The finding of this study showed that economic factors had a significant effect on unemployment when institutional quality is effective most especially when corruption is controlled for, as well as when the rule of law is adequately controlled for. The result is contrary to **Hossain,Tahrim, Hossain, and Rahman (2018) ; Abraham, and Osaru (2017)** which found that a non-significant effect of interaction of economic factors and institutional quality. Based on our findings, the study recommended that all the countries in the region should strengthen their institutional quality by ensuring political stability and regulatory quality in order to reduce the rate of unemployment in the region.

5. Conclusion and Recommendations

This study examined the interaction effect of institutional quality on the relationship between economic factors and unemployment in SSA between 1996 and 2021. This study is limited to only 24 countries among 48 countries in the region due to data availability.

The study used five macroeconomic indicators of gross domestic product, inflation rate, interest rate, exchange rate and trade. The objective of unemployment reduction in Sub –Saharan Africa was analysed in relation to institutions as a composite variable of rule of law, control of corruption, political stability and absence of violence/terrorism, regulatory quality, voice and accountability and government effectiveness.

The data for this work were sourced from the World Bank World Development Indicators (WDI) and World Governance Indicators (WGI). The estimation method employed to draw conclusions is the Panel Autoregressive Distributed Lag model (Panel ARDL) that has the inherent capability of producing both short-run and long run simultaneously**.**

Meanwhile, gross domestic product (GDP), trade openness (TOPEN), interaction between INF and institutional quality (INF_INSQ) and exchange rate and institutional quality (EXR_INSQ) exerted a negative and significant relationship with the dependent variable – unemployment rate – during the study period across the countries studied.

The introduction of the moderating variable – institutional quality in the economic model shows a negative and significant impact of institutional quality on unemployment. This implies that as the state institutions are being strengthened qualitatively, action, it brings decrease in unemployment in these countries. The introduction of the moderating variable – institutional quality in the social model shows a negative and significant impact of institutional quality on unemployment. This implies that as the state institutions are being strengthened qualitatively, action, it brings decrease in unemployment in these countries.

Based on the findings of this study, the following recommendations were made.

There is need for policy makers in Sub Saharan African countries to promote transparency and accountability in state institutions to build public trust. Anti-corruption initiatives should be installed in order to ensure efficient and effective functioning of institutions.

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