Original Article

Globalization and Unemployment: Empirical Evidence from West African Sub-Region

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Abstrac - This paper investigated the effect of globalization on unemployment in West Africa between 1991-2017. Data were obtained from the World Bank, and the index of globalization was the KOF Globalization Index. Unemployment was defined as a function of globalization (overall, economic, political, and social) and inflation. The study employed a unit root test, Fisher cointegration test, error correction mechanism, and Dumitrescu-Hurlin Granger causality test. The unit root test revealed that the variables were integrated of order *I*(0) and *I*(1) and the cointegration test presented evidence of a long-run relationship. Findings from the VECM revealed that globalization leads to an insignificant decrease in unemployment in the short run but will lead to a significant increase in the long run. It was also globalization discovered that economic reduces unemployment significantly in the short run. The Dumitrescu-Hurlin test revealed that there is no causality between political globalization and unemployment, while economic and social globalization exhibited a bidirectional causality with unemployment. The paper concludes by stating that the economic dimension of globalization should be encouraged as it will help in reducing unemployment in the region in the short run.

Keywords - *Globalization*, *Unemployment*, *West Africa*, *Cointegration*, *Panel Data*, *VECM*.

I. INTRODUCTION

Globalization and trade liberalization have been viewed to be a driving force in generating inequality in a country [1]. This made [2] to posit that trade liberalization can destroy the "good jobs", which are defined as the above-average wage; implying an increase in worker displacement (unemployment) after trade liberalization [3][4]. However, findings from researchers have shown that trade does not affect the unemployment rate [5][6][7].

The role of globalization in influencing unemployment have been specifically linked to trade liberalization, which is a component of the economic dimension of globalization. The critical question is, therefore: How do economic globalization influence unemployment? [8] provides seven ways in which such can evolve. These are the number of jobs, structure of jobs, composition of jobs, R&D jobs, job earnings, migration, and employment conditions.

The number of jobs can be affected by offshoring [9]. Closing an enterprise in one country to move it to another country may result in job losses in a particular economic activity of the source country. It may also result in job gains for the destination country due to higher productivity in the remaining enterprises, higher wages, and higher consumer demand. In regards to the structure of jobs, jobs associated with certain economic activities may tend to disappear. In contrast, jobs linked to others are created due to changing competitive advantages and patterns of specialization [9].

Through economic globalization, the composition of jobs – the mix of skilled and unskilled jobs in the economy – is likely to change. In the developed countries, low-skilled workers have been most affected by festering revenues and/or growing unemployment due to rivalry from developing countries' workers and also as a result of technological progress [10]. However, the workforce in developing countries is becoming better qualified and increasingly engaging in more erudite, service-oriented activities. Skilled workers in developed countries are more and more feeling the competition of their counterparts in developing countries due to globalization. Thus, trade liberalization increases the unemployment of unskilled workers [11][12].

On R&D jobs, trade liberalization increases the profitability of innovation activity by raising the profit margin of the exporting firms [11]. As a result, more firms will engage in research and development, increasing the demand for skilled labour [11]. On the contrary, a higher prevalence of innovations upsurges the turnover rate of unskilled workers by speeding up the creative destruction process and increasing the frictional unemployment rate of unskilled workers [13].

Job earnings are affected by economic globalization in two ways viz: (i) It increases the overall efficiency of the economy, thereby causing an increase in real incomes that may be shared with job earnings, and (ii) It fosters movements of products and production factors hence, it even out price differences between countries including the price of labour [10]. As a result, job earnings seem to be steadily increasing in developing countries, leading to a constricting of the job earnings gap at the global level. Conversely, the job earnings gap between the best and the least qualified workers seems to be flared within developed countries [14].

Migration creates significant inflows and outflows of workers whose impact on labour markets is still unclear [10]. In developed countries, migrants may ease labour shortages and be part of the solution to population ageing. In developing countries, however, migration to more developed countries may result in a brain drain. It is estimated that about 30 per cent of migration in OECD countries is linked to labour [15] and is as a result of regional agreements liberalizing the movement of people, by changing patterns of specialization, and by the development of multinational enterprises moving key personnel to, from and between their foreign affiliates. Changing patterns of specialization induced by economic globalization or technological progress, such as a more service-oriented economy, may also have effects on employment conditions. Lower safety requirements, longer working hours, or a ban on trade unions, for instance, maybe attractive for multinational enterprises and may spur offshoring.

effects of globalization, through The trade liberalization, on unemployment have been traced to exhibit differing outcomes. [16] argued that lower trade barriers could lead to an increase in unemployment because the decline in trade barriers improves the profitability of exporting firms, thus leading to an expansion of the trading sector. Thus, unemployment will increase when a disparity in skill requirements exists, leaving unskilled workers unemployed if the sector in question is characterized by labour market friction [10]. In the same vein, higher trade exposure is accompanied with a higher level of equilibrium in unemployment; because job destruction resulting from the movement of small lowproductivity firms, exceeds job creation by large highproductivity firms because larger firms will extract higher rents by limiting the level of job creation [17].

Going by the positive effect of globalization (job destruction) on unemployment as put forward by [16]; the negative effect – job creation – by [18]; and the uncertain effect by [12] and [11], the following questions are pertinent:

- Does the overall globalization index affect unemployment in West Africa?
- Is there any significant effect of economic, political, and social globalization index on the level of unemployment in West Africa?

• What is the nature of the relationship between globalization index and unemployment in West Africa?

Thus, this study broadly seeks to examine the effect of globalization on unemployment in West Africa. The specific objectives are:

- To investigate the effect of the overall globalization index on unemployment in West Africa.
- To examine the effect of the three dimensions of globalization index on unemployment in West Africa.
- To examine the nature of the relationship between globalization index and unemployment in West Africa.

The following null hypotheses will be tested in the course of the study:

- There is no significant effect of the overall globalization index on unemployment in West Africa.
- Economic, political, and social globalization index does not significantly affect unemployment in West Africa.
- There is no causal relationship between the index of globalization and unemployment in West Africa.

II. LITERATURE REVIEW

The literature on the linkages between globalization and unemployment have been traced to the role of trade in employment generation. Indeed, the Heckscher-Ohlin trade theory is of the opinion that both trade and foreign direct investment are possible ways of utilizing surplus labour in developing countries [13]. Based on this, it is believed that such can help to generate a trend of specialization in domestic labour-intensive activities which would result in a growth of domestic employment [13]. The negative effect of trade on unemployment can only be achieved with the assumption of a homogenous production function across countries and a single equilibrium position.

If these two assumptions are relaxed, the employment impact of increasing trade may not indeed help developing countries. Ricardian comparative advantage model, which predicts that different factors of production specialize in different economic activities and this depends on the relative productivity differences, especially the labour as a physical unit [19], have also been put to the test by researchers such as [20] and it favours the accession that trade openness could have a negative effect on unemployment. That is, increasing magnitude of trade openness can stimulate employment generation in the short run.

However, studies have shown that globalization, in the form of trade openness, can lead to job creation [18], job destruction [16], and such effects can be uncertain [12]11]. Meanwhile, [21][22][23] and [24] state that if globalization increases the total factor productivity of the developing countries, the employment enhancing

competitive effect has to be compared with the direct labour-saving effect of the imported technologies [13]. It is worth noting that the positive or negative relationship between trade and unemployment is attributed to the differences in labour-market regulations across countries [16][25].

Empirical studies have been conducted to investigate the effect of globalization on unemployment. [26]) in his study on "International trade, the division of labour and unemployment" submit that trade improves productivity in a country and reduces the unemployment rate. Similarly, findings of an adverse effect were observed by [27] when he carried out his study on 20 OECD countries.

[28] examined the impact of trade reform in the labour reallocation. Findings of the study revealed that if trade liberalization does not follow by a labour market reform, the inter-sectoral reallocation of workers will be much slower; leading to degeneration in the productivity gains from trade liberalization.

[20] carried out a cross-national study on international trade and unemployment. The study showed that trade openness improves aggregate labour productivity and subsequently reduce the unemployment rate because it results in more job creation and job search.

[29] investigated the effect of trade on unemployment for 20 OECD countries. Findings showed that an increase in business leads to higher aggregate unemployment in rigid labour market institutions, while it is likely to shrink unemployment in a flexibility labour market. Also, [30] investigated the impact of exports on employment in Indonesia using the input-output model. The study revealed that fewer jobs were created through exports in manufacturing industries in 2005 than before the crisis, but jobs were created in the service sector.

[31] examined the effect of trade on unemployment under a structural change in Australia. The study concluded that trade liberalization causes relocation of jobs with an attendant decrease in employment in the manufacturing sector but an increase in mining and services sectors.

A study by [32] showed that the import competition of the United States of America's products with Chinese products led to higher unemployment in the US over the period 1990 – 2007. Also, [33] utilized the worker-level data for the period 1992 to 2007 and observed that the import competition with China distorts the workers' earnings (wages) in the US manufacturing employment with a greater negative effect in the lowskilled workers than the high-skilled workers.

[34] in his study on "Trade Liberalization and Labour Market Dynamics" demonstrated that adjustment to trade shocks take significant time, and this decreases the productivity gains from international trade in Brazil. The effects of the trade liberalization on the labour market in Brazil depends on the age and the education level of workers. Similarly, [35] studied the effect of intra-African trade on unemployment within the region and found that this type of trade reduces youth unemployment in the region.

[36] observed that the labour market regulations suppress the job-destroying effects of the trade shocks in the Colombian economy. Also, the study revealed that trade liberalization and globalization lead to higher unemployment in the country.

[37] examined the impact of trade openness on unemployment in Nigeria for the period 1970 to 2010. The study observes that trade liberalization policy has been a driving force to a higher unemployment rate in Nigeria.

[38] investigated the impact of globalization on the structural unemployment in 87 countries between 1991 to 2014 using the Ricardian Comparative Advantage and the Heckscher–Ohlin models. It was observed that one standard deviation increase in the trade openness approximately leads to 0.6 percentage point lower structural unemployment rate. Also, economic, social and political aspects of globalization on the structural unemployment were negative but statistically insignificant.

[39] analyzed the welfare effects of trade and labour market reforms in 28 OECD countries. Findings of the study indicate that trade liberalization reforms lead to lower unemployment in most of the countries. However, a small number of countries experienced a higher level of unemployment due to trade liberalization.

[10] studied the effects of economic globalization on unemployment by examining 16 emerging economies between 1991 to 2014. The empirical findings revealed that increase in economic globalization increased the unemployment rates in Colombia, Hungary, India, Malaysia, Poland, South Africa, and Turkey but decreased the unemployment rates in Brazil, China, Indonesia, Mexico, Pakistan, Peru, Philippines, Russia, and Thailand.

Finally, [13] examined the impact of globalization on unemployment in 35 countries in Sub-Saharan Africa (SSA) for the period 2007 - 2014 using system generalized method of moments estimation technique. The study revealed that aggregated globalization significantly impact the unemployment rate in SSA. With disaggregation, only political globalization was observed to reduce unemployment. The paper recommended that policies should also ensure that the regulations of the labour market are suppler so as to benefit from globalization which can impact significantly on the unemployment rate.

Based on the empirical literature reviewed, it is observed that the effect of globalization on unemployment is still a debating issue. There have been strands of reported positive and negative effect in which at times may be insignificant. This study takes it inspiration from these conflicting findings to contribute to addressing the issue of globalization and unemployment as it relates to the West African sub-region.

III. METHODOLOGY

A. Model Specification

The model in this study is built based on the set objectives.

Model 1: To examine the influence of globalization on unemployment in West Africa, the model is specified thus;

$$UNM_{it} = f(GLB_{it}, INF_{it}) - -$$
(1)

Equation (1) simply states that unemployment is a function of globalization and inflation. This yields an estimable form of

$$UNM_{it} = \lambda + \delta_I GLB_{it} + \delta_2 INF_{it} + \mu_t - -(1.1)$$

Where UNM = unemployment rate

GLB = KOF Globalization Index

INF = Inflation Rate

Model 2: To investigate the effect of the three components of globalization (economic, political, and social) on unemployment in West Africa, the model is specified as follows:

$$UNM = f(GEC, GPO, GSO, INF) - -$$
(2)

Which transforms to:

$$UNM_{it} = \xi +\beta_1 GEC_{it} + \beta_2 GPO_{it} + \beta_3 GSO_{it} + \beta_4 INF_{it} + \mu_{it} - - (2.1)$$

Equation (2.1) states that unemployment in West African countries (UNM_{it}) depends on economic globalization ($\beta_1 GEC_{it}$), political globalization (GPO_{it}), social globalization (GSO_{it}), inflation (INF_{it}), plus a random error term (μ_{it}).

Model 3: To examine the direction of causality between unemployment and globalization, the [40] Panel Causality Tests approach is adopted. The model in its general form is specified as:

$$y_{it} = \alpha_i + \sum_{k=1}^k \beta_{ik} y_{i,t-k} + \sum_{k=1}^k \gamma_{ik} x_{i,t-k} + \varepsilon_{i,t} - (3)$$

Where $x_{i,t}$ and $y_{i,t}$ are the observations of two stationary variables for country i in period t. In this particular scenario, the model for causality test is specified as:

$$UNM_{it} = \theta_i + \sum_{k=1}^k \pi_{ik} UNM_{i,t-k} + \sum_{k=1}^k \gamma_{ik} GLB_{i,t-k} + \varepsilon_{i,t} - \cdots$$
(3.1A)

And

$$GLB_{it} = \theta_i + \sum_{k=1}^k \pi_{ik} GLB_{i,t-k} + \sum_{k=1}^k \gamma_{ik} UNM_{i,t-k} + \varepsilon_{i,t}$$
- - - (3.1B)

From Equations (3.1A) and (3.1B), the null hypothesis for the causality test is stated as:

 $H_0: \gamma_{i1} = \gamma_{i2} = \dots = \gamma_{ik} = 0$ $\forall_i = 1, \dots, N$ Which in fact states the absence of causality. The alternative hypothesis is given as:

$$\begin{aligned} H_1: \gamma_{i1} &= \gamma_{i2} = \cdots = \gamma_{ik} \neq 0; \quad \forall_i = 1, 2, \dots, N_1 \\ \gamma_{i1} &\neq 0 \text{ or } \dots \text{ or } \gamma_{ik} \neq 0; \forall_i = N_1 + 1, \dots, N \end{aligned}$$

Where $N_1 \in [0, N - 1]$ is unknown. If $N_1 = 0$, there is causality for all individuals in the panel. N_1 is strictly less than N. Otherwise, there is no causality for all individuals, and H_1 reduces to H_0 [41].

B. A Priori Expectation

The a priori expectation for the parameters estimates are as follows:

- i. The coefficients of globalization (δ_1 in model 1 and β_1 to β_3 in model 2), can take any sign since globalization can exert either a negative or positive effect on unemployment.
- ii. The coefficients of inflation (δ_2 in model 1 and β_4 in model 2) are expected to be negative to conform with the Philips postulation of an inverse relationship between unemployment and inflation.

C. Data and Sources

Data for the study spans through 1991 to 2017 covering twenty (20) West African countries of Benin Republic, Burkina Faso, Cameroon, Cape Verde, Chad Republic, Cote d'Ivoire, Equatorial Guinea, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger Republic, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone, and Togo. The data utilized in the study include unemployment rate, overall globalization index, economic globalization index, political globalization index, social globalization index, and inflation rate.

The unemployment date, modelled by the International Labour Organization (ILO), and inflation rate were obtained from [42] database on World Development Indicators. Similarly, the globalization index utilized in the study is the Konjunkturforschungsstelle (KOF) Index of Globalization developed by [43].

D. Technique of Analysis

The technique of analysis includes a unit root test, cointegration test, and the vector error correction mechanism.

a) Unit Root Test

The study employed a panel unit root test developed by [44] for the common sample and that of [45] for the individual unit root processes. The general form of the model for the unit root test is specified as follows:

$$\Delta Y_{it} = \alpha_i + \beta_i Y_{i,t-1} + \delta t_i + \sum_{j=1}^k \gamma_{ij} \Delta Y_{i,t-j} + \mu_{it} - (4)$$

Where Δ is the first difference operator, Y_{it} is the variable of interest, μ_{it} is the disturbance term (which is assumed to be white-noise) with a variance of σ^2 , i = 1, 2, 3, ..., N indexes country and t = 1, 2, 3, ..., T indexes time. The null (H₀) and alternative (H₁) hypothesis for the stationarity of the panel data set from Equation (3) is given as:

$$\begin{cases} H_0: \beta_i = 0\\ H_1: \beta_i < 0 \end{cases};$$

Where the alternative hypothesis implies that Y_{it} is stationary, the test is based on ADF test, which assumes homogeneity in the dynamics of the autoregressive coefficients for all panel units with cross-sectional independence [44].

To increase the power of the panel unit root test in a finite sample, [44] specified another equation as follows:

 $\Delta Y_{it} = \alpha_i + \beta_i Y_{i,t-1} + \delta t_i + \sum_{j=1}^k \gamma_{ij} \Delta Y_{i,t-j} + \mu_{it} - (4)$ From Equation (4), the null and alternative hypothesis are stated as follows:

 $\begin{cases} H_0: \beta_1 = \beta_2 = \dots = \beta = 0\\ H_1: \beta_1 = \beta_2 = \dots = \beta < 0 \end{cases}$

Taking the variables one after the other, the model for the unit root test can be specified as:

 $\Delta UNM_{it} = \alpha_i + \beta_i UNM_{i,t-1} + \delta t_i + \sum_{j=1}^k \gamma_i ij \Delta UNM_{i,t-j} + \mu_{it} - - (4.1)$

 $\begin{aligned} \Delta GLB_{it} &= \alpha_i + \beta_i GLB_{i,t-1} + \delta t_i + \sum_{j=1}^k \gamma \, ij \Delta GLB_{i,t-j} + \mu_{it} \\ - & - & (4.2) \end{aligned}$

 $\Delta GEC_{it} = \alpha_i + \beta_i GEC_{i,t-1} + \delta t_i + \sum_{j=1}^k \gamma \, ij \Delta GEC_{i,t-j} + \mu_{it}$ - (4.3)

 $\Delta GPO_{it} = \alpha_i + \beta_i GPO_{i,t-1} + \delta t_i + \sum_{j=1}^k \gamma \, ij \Delta GPO_{i,t-j} + \mu_{it} - - (4.4)$

$$\Delta GSO_{it} = \alpha_i + \beta_i GSO_{i,t-1} + \delta t_i + \sum_{j=1}^k \gamma \, ij \Delta GSO_{i,t-j} + \mu_{it}$$
- - - (4.5)

And then taking inflation,

$$\Delta INF_{it} = \alpha_i + \beta_i INF_{i,t-1} + \delta t_i + \sum_{j=1}^k \gamma_j \Delta INF_{i,t-j} + \mu_{it} - \frac{1}{4.6}$$

The essence of the unit root is to determine the order of integration of the variables so as to determine the exact approach to be utilized in the analysis. This is based on the premise that regressing two non-stationary series will yield a spurious regression result; hence, the need to free the variables from the effect of time.

b) Cointegration Test

The cointegration approach utilized in this study follows the Johansen Fisher Panel Cointegration test. The

test helps in detecting the presence of a long-run relationship by looking at the Trace statistic and the Max-Eigen statistic with their respective probabilities. The significance of the test indicates the presence of a long-run relationship; otherwise; it does not exist.

c) Vector Error Correction Mechanism

The error correction mechanism (ECM) measures the speed of adjustment from the short run disequilibrium to an equilibrium position in the long run. The use of the autoregressive distributive lag (ARDL) approach makes the process easier as it produces both the short-run and long-run coefficients automatically. The model for the ECM in its general form is specified as:

$$\Delta UNM_{i,t} = \varphi_{i,j} + \sum_{i=1}^{m} \phi_{i,k} \Delta X_{i,t} + \lambda_i ECM_{i,t-1} + \mu_{i,t} (5)$$

Where Δ is the first difference operator; $\varphi_{i,j}$ (j, k = 1, 2, ..., N) represents the fixed country effect; i (i = 1, ..., m) is lag length determined by the Schwarz Information Criterion (SIC); X_{i,t} is the vector of regressors; ECM_{i,t-1} is the estimated lagged error correction mechanism (ECM) derived from the long-run cointegrating relationship; λ_i is the adjustment coefficient; and $\mu_{i,t}$ is the disturbance term, which is assumed to be normally distributed with a zero mean and a constant variance.

And incorporating all the variables in the respective models,

$$\Delta UNM_{i,t} = \varphi_{i,j} + \sum_{i=1}^{m} \beta_{i,k} \Delta GLB_{i,t} + \sum_{i=1}^{m} \varphi_{i,k} \Delta INF_{i,t} + \lambda_{i}ECM_{i,t-1} + \mu_{i,t} - (5.2)$$

For model 2,

$$\Delta UNM_{i,t} = \varphi_{i,i} + \sum_{i=1}^{m} \vartheta_{i,k} \Delta GEC_{i,t} + \sum_{l=1}^{m} \Phi_{i,k} \Delta GPO_{i,t} + \sum_{i=1}^{m} \xi_{i,k} \Delta GSO_{i,t} + \sum_{i=1}^{m} \gamma_{i,k} \Delta INF_{i,t} + \lambda_{i} \text{ECM}_{i,t-1} + \mu_{i,t} - (5.3)$$

Where all the variables are as defined earlier, and β , φ , ϑ , Φ , ξ , and γ is the long-run coefficients adjusted for short-run disequilibrium.

IV. EMPIRICAL FINDINGS AND DISCUSSION

A. Unit Root Test

The result of the unit root is presented in TABLE 1.

Table 1. Unit Root Test Result Individual Unit Root Process Common Unit Root Process (Im, Pesaran and Shin W-stat) (Levin, Lin & Chu t*) Variable Variable Order of Level First Level First Difference Difference Integration UNM -0.19405 -11.3472 UNM -0.76493 -10.6468 (0.4231)(0.0000)** (0.2222)(0.0000)** I(1) -17.3495 GLB 2.03685 GLB -2.64285 -16.9515 (0.9792)(0.0000)** (0.0041)** (0.0000)** I(1) -19.5495 GEC -2.77352 GEC -3.08168 -19.3015 (0.0010)** (0.0000)** $(0.0028)^{**}$ (0.0000)** I(0) GPO -1.96980 -17.5316 GPO -6.14240 -18.6554

	(0.0244)*	(0.0000)**		(0.0000)**	(0.0000)**	I(0)
GSO	5.92210	-11.8161	GSO	0.30154	-11.9126	
	(1.0000)	(0.0000)**		(0.6185)	(0.0000)**	I(1)
INF	-10.3589	-22.7672	INF	-11.4169	-17.4005	
	(0.0000)**	(0.0000)**		(0.0000)**	(0.0000)**	I(0)

Note: ** and * denotes significance at the 1% and 5% level respectively. Source: Output extracted from Eviews 10.

From TABLE 1, there is clear evidence that the variables are in a mixed order of integration. For instance, index of economic globalization (GEC), index of political globalization (GPO) and inflation are all stationary at level, I(0). However, the unemployment rate (UNM),

index of overall globalization (GLB), an index of social

globalization (GSO) became stationary after they were

differenced once. Hence, they are stationary at the first difference, I(1). This mixed order of integration warrants the test for cointegration.

B. Cointegration Test

The cointegration test results for Model 1 and Model 2 are presented in TABLE 2 and TABLE 3, respectively.

Table 2. Johansen Fisher Panel Cointegration Test Result for Model 1						
Hypothesized Number of	Fisher Statistic (from	Probability	Fisher Statistic	Probability		
Cointegrating Equations	Trace Test)		(from Max-Eigen			
CE CE (s)			Test)			
$\mathbf{r} = 0$	180.7	0.0000**	161.2	0.0000**		
r > 1	62.23	0.0137*	58.51	0.0295*		
r > 2	49.83	0.1372	49.83	0.1372		

Fisher Donal Cointegration Test Desult for Model 1

Note: ** and * denotes significance at the 1% and 5% level respectively. Source: Output extracted from Eviews 10.

From TABLE 2, the Trace statistic and Max-Eigen statistic report the existence of two (2) cointegrating equations. This is because the Trace statistic and the Max-Eigen statistic are all statistically significant at the % level of

significance. Hence, cointegration exists in Model 1. Thus, we can proceed to the error correction mechanism. In the same vein, the cointegration result for Model 2 is presented in TABLE 3.

Table 3. Johansen Fis	sher Panel Cointegration 7	Test Result for Model 2

Hypothesized	Fisher Statistic	Probability	Fisher Statistic	Probability
Number of	(from Trace Test)		(from Max-Eigen	
Cointegrating			Test)	
Equations CE CE				
(s)				
r = 0	361.4	0.0000**	248.0	0.0000**
r > 1	188.4	0.0000**	104.7	0.0000**
r > 2	112.1	0.0000**	75.66	0.0006**
r > 3	68.50	0.0033**	48.00	0.1803
r > 4	76.01	0.0005**	76.01	0.0005**

Note: ** and * denotes significance at the 1% and 5% level respectively. Source: Output extracted from Eviews 10.

Evidence from Table 3 shows that there are four (4) cointegrating equations. This also implies that there exists a long-run relationship between the various components of globalization and unemployment in West Africa. Hence, we will proceed to the error correction mechanism for Model 2 as well.

C. Error Correction Mechanism

For Model 1 and Model 2, the ARDL approach provides us with both the short-run and long-run equilibrium relationship, as presented in TABLE 4 and TABLE 5, respectively.

Tuble in vector Error correction internation for model 1					
Variable	Coefficient	Standard Error	t-statistic	Probability	
Long-Run Model 1: UNM = 0.1917GLB + 0.0153INF					
GLB	0.191704	0.026233	7.307809	0.0000**	
INF	0.015269	0.017437	0.875666	0.3817	
Short Run Model 1: <i>AUNM</i> = -0.1465 – 0.0033 <i>AINF</i> – 0.0140 <i>AGLB</i> – 0.0537ECM(-1)					
ECM(-1)	-0.053685	0.017179	-3.125057	0.0019**	
D(GLB)	-0.013994	0.018213	-0.768319	0.4427	

Table 4. V	ector Error	Correction	Mechanism	for Model 1
	a			

D(INF)	-0.003389	0.002279	-1.487114	0.1377
С	-0.146542	0.087414	-1.676424	0.0944*

Note: ** and * denotes significance at the 1% and 10% level respectively. *Source: Output extracted from Eviews 10.*

From TABLE 4, the long-run coefficient indicates that globalization and inflation will exert a positive effect on unemployment in the long run. Also, the effect of globalization is statistically significant at the 1% level of significance, while inflation is not statistically significant. This implies that a 1% increase in overall globalization will lead to a 19.17% increase in unemployment in the long run. Meanwhile, the positive effect of inflation on unemployment contradicts with the original Philips postulation. But recall that such negative relationship holds in the short run and that in the long run, the Philips curve

is vertical (perfectly inelastic); thus, our result is valid. The short-run result indicates that both globalization and inflation exerts a negative though the insignificant effect on unemployment. Therefore, globalization is only beneficial in reducing unemployment in the short run. The negative effect of the coefficient of inflation (-0.0033) is an indication that the Philips curve postulations are valid in the short run. The coefficient of the error correction mechanism (0.0537) shows that 5.37% of the short-run disequilibrium is corrected annually. However, the speed of adjustment is very slow.

Variable	Coefficient	Standard Error	t-statistic	Probability	
Long Run Model 2: UNM = 0.1433GEC + 0.0143GPO + 0.0750GSO + 0.0040INF					
GEC	0.143304	0.026942	5.318916	0.0000**	
GPO	0.014256	0.016091	0.885927	0.3762	
GSO	0.074974	0.029174	2.569931	0.0105*	
INF	0.004006	0.012660	0.316437	0.7518	
Short Run Model 2: <i>AUNM</i> = -0.3460 - 0.0031 <i>AINF</i> + 0.0037 <i>AGSO</i> + 0.0196 <i>AGPO</i> - 0.0157 <i>AGEC</i> -					
0.0775ECM(-1)					
ECM(-1)	-0.077536	0.036072	-2.149455	0.0322*	
Δ (GEC)	-0.015732	0.007063	-2.227297	0.0265*	
Δ (GPO)	0.019616	0.023592	0.831456	0.4062	
$\Delta(\text{GSO})$	0.003666	0.017664	0.207522	0.8357	
$\Delta(INF)$	-0.003147	0.002815	-1.118108	0.2642	
C	-0.345975	0.173691	-1.991897	0.0471*	

Note: ** and * denotes significance at the 1% and 5% level respectively. *Source: Output extracted from Eviews 10.*

TABLE 5 presents the ECM result for Model 2. In the long run, all the variables exert a positive effect on unemployment; However, the only index of economic globalization and social globalization are statistically significant at the 1% and 5% levels respectively. Thus, a 1% increase in the index of economic globalization and social globalization will lead to a 14.33% and 7.50% increase in unemployment respectively. In the short run, index of economic globalization helps significantly in reducing unemployment. Thus, a 1% increase in the index of economic socialization will lead to a 1.57% decrease in unemployment in the short run. Index of social and political globalization is still observed to exert positive effects on unemployment in the short run. At the same time, inflation still obeys the original Philips postulation of an inverse relationship between unemployment and inflation. The coefficient of the ECM (-0.0775), which is rightly signed (negative), indicates that 7.75% of the short-run disequilibrium is corrected annually.

D. Granger Causality Test

In determining the nature of the causal relationship between unemployment and the indices of globalization (overall globalization, economic globalization, social globalization, and political globalization), the Pairwise Dumitrescu-Hurlin panel causality test result is presented in TABLE 6 as follows:

Null Hypothesis:	W-Stat.	Zbar-Stat.	Probability
GPO does not homogeneously cause UNM	2.71258	0.88091	0.3784
UNM does not homogeneously cause GPO	2.41616	0.34770	0.7281
GLB does not homogeneously cause UNM	4.51326	4.12010	0.0000**
UNM does not homogeneously cause GLB	3.42750	2.16695	0.0302*

Table 6. Pairwise Dumitrescu Hurlin Panel Causality Tests Result

GEC does not homogeneously cause UNM	4.30460	3.74474	0.0002**
UNM does not homogeneously cause GEC	5.49176	5.88028	0.0000**
GSO does not homogeneously cause UNM	6.25922	7.26082	0.0000**
UNM does not homogeneously cause GSO	5.89728	6.60974	0.0000**

*Note: ** and * denotes significance at the 1% and 5% level respectively. Source: Output extracted from Eviews 10.*

Table 6 clearly shows that there is no causality between unemployment and political globalization. Every other index reported a bi-directional causality. For instance, there is bidirectional causality between overall globalization (GLB) and unemployment in West Africa. This is traced from the significance of the W-stat. And Zbar-stat at 1% and 5% levels. Hence, globalization homogeneously causes unemployment and unemployment also homogeneously cause globalization in West Africa. Similar explanations can be given in regards to the relationship between economic globalization and unemployment social globalization and and unemployment.

V. CONCLUSION

This study is aimed at investigating the effect of dimensions, globalization, and its various on unemployment in West African Sub-Region. The study captures twenty West African countries with the exception of Saint Helena due to data unavailability. The study cut across the period 1991 to 2017. At the aggregate, the study indicates that globalization exerts a positive and significant effect on unemployment in the West African Sub-Region. However, there is a noticeable negative but insignificant short-run effect of globalization on unemployment in the region. This means that in the long run, increasing the magnitude of globalization will generate a 19.17% increase in unemployment in West Africa. Disaggregating globalization into economic, political and social dimensions, only economic globalization helps in reducing unemployment in the short run by only 1.57% but generates as much as 14.33% in the long run. Political and social globalization are all generating a positive short-run and long-run effect on unemployment in West Africa. Part of the empirical analysis captures the effect of inflation on unemployment. It is observed that inflation exerts a negative effect on unemployment in the short run, which is in line with original Philip's postulation, but a positive effect, in the long run, totally with the long vertical run Philip's curve.

The Pairwise Dumitrescu Hurlin panel causality test shows that there is no causal relationship between political globalization and unemployment in West Africa while there is the presence of bidirectional causality between economic globalization and unemployment as well as between social globalization and unemployment. It is evident from the findings that globalization in the economic dimension should be encouraged as it will help in reducing unemployment in the region. However, such should be viewed as a short term benefit hence; efforts towards promoting strong employment generation outlets should be targeted and promoted so as to outweigh the positive effect that such globalization may bring in the long run.

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