UNEMPLOYMENT RATE IN NIGERIA: THE RESPONSIVENESS OF GROWING DOMESTIC AND EXTERNAL DEBT

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Abstract

Owing to the continuous increase in domestic debt, external debt and unemployment rate in Nigeria, the impact domestic and external debt have on the unemployment rate for the period 1981-2021 was examined using ARDL methodology. From the empirical analysis, it was found that domestic debt statistically and significantly engenders a reduction in unemployment rate while external debt increases unemployment rate over the long-term. In the event of temporary displacement from equilibrium, the speed of adjustment thereof was 59 percent. The causality tests shows one-way causation from domestic debt to unemployment rate; bidirectional causation was established between unemployment and domestic investment; foreign investment and unemployment; domestic investment and domestic debt; and between domestic investment and external debt. The test for structural stability also shows that the model is structurally stable. Options for policies that increase domestic savings in other to create room for the availability of fund for more domestic loans amongst others were put forward in the light of the empirical findings.

Keyword: Domestic Debt, External debt, Nigeria, Time Series Analysis, Unemployment

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I. Introduction

Policy-makers often resort to domestic or external borrowing in the quest to influence key macroeconomic aggregates (such as unemployment, balance of payment, inflation rate) on the path of sustainable growth. The need to borrow through domestic or external sources is premised on the gap that exists between desired and available resources. Attractions for domestic debt are attributed to the fact that it is denominated in domestic currency, lowers currency mismatches and promotes a more stable investors' base (Aigheyisi, 2015). Also, as stated by Edo, Osadolor and Dading (2020), the growing trend in Nigeria's external debt profile could be attributed to the 'convenience' and disposition of external creditors to grant loans compared, to raising taxes or -lowering interest rates. As such, few years after Nigeria was granted external debt relief (2005/2006), Nigeria again embarked on massive external borrowing placing external debt stock to the tune of about US$18.9 billion in 2017 (Edo, Osadolor & Dading, 2020). Data from the Debt Management Office (DMO 2018; 2022) shows that an increase in domestic debt has been sustained in Nigeria over time. For example, DMO (2018) report shows that domestic debt (as percentage of GDP), which was 10.92 percent in 2013, increased to 13.04 percent and 14.52 percent in 2016 and 2017, respectively. Also, data from the National Bureau of Statistics (NBS, 2023) shows that government/public debt stock in Nigeria was about N46.25 trillion in Q4 in 2022 from N44.06 trillion in Q3 2022. This shows that government debt increased by 4.96% in Q4 2022. External debt stood at about N18.70 trillion and domestic debt was N27.55 trillion in Q4 2022. A further breakdown of these figures from NBS (2023) reveals that the share of external debt to total government debt was about 40.44 percent in Q4 2022, while domestic debt was approximately 59.56 percent.

Despite this huge increase in the domestic and external debt stock, reports from the NBS (2022) and Central Bank of Nigeria (CBN, 2022) shows that unemployment rate in Nigeria has been on a relatively steady increase since 2000. For example, reports from NBS (2023) and CBN (2022) show that unemployment rate in Nigeria increased from approximately 15 per cent in 2008 to about 26 per cent in 2012. Though a decline was recorded in a few years such as 2013 and 2014, however, the unemployment rate in Nigeria was above 21 percent in 2021/2022. Owing to the challenges posed by the unabated continuous increase in unemployment rate to the economy, this study is set out to examine the role of domestic and external debt as it relates to unemployment rate in Nigeria. Thus, rather than lumping domestic and external debt - a common practice in the literature (see for example; Iwuoha, 2020; Nwaeze 2019; Igberi, Odo, Anoke and Nwachukwu, 2016; Tarmer 2016), this study relates domestic and external debt to unemployment rate in Nigeria with a view of bringing to fore their specific impacts comparatively. This will no doubt direct/ influence policy as it relates to domestic and external sources of fund for developmental purposes in Nigeria. Following this introduction is preliminary analysis; review of the literature; empirical result and discussion; conclusion and recommendation.

II. Preliminary Analysis

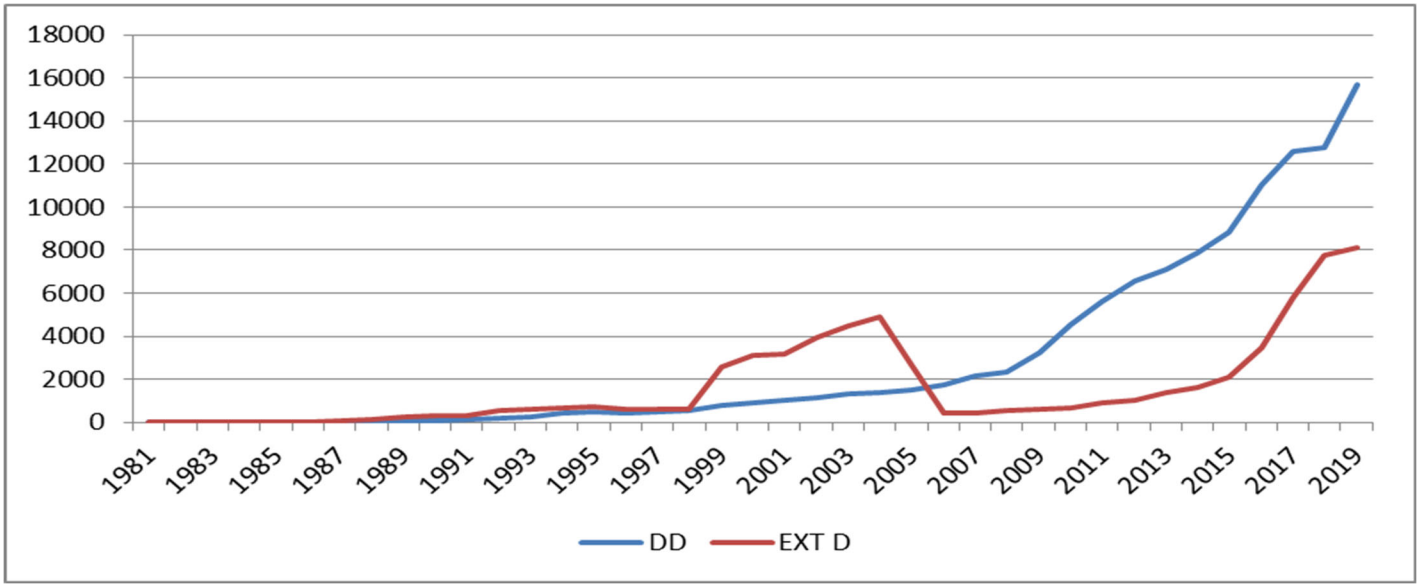
II.1. Trend in Domestic Debt, External Debt and Unemployment Rate in Nigeria

Data from CBN (2010) shows that in 1994, treasury bills, treasury bond, treasury certificate and developmental stock accounted for about 42 per cent, 48 per cent, 9.16 per cent and 8.22 per cent of domestic debt accordingly. It also revealed that by 2002, treasury bill had accounted for about 62.93 per cent, treasury bond 36.93 per cent and development stock 0.14 per cent of domestic debt. Before 2016, the instruments mainly employed by the government to raise funds domestically were treasury bills, treasury bonds and federal government bonds. However since 2017, three new instruments were introduced; these are: the savings bond, the sukuk and the green bond (DMO, 2018). Figure 1 shows the trend in the domestic debt and external debt profile in Nigeria for the period 1981 to 2021. From the Figure, it can be observed that the trend in domestic debt was in the upward direction during the period. Domestic debt was somewhat stable with marginal increase from 1981 through 1995, 1997, 1999 and 2001. However in 2003, Nigeria's domestic debt hit N1.09 trillion while the domestic debt-GDP ratio stood at about 21.26 per cent. Domestic debt stood at about US$34.4 billion in 2011, and increased further to US$47.05 billion in 2014 before falling slightly again to about US$43.185 billion in 2015. Domestic debt as a share of GDP stood at 10.92 per cent, 13.04 per cent, 14.52 per cent and above 15 percent in 2013, 2016, 2017 and 2021 respectively (DMO 2022), and as of Q4 2022, Nigeria domestic debt stood at about US$61.41billion

(NBS, 2023). The increase in volume of domestic debt could be attributed to the need to attend to myriad developmental challenges (for example; growing unemployment rate, insecurity etc) bedeviling the country. The continuous upward trend in domestic debt profile in Nigeria could be attributed to the need to attend to developmental challenges such as; weak infrastructural facilities among others in the face of unstable and dwindling earnings from crude oil -main stay of the Nigeria economy (see Ayuba & Khan 2019; Aigheyisi 2015).

Nigeria's external debt comprises the multilateral debt, bilateral debt, and foreign commercial loans. External debt trend in the last two decades has been on the upward direction, despite the debt relief in 2005/2006 by some creditors; (the Paris and London Club of Creditors) which resulted in the stock of external debt decline from about $20.2billion in 2005 to about $3.6billion in 2007 (IMF, 2018). External debt began to rise steadily again from 2007 standing at about N523.30 billion, N896 billion, N1631 billion and N3478 billion in 2008, 2011, 2014 and 2016 respectively (World Bank, 2020). Specifically, outstanding debt stock in Nigeria as at 2017 was above $15 billion (Edo, Osadolor and Dading 2020) and by 2022 Q4, Nigeria's external debt was about N18.70 trillion (NBS, 2023). Reasons adduced for the change in the pattern of external debt accumulation could also be premised on the need for harnessing external sources of fund to complement domestic resources in the face of incessant fluctuations in crude oil price; and the depreciation of the Nigerian currency (Naira) with its implication on meeting external debt obligations as it fall due. Figure 1 shows that the trend in external debt is in the upward direction for the period 1981-2021.

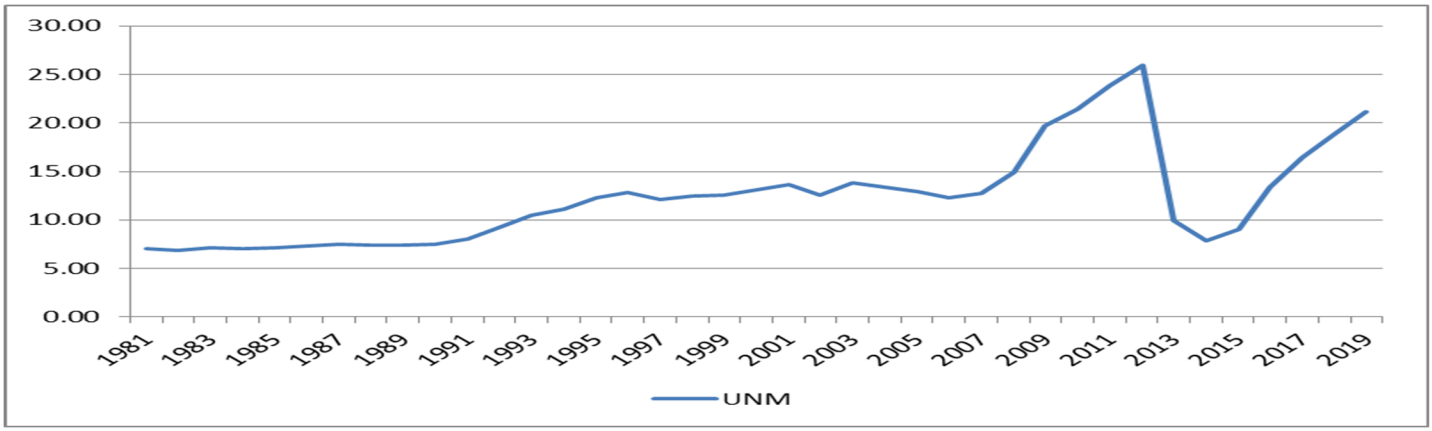
Figure 1: Trend in Nigeria Domestic and External debt 1981 and 2021 (Billions of Naira)
Source: World Bank, WDI 2022.



Though, some programmes and agencies had been put in place/established to tame the rising unemployment rate in Nigeria for example; the NDE-National Directorate of Employment, Small and Medium Enterprises and several National Social Investment Programmes. However, significant results were not recorded as it concerns the unemployment rate in Nigeria. Unemployment rate continue to be on the upward direction averaging approximately 14 to 15 per cent for the period 1981 to 2021. As depicted in Figure 2, the rate of unemployment rose from 7.5 per cent in 1990 to 12.8 per cent in 1996. This was sustained in the neighborhood of 12 and 13 per cent between 1997 and 2007, before increasing further, from about 15 per cent in 2008 to about 26 per cent in 2012 (highest within the period 1990-2018), and could be attributed to weak policy response on the part of government. However, due to some policy initiatives under National Social Investment Programmes such as the subsidy reinvestment programme (SURE-P), Graduate Internship Programme amongst others; unemployment rate fell to about 9.9 percent in 2013 with a further dip to about 7.8 per cent in 2014. However, unemployment rate stood at about 13.3 per cent, 16.4 per cent, 16.9 per cent

and above 21 percent in 2016, 2017, 2018 and 2021/2022, respectively.

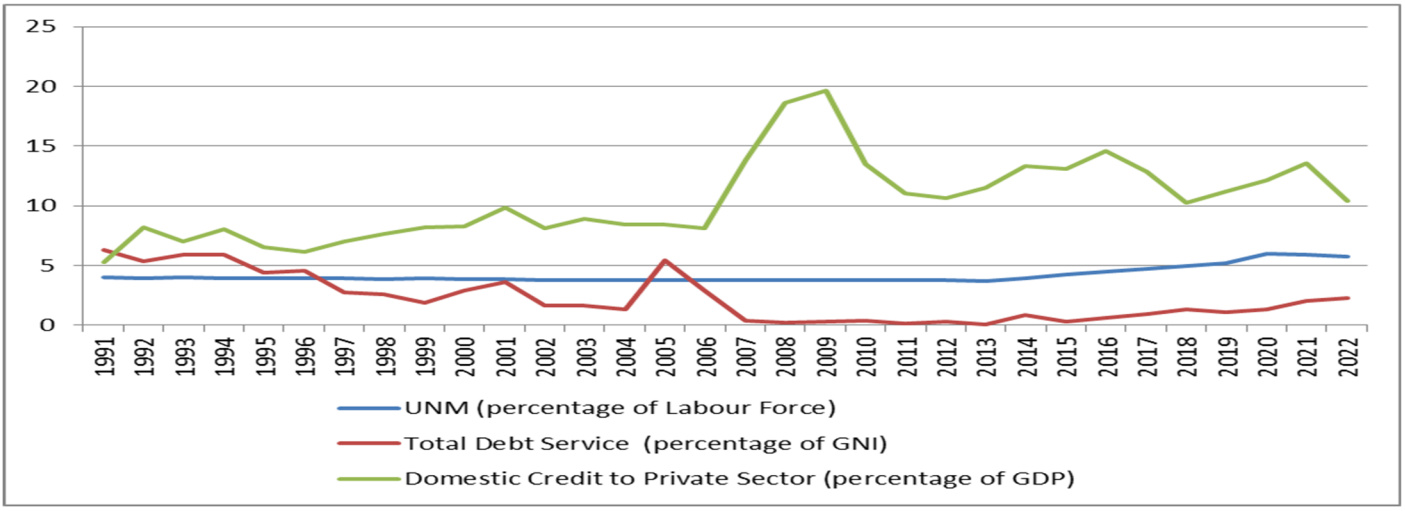
Figure 2: Trend in Unemployment rate in Nigeria from 1981 to 2021



Source: World Bank, WDI 2022

Among the direct consequences of domestic and external borrowing are investments in critical sector of the domestic economy and meeting its obligations as its falls due. Figure 3 shows the trend in unemployment rate, debt service and domestic credit to private sector for the period 1991 to 2022. From the Figure, it can be observed that unemployment rate was on a relative increase for the period. Debt service was however on a relatively galloping decrease between 1991 and 2004, before it recorded a remarkable increase in 2005. A downward trend was however recorded in 2006/2007 largely owing to the debt relief granted Nigeria within the same period. As external borrowing assumes an upward increase once more (beginning from 2007/2008), debt service also began to increase resulting in an upward trend between 2009 and 2022. It is indeed a fact that the availability of domestic credit is critical for sustainable domestic private sector investment and this no doubt has positive implications on employment generation. Domestic credit to private sector trend in Nigeria as shown in Figure 3 is on the trajectory of an upward direction (though fluctuating pattern) for the period 1991 to 2022. The seemingly fluctuating trend has not significantly contributed to the volume of private sector investment and by extension engenders a reduction in the rate of unemployment in Nigeria.

Figure 3: Unemployment, Debt Service and Domestic Credit to Private Sector in Nigeria (1991 and 2022)



Source: World Bank, WDI 2020

III. Literature Review

III.1. Theoretical Review

Among the basic theories that establish a linkage between unemployment and macroeconomic variables are Phillips (1958) - Phillips curve and Okun (1962) - Okun's law. Okun's law established the relationship between output and unemployment (a negative relationship between cyclical unemployment and output). Okun's law shows how much of a country's gross domestic product (GDP) may be lost when the unemployment rate is above its natural rate. The logic behind Okun's law is that Output is a function of on the quantity of labor employed in the course of production. This implies that the higher the input (labour), the higher the output vice-versa and by extension an inverse relationship between output and unemployment. Thus, the Okun's law can also be determined as a positive relationship between change in output and change in employment. However, as put by Wen and Chen (2012), the relevance of Okun's law is a function of the definition ascribed to the long-run economic growth and unemployment rate (Wen & Chen 2012). The Phillips curve defines the nexus that exist between inflation and unemployment, that is, a trade-off between unemployment and inflation. It employs the aggregate unemployment rate to measure economic activity and demand pressures on inflation. The curve explains that in a situation wherein the demand for labour is high, probably due to low level of unemployment, employers tends to increase wages so as to attract most qualified/efficient labour. However, the opposite holds when the demand for labour is low and unemployment is high (Phillip, 1958).

III.2. Empirical Review

This section reviews studies that relate debt to unemployment rate. Elekwa and Onyenama (2022) examined the impact of disaggregated debt components on unemployment in Nigeria spanning through 1992 to 2020 using auto-regressive distributed lag-(ARDL) model. From the result, a positive and significant nexus was established between unemployment rate and external debt. Siddiqa (2021) examined the determinants of unemployment using selected developing countries with Generalized Method of Moments (GMM) method. It was found that external debt positively and significantly impact unemployment rate. On the relationship between unemployment and government debt, Soukaina and Hammami (2021) examined the dynamic links between public debt, unemployment rate, and budget deficit in the MENA Countries and Eurozone for the period 1990 to 2016 using simultaneous equation model. It was established that there is exist a two-way relationship between unemployment and government debt.

Aphu (2019) examined the impact public expenditure has on unemployment rate in African countries in a panel data covering the period 2000-2017, using the system General Method of Moment (sGMM). The study finds that public spending on infrastructure and education lowers unemployment rate. It was however found that public expenditure on security and health result in an increase in the rate of unemployment. Onodugo, Obi, Anowor, Nwonye and Ofoegbu (2017) employed a regression model to determine the impact public spending has on unemployment rate in Nigeria for the period 1980 to 2013. It was found that capital, recurrent and private investment spending result in a reduction in unemployment rate, though recurrent expenditure exhibited less statistical significant. Khalid and Tarmer (2016) examined the relationship and effect of public debt on domestic product and unemployment covering the period 1999-2014 in a simple regression analysis. It was established that there is a nexus between public debt and GDP, and between public debt and unemployment with public debt in percentage of GDP standing at about 20 percent. Other studies that upheld that public debt results in a reduction in unemployment rate include; Nwaeze (2019); Steinar and Sparrman (2018); Nwosa (2014); Apere (2014); Ebi, Abu and Clement (2013).

On the other hand, Okoye and Obi (2022) examine the relationship between public debts, poverty and unemployment in Nigeria spanning the period 1981-2022 using an unrestricted vector auto-regression model. It was found that public debts did not positively impact on unemployment rate in Nigeria. This was premised on the fact that most of the borrowed funds were employed to finance consumables. Iwuoha (2020) examined the impact of public debt on the unemployment rate in Nigeria for the period 1981

to 2019; applying the vector error correction model- (VECM) methodology. The findings show that public debt negatively impacts unemployment rate in Nigeria. Igberi, Odo, Anoke and Nwachukwu (2016) also examined the impact public debt has on unemployment rate in Nigeria covering 1980 to 2015 using ARDL and Wald test techniques. From the long run, it was found that a 1 percent rise in public debt results in a 1.6 percent rise in the rate of unemployment.

Battaglini and Coate (2011) investigated the nexus that exist between fiscal policy and unemployment rate using a dynamic model. It was found that the use of fiscal expansion to curtail the rising unemployment rate often results in high debt accumulation. External debt impact negatively on macroeconomic variables and growth owing to the non-utilisation of borrowed funds in productive investment. This assertion has been upheld in several studies such as Edo, Osadolor and Dading (2020); Mihaiu (2014); Ayyoub, Chaudhry and Yaqub (2012), Vamvakidis (2007); Schclarek (2004), Pattillo, Poirson, Ricci (2004), Edo (2002). The tremendous increase in total external debt acted as a drag on the economy, this informed the response of the International Monetary Fund -IMF and the World Bank debt reliefs with 'Highly Indebted Poor Countries program' (Edo, Osadolor & Dading 2020).

Thus, beside the existence of mixed empirical findings as it relates to public debt and unemployment rate (see Iwuoha, 2020; Igberi, Odo, Anoke and Nwachukwu, 2016; Nwaeze 2019; Steinar and Sparrman, 2018; Tarmer 2016), there exist scanty studies that specifically examined -side by side, domestic debt and external debt with a view of bringing to fore in comparative terms their impact on unemployment rate in Nigeria.

IV. Theoretical Framework and Methodology

IV.1. Theoretical Framework

A combination of Phillips Curve (1958) and Okun's Law (1962) establishes the nexus between unemployment, output and inflation in line with Dornbusch, Fischer and Startz (2011), Dogan (2012); and Folawewo and Adeboje (2017) is the theoretical basis of this study.

Given the Phillips curve wage-employment relation which shows the nexus that exist between the level of employment, expected inflation and change in wage rate is;

$$g_w - \pi^e = \left[\left(W_{t+1} - W_t\right) \div W_t\right] - \pi^e = - \in \left(N^* - N \div N^*\right) \quad (1)$$

Where; g_w is wage inflation rate; π^e is expected inflation; W_{t+1} is next period wage; W_t is present wage; N captures actual level of unemployment; N^* represent full employment.

Also, given Okuns law relation between unemployment and output as:

$$\left(Y - Y^e\right) \div Y^* = -\omega\left(u - u^*\right) \quad (2)$$

Where; Y is the actual GDP and Y* is the potential GDP; ω shows the nexus between GDP growth and unemployment gap (that is rate of unemployment (u) and natural rate of unemployment (u^*)); and the negative sign implying a trade-off.
Based on firms' optimization process and price-setting behavior, the nexus between inflation, unemployment and output is established by combining Phillip curve and Okun's law (see Blanchard and Johnson (2013)). Thus, bringing equation (1) and (2) together results in equation (3) as stated below;

$$P_{t+1} = P^e{}_{t+1}\left[1 + \lambda\left(Y - Y^*\right)\right] \quad (3)$$

By substitution of equation (2) into equation (3), the relationship between unemployment, output and inflation is derived and stated as;

$$-(u-u^{*}) = \left[(P_{t+1} - P^{*}{}_{t+1}) \div P_{t+1}\right] * 1 \div \lambda Y^{*}\omega \quad (4)$$

Equation (4) therefore satisfies Phillips curve and Okun's law respectively; that is, unemployment is inversely related to inflation and output.

With particular reference to Dogan (2012), Folawewo and Adeboje (2017), an unemployment relation is explicitly presented as;

$$unemp_{it} = \alpha_{1i} + \alpha_2 gdp_{it} + \alpha_3 \inf_{it} + \alpha_4 fdi_{it} + \alpha_5 labprod_{it} + \alpha_6 extdebt_{it} + v_{it} \quad (5)$$

Where; unemp = Unemployment rate; gdp= GDP growth; inf = inflation rate; fdi = foreign direct investment; labprod = labour productivity growth; extdebt = total external debt stocks; pop= population and v_{it} = composite error term.

IV.2. Methodology

Auto-regressive Distributed Lag (ARDL) methodology as explained by Pesaran and Shin (1999); and Pesaran, Shin and Smith (2001), is adopted for this study. Amongst the strength of ARDL methodology is its applicability when variables possess mixed order of integration and it is also suitable in analyzing short-run and long-run impacts. Also, the estimates and t-statistics values are mainly unbiased with endogenous regressor(s) (Harris and Sollis, 2003). Here, variables are first subjected to descriptive and correlation analysis, and thereafter the test of unit root using the Augmented Dickey Fuller (ADF) and Dickey Fuller Generalised Least Squared (DF-GLS) tests.

IV.2.1. Model Specification and Data Sources

The link between unemployment and macroeconomic variables such as inflation, foreign direct investment, external debt is built on the Phillips curve and Okun's law theoretical exposition (see Nwosa, 2014; Strat, Davidescu and Paul 2015). Thus, building on Dogan (2012); and Folawewo and Adeboje (2017) as stated in equation (5), and by bringing in other variables of interest (expanding the list of macroeconomic variables that determines unemployment rate), this result to equation (6) as defined below;

$$UNM = F(GDP, DDB, EXTDEBT, DIN, LABPROD, FDI, INS, INF) \quad (6)$$

Where; DDB = domestic Debt; DIN = domestic investment; INS = interest rate spread. All other variables are as previously defined.

However, to avoid the problem of over parametarisation of variables and the degree of freedom, focus is on variables of interest. This result to the model as presented in equation (7) below;

$$UNM = F(DDB, EDT, DIN, FDI, INS, INF) \quad (7)$$

The empirical model in its econometric form can be presented as:

$$UNM_t = \beta_0 + \beta_1 DDB_t + \beta_2 EDT_t + \beta_3 DIN_t + \beta_4 FDI + \beta_5 INS_t + \beta_6 INF_t + \mu_t \quad (8)$$

The ARDL represented is;

$$\Delta UNM_t = \theta(UNM_{t-1} - c - \delta_1 DDB_{t-1} - \delta_2 EDT_{t-1} - \delta_3 DIN_{t-1} - \delta_4 FDI_{t-1} - \delta_5 INS_{t-1} - \delta_6 INF_{t-1}) +$$
$$\sum_{j=1}^{p}(\alpha_j \Delta UNM_{t-j}) + \sum_{i=0}^{m}(\lambda_i \Delta DDB_{t-i}) + \sum_{i=0}^{n}(\gamma_i \Delta EDT_{t-i}) + \sum_{i=0}^{q}(\omega_i \Delta DIN_{t-i}) +$$
$$\sum_{i=0}^{h}(\chi_i \Delta FDI_{t-i}) + \sum_{i=0}^{v}(\tau_i \Delta INS_{t-i}) + \sum_{i=0}^{k}(\eta_i \Delta INF_{t-i}) + \mu_t \quad (9)$$

Where; δ_1, δ_2, δ_3, δ_4, δ_5 and δ_6 are coefficient in the long run while α_j, λ_i, γ_i, ω_i, χ_i, τ_i and η_i are coefficients in the short run. Also, m, n, q, h, v and κ captures the lags of variable in the dynamic model, Δ represent the difference operator. Lastly, Θ is the speed of adjustment and μ the error term. Here, the *a priory* definition of the variables are indeterminate, that is, they could either be positive or negative.

Data for the study runs through 1981-2021 and are sourced from World Development Indicators Country Data (2022).

V. Result and Discussion

Table 1 present the coefficients of correlation of variables. It can be observed that domestic debt (DDB), external debt (EDT), domestic investment (DIN), foreign direct investment (FDI) and interest rate spread (INS) are positively related to unemployment (UNM) with inflation (INF) being the only exception (negatively sign). A similar conclusion can also be held for domestic debt, external debt, domestic investment and foreign direct investment. All other variables (unemployment, domestic debt, external debt, domestic investment, foreign direct investment and inflation) exhibited a positive correlation concerning interest rate spread. However, with respect to inflation, all the variables (except interest rate spread) show a negative relationship.

Table 1: Correlation Matrix

	UNM	*DDB*	*EDT*	*DIN*	*FDI*	*INS*	*INF*
UNM	1.00						
DDB	0.52	1.00					
EDT	0.19	0.51	1.00				
DIN	0.42	0.87	0.34	1.00			
FDI	0.51	0.51	0.42	0.25	1.00		
INS	0.37	0.44	0.33	0.41	0.35	1.00	
INF	-0.13	-0.26	-0.15	-0.41	-0.17	0.11	1.00

Source: Authors' Computations (2023)

From Table 2, the ADF test result shows that variables are characterize by mixed order of integration, that is, integrated at level (I (0)) or at first difference (I(1)). This was affirmed using the DF-GLS test. Since none of the variable is I(2), the ARDL bounds test method to determine co-integration seems appropriate.

Table 2: Unit Root Test

ADF Test					
Variables	*Levels*		*Ist Difference*		*I(d)*
	ADF Stat	*ADF 95%*	*ADF Stat*	*ADF 95%*	
UNM	-4.18**	-3.53	-	-	I(0)
DDB	-6.89***	-4.28	-	-	I(0)
EDT	-3.05	-3.21	-3.33*	-3.21	I(1)
DIN	-2.73	-3.21	-7.75***	-4.21	I(1)
FDI	-7.96***	-4.28	-	-	I(0)
INS	-1.56	-3.21	-6.85***	-4.21	I(1)
INF	-4.14**	-3.51	-	-	I(0)
DF-GLS Test					
Variables	*DF Stat*	*DF 95%*	*DF Stat*	*DF 95%*	*I(d)*
UNM	-3.32**	-3.19	-	-	I(0)
DDB	-6.11***	-3.77	-	-	I(0)
EDT	-2.61	-3.19	-3.42**	-3.19	I(1)
DIN	-1.89	-3.19	-3.26**	-3.19	I(1)
FDI	-5.55***	-3.77	-	-	I(0)
INS	-2.01	-3.19	-6.14***	-3.77	I(1)
INF	-3.44*	-2.89	-	-	I(0)

Source: Authors' Computation (2023)
*Note: ***,**, * indicates statistically significant at 1, 5 and 10 percent significant levels respectively.*

Table 3 shows ARDL Bound Test for Cointegration. From the result as shown in the Table 3, variables are co-integrated. This is as a result of the fact that F-statistic of approximately 15 unit and T-Test of approximately 11 unit are statistically significant (at 1 percent) in that each are more than the upper bound I(1) critical value. By this, it means that the variables are cointegrated.

Table 3: ARDL Bound Test for Cointegration

F-Bounds Test				*Null Hypothesis: No levels relationship*
Test Statistic	*Value*	*Significant*	*I (0)*	*I(1)*
		Asymptotic: n=1000		
F-statistic	15.23	10%	4.22	6.01
K	6	5%	4.19	6.31
		2.5%	5.44	5.73
		1%	4.01	4.11
T-test	-11.15	10%	-3.41	-6.35
		5%	-3.13	-4.92
		1%	-6.15	-7.15

Source: Authors' Computation (2023)
Note: k= Number of explanatory variables.

Table 4 shows ARDL -long run and short run results, as well as the Wald test. From Table 4 domestic debt impact on unemployment rate was negative and significant statistically at 5 percent. That is, domestic debt engenders a reduction in unemployment rate over the long term period to the tune of about 0.62 percent given a one percent rise in domestic debt. Though this is contrary to Ugo (2008); Carlson and Spencer (1975) assertion that domestic borrowing engenders financial instability and a reduction in credit availability to private sector owing to rise in interest rate (if domestic debt does not stimulate the economy as expected). The result is however in tune with Omodero (2019), Khalid and Tarmer (2016) and Izevbigie (2015) empirical findings that domestic debt impact positively on private sector credit, domestic investment and by extension unemployment rate. External debt impact on the rate of unemployment was positive and significant statistically at 1 per cent levels in the long run. This indicate that a one percent rise in external debt leads to about 0.009 percentage rise in unemployment rate. This is also in tune with empirical analysis by Edo, Osadolor and Dading (2020), Mihaiu (2014) and Vamvakidis (2007) which upheld that external debt negates macroeconomic variables such as unemployment and economic growth owing to the non-committal of borrowed fund into productive ventures amongst others. Comparatively, while domestic debt reduces unemployment, external debt exacerbates it.

In the long run, domestic investment and foreign direct investment reduce unemployment rate. This was however only significant with respect to foreign investment. This indicates that while foreign direct investment is responsive in addressing unemployment rate in Nigeria, same might not hold for domestic investment. A further implication emanating from the estimate as presented in Table 4 is that there exist a sort of disconnect with regards to the domestic debt impact and foreign investment impact as it relates unemployment; and external debt impact on unemployment. Though, the impact inflation exerted on unemployment rate was positive, it was not statistically significant. This implies that inflation rate has not remarkably contributed in worsening unemployment rate in Nigeria. This was however different with respect to interest rate spread which was statistically significant and shows a negative impact on unemployment rate in the long run. This indicates that a one percent rise in the interest rate spread lead to about 0.55 percent reduction in the unemployment rate. Wald test shows that there exists a significant difference on the effect of the variables on unemployment rate in the short-run. This means a rejection of the null hypothesis of the exclusion of lags of all variables as employed in the model. The speed of adjustment to inter-temporary equilibrium in the long run from short run owing to temporary displacement is high (approximately 60 percent). The R^2 and adjusted R-squared values of about 0.83 and 0.80 show that explanatory variables (domestic debt, external debt, domestic investment, interest rate spread and inflation rate) account for over 83 per cent and 80 per cent variation in the dependent variable (unemployment rate).

Table 4: Long Run, Error Correction and Wald Test Estimates

Long run Coefficient				
Variable	Coefficient	Std. Error	t-Statistics	Probability
DDB	-0.62	0.146	4.29	0.00
EDT	0.009	0.001	9.62	0.00
DIN	-0.13	0.15	-0.86	0.39
FDI	-0.31	0.14	2.19	0.03
INS	-0.55	0.179	-3.112	0.004
INF	0.002	0.019	0.114	0.909
C	8.60	0.19	44.96	0.00
Short run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Probability
D(UNM(-1))	0.30	0.09	3.21	0.003
D(DDB)	1.18	0.59	-1.98	0.06
D(DDB(-1))	0.011	0.001	10.28	0.00
D(DIN)	0.26	0.04	-6.05	0.00
D(DIN(-1))	-0.01	0.004	-1.85	0.07
D(FDI)	-0.20	0.11	1.84	0.07
D(FDI(-1))	-0.25	0.12	2.09	0.04
CointEq(-1)*	-0.59	0.06	-10.11	0.00
R-squared	0.83			
Adjusted R-squared	0.80			
F-statistic	12.19			
Prob(F-statistic)	0			
Wald Test				
Test Statistic	Value	Df	Probability	
t-statistic	-1.36	25	0.11	
F-statistic	1.77	(1, 25)	0.11	
Chi-square	1.77	1	0.10	
Normalized Restriction (= 0)		Value	Std. Error	
C(2) - C(3)		-0.30	0.21	

Source: Authors' Computation (2023)
Dependent Variable: UNM; ARDL Lag Structure: ARDL (1, 2, 2, 0, 2, 0)

Table 5 shows causality tests of variables of interest. The results show unidirectional causality between domestic debt and unemployment rate. The causality runs from domestic debt to unemployment rate. This therefore means that domestic debt is a predictor of unemployment rate in Nigeria. However, no causality was found between external debt and unemployment. Table 5, also shows that there exists bidirectional causality between domestic investment and unemployment; foreign investment and unemployment. Furthermore, bidirectional causality was found between domestic investment and domestic debt with both statistically significant at 1 percent level. Similarly, bidirectional causality was found between domestic investment and external debt.

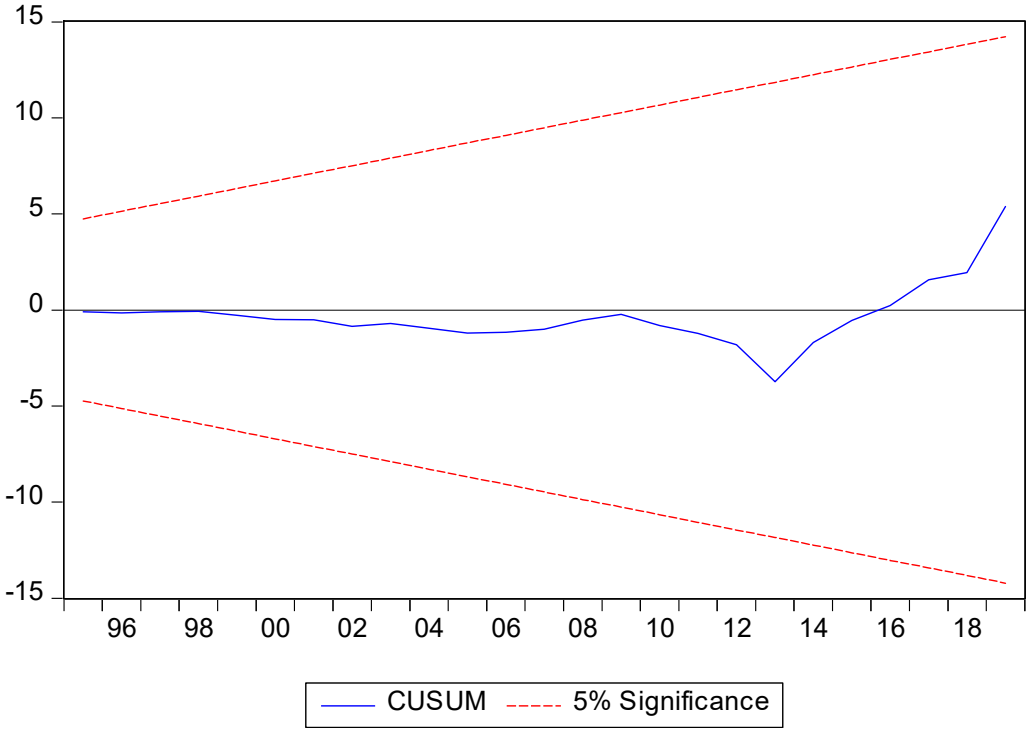
Table 5: Toda-Yamoto Granger Causality Test Result

Direction of Causality	*Observation*	*Chi-sq*	*Prob.*
DDB → UNM *UNM → DDB*	*38*	*3.10** *1.49*	*0.05* *0.11*
EDT → UNM *UNM → EDT*	*38*	*0.79* *1.03*	*0.25* *0.22*
DIN → UNM *UNM → DIN*	*38*	*2.01** *3.24**	*0.07* *0.05*
FDI → UNM *UNM → FDI*	*38*	*9.22*** *4.99**	*0.00* *0.04*
EDT → DDB *DDB → EDT*	*38*	*1.62* *4.82**	*0.11* *0.00*
DIN → DDB *DDB → DIN*	*38*	*7.13*** *30.11***	*0.00* *0.00*
DIN → EDT *EDT → DIN*	*38*	*3.05** *2.181**	*0.04* *0.07*

Source: Authors' Computations (2023)
(*Note: *, ** indicate significance at 5 and 1 percent level).*

Figure 3 shows a test of structural stability of the model using cumulative sum of recursive residuals (CUSUM). This test is carried out because model stability aids policy reliability. From the results, as presented in Figure 3, it can be observed that plots of CUSUM at a 5 percent significance level fall within the critical bounds. This therefore means that there is structural stability in the model and thus policy options emanating thereof can be relied upon.

Figure 3: Structural Stability Test



Source: Authors' Computation (2023)
Table 6 shows the test of normality, autocorrelation and heteroscedasticity. The Jarque-Bera P-value of 0.27 is more than a 0.05 (5

per cent) statistical significance. Thus, it can be held that the residual is normally distributed. In a similar vein, the 0.51 p-value of the F-statistic of the Breusch-Godfrey (B-G) autocorrelation is more than a 0.05 (5 percent) level of statistical significance. Based of this, there is no problem of autocorrelation in the model. Breusch-Pagan-Godfrey employed for heteroscedasticity reveals that the probability value of 0.77 is greater than 5 per cent, that is, 0.05. This also implies no case of heteroscedasticity in the model.

Table 6: Normality, Serial correlation and Heteroscedasticity Tests

Histogram Normality test (J-B)	1.614 (p = 0.27)
Breusch-Godfrey Serial Correlation LM Test	1.013 (p = 0.51)
Heteroskedasticity Test: Breusch-Pagan-Godfrey	0.522 (p = 0.77)

Source: Authors' Computation (2023)

VI. Concluding Remarks

An investigation of the impact of domestic and external debt on unemployment rate in Nigeria was conducted for the period 1981 to 2021. The findings show that domestic debt reduces unemployment rate and external debt worsens it. Wald test indicates a rejection of the null hypothesis of exclusion of the lags of all variables while the speed of adjustment was about 59 percent. The causality test reported for key variables established one-way causation (unidirectional causality) running from domestic debt to unemployment rate. Bidirectional causality was established between unemployment and domestic investment. The plots of CUSUM at 5 percent statistical significance affirmed the structural stability of the model. Breusch-Godfrey autocorrelation test, Breusch-Pagan-Godfrey, heteroscedasticity and histogram normality test shows the absence of autocorrelation and heteroscedasticity and that the residual are normally distributed

Based on the findings of the study, we recommend that;

Since domestic debt positively impact unemployment rate, domestic borrowing should be seen as a veritable source of funds and as such emphasized by policy makers in the quest of mobilization of fund for developmental purposes in Nigeria. In the light of the above, policy makers should promote policies that encourage domestic savings such as increase in interest rate on deposit, macroeconomic stability (control of inflation rate), in other to enhance domestic borrowing in Nigeria. Lastly, though external borrowing could complement domestic resources, there is need for caution in the light of its negative impact on unemployment rate in Nigeria.

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