



Unemployment, Inflation and Economic Growth: Evidence from Nigeria

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Abstract

Nigeria has continued to grapple with rising unemployment amidst high inflation and slow growth of Nigeria's gross domestic product. This precarious situation has become worrisome as it remains unabated notwithstanding all the efforts of policy makers. The study evaluates the effect of unemployment and inflation on economic growth of Nigeria for the period between (1981-2021). The study used standard econometrics techniques such as autoregressive distributed lag model (ARDL) to measure the degree of effect of inflation and unemployment on economic growth. It also deployed the Pesaran and Shin bound testing procedure to determine the short run and long run relationship of the variables under study. The findings revealed that inflation and unemployment have long run relationship with economic growth. It further revealed that unemployment is inversely correlated with economic growth whereas inflation is positively related to economic growth. In specific terms, one per cent increase in GDP resulted to a fall in unemployment rate by -0.019. The result also shows R² value of about 0.61 percent indicating that gross domestic product accounts for about 61 per cent of the variation in unemployment rate in Nigeria. The study therefore recommends that the government should tailor policies that can spur economic activities which in turn will reduce unemployment rate and stabilize prices.

Key words: Nigeria; ARDLs; inflation; unemployment and economic growth.

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Introduction

The labour force in Nigeria has witnessed major fluctuations in the unemployment rate as a result of several shocks in the economy. Following the exploration of oil in commercial quantities in Nigeria in the early 70s; government revenue increased albeit increase in public expenditure. The large revenue earned through oil sales was used to create emergency urban centers and neglecting the rural sector in the development process as well as raising the population of public service. The consequence of rapid urbanization as a result of run-away population is high rate of unemployment. The outcome of this was a drop in agricultural output as well as stiff pressure on manufacturing output. This has culminated in rising inflation and decline in GDP growth rate.

No economy is in self isolation and insulated from external shocks; global economic misfortune has indirect bearing on the macroeconomic indices of any nation. The COVID-19 pandemic and the Ukraine-Russia war have jointly affected the World output. The World Bank report estimated the global GDP to grow by 5 per cent in 2022 but the Ukraine war dealt a massive shock to economy as output growth dropped to about 3 per cent in 2022 and may drop to about 2.2 in 2023 Jalingo (2023). The Ukraine war and the sanctions imposed on Russia have disrupted and distorted supply chain especially agricultural products and farm tools and equipment thereby resulting to shortages in agricultural produce and manufactured output thereby raising prices; unemployment rate and lowering unemployment Al-Saadi (2023).

Worst still; the domestic economy has continued to suffer grave consequences of the menace of the insecurity created by Fulani-Herdsman; banditry and Boko Haram in the North East and North Central in terms of food shortage and rural unemployment Kah (2017) and Adebisi; Azeez; & Oyediji (2016); there is also inputs supply gap to the manufacturing sector and displacement of farmers has been a major challenge. These have negatively affected some macroeconomic variables such as the GDP; unemployment and inflation in Nigeria. Nevertheless; the oil spills on the Nigerian ecosystem which has continued unabated has persistently contributed to water pollution and destruction of the aquatic lives of sea food and affected fishing in the South- South region of Nigeria. This is accentuated by the unending insecurity and militancy in the creeks of their region; internal displacement due to flooding has affected food supply; unemployment and inflation in the zone and Nigeria in general. In



the South East; general insecurity occasioned by unknown gun-men and sit-at-home enforcements has also devastated the economy especially output growth of small and medium scale enterprises Nweke; Igweike & Eze (2023).

In the last four decades; Nigeria has persistently faced increasing level of unemployment rate especially as the country ditched her into mono-cultural economy. The oil-based economy has thrown the entire Nigerian workforce as misfits to be absorbed into the oil sector which is solely filled with expatriate workers who are better equipped with modern technological expertise for the job. Besides; the agricultural sector which has hitherto provided the adequate valve in absorbing the large army of the unemployed has been neglected and abandoned. This ugly situation has left a big blow on the country's GDP. The manufacturing sector that depends on the output of agricultural has also suffered neglect and drop in output thereby suffocating aggregate output of the country.

Given these scenarios; the growth rate of the GDP of Nigeria has continued to worsen; the rate of unemployment has remained all time high; rise in inflation rate is unprecedented amid other macroeconomic shocks. The Nigerian economy has continued to grapple with sustainable GDP growth rate over the years and in turn exerted negative influences on some macroeconomic variables such as household consumption spending; food insecurity; low level private domestic investment and inflation.

It is apparently clear that unlike other macroeconomic variables that possess positive correlation with economic growth; unemployment rate can be reduced following the increase output of goods and services. In effect; Okun (1961) in his thesis espouses a negative correlation between unemployment and GDP whereas Phillips curve shows a inverse correlation between inflation and unemployment. The change in unemployment occasioned by changes in GDP predicts effect on price inflation. The rise in inflation prices following growth in output of goods creates a policy problem for economists in grappling with the hydra-headed monster of inflation and economic growth.

The findings of Madilo and Khumalo (2014); Hjazeen et al (2021) in their different studies and different countries found that unemployment and economic growth are negatively correlate and Okeowo (2023) found a positive contribution of unemployment and inflation on



economic growth; these claims are in tandem with theoretical views of Okun (1961) and Phillip (1957)

In Nigeria; Mohammed; Okoroafor & Omoniyi (2015) finds inflation and unemployment inversely correlated with economic growth. Unsteady growth rate of the GDP worsened the unemployment rate thereby increasing pressure on consumer prices. The Nigerian economy has persistently suffered slow economic growth rate not minding her huge natural and human resources over the years this has in turn inadvertently impacted negatively on the rate of unemployment and inflation. Okeowo (2023) posits that unlike other macroeconomic variables that possess positive correlation with economic growth; unemployment rate can be reduced following the increase output of goods and services.

Mohammed; Yelwa & Okoroafor (2015) espouses a negative correlation between unemployment; inflation and economic growth in Nigeria. This implies that an increase in GDP will result to increase in employment; increase in household consumption; increase saving as well as increase in gross capital formation and investment whereas the general price level will fall. The findings of Madilo and Khumalo (2014); Hjazeen et al (2021) in their different studies on different countries find that unemployment and economic growth are negatively correlated. On the other hand; Okowo (2023) found a positive contribution of unemployment and inflation on economic growth of Nigeria; this is opposed to Okun's law of negative effect of unemployment and economic growth.

The findings of Dodo & Idris (2022) supports the empirical findings of Mohammed et al on the positive effects of unemployment and negative effects of inflation on economic growth respectively. Nigeria's unemployment rate which stood at 29 per cent in 2005 increased to 33.3 per cent in (2020) and increased further to 37.7 per cent in 2022. Meanwhile; the country's GDP growth rate within the same period declined significantly from 8.4 per cent in 2010 to 0.8 per cent in 2022. Worst still; inflation rate in Nigeria has also increased from 11 per cent in 1981 to 16.5 per cent in 2017 and 22.8 per cent in 2022.

This gloomy situation poses critical question on the extent of impact of unemployment and inflation on Nigeria's economic growth as well as nexus between unemployment; inflation



and economic growth in Nigeria as guide for policy makers in resolving the country's current economic quagmire.

Conceptual Explication

Unemployment

Ernest & Rani (2011) observes unemployment as a state where people who are willing to work at the prevailing wage rate are unable to find jobs. Okeke (2020) contends that unemployment is that ratio of people in a country who are actively looking for employment but are not engaged in any. Mostly; when the degree in which the people's gainful activities fail to make the maximum use of their productive capacity. It is a state of being without any job both for educated and uneducated persons; for earning one's living. Thus; the person is unable to get full employment even though he or she has

reached the age prescribed by law to work. It can also be referred as a phenomenon that occurs when a person who is actively searching for employment and is unable to find work.

Unemployment rate is the proportion of the labour force that is currently unemployed. Disguised unemployment is when part of the labour force is left redundant to a level where productivity is zero (The Central Bank of Nigeria CBN; 2013). Unemployed people can be seen as those who have never worked but they are of age and those who have lost their jobs still seeking re-entry into the labour force.

Inflation

Inflation is a household name in every economy and has been variously conceptualized. However; unlike many concepts in economics; there appears to be a consensus among economists that inflation is a continuous rise in the prices of goods and services. Specifically though; Olapinwa & Esan (2013) defines inflation as the continuous increase in the prices of all goods and services over a long period of time. Samuelson et al (1960) says inflation occurs when the general level of prices is rising. The free encyclopaedia sees inflation as a decline in the real value of money – a loss of purchasing power in the internal medium of exchange which is also the monetary unit of account in an economy.



Various measures of inflation include indexes such as the Consumer Price Index (CPI) or the implicit price deflator for Gross National Product (GNP). When there is inflation; the domestic currency loses purchasing power; hence inflation is frequently described as a state where 'too much money is chasing too few goods'. In the definition of inflation; two key words must be borne in mind. First; is aggregate or general; which implies that the rise in prices that constitutes inflation must cover the entire basket of goods in the economy as distinct from an isolated rise in the prices of a single commodity or group of commodities. That is; changes in the individual prices or any combination of the prices cannot be considered as the occurrence of inflation. However; a situation may arise such that a change in an individual price could cause the other prices to rise. An example is petroleum product prices in Nigeria. This again does not signal inflation unless the price adjustment in the basket is such that the aggregate price level is to rise. Second; the rise in the aggregate level prices must be continuous for inflation to be said to have occurred. The aggregate price level

must show a tendency of sustained and continuous rise over different time periods Ademola; Abdulsalam; Badiru; Abullahi (2016).

Khalik; Soufan & Shihab (2014) evaluated the relationship between unemployment and economic growth in Arab Countries for the period of 1994 and 2010 by applying the pooled EGLS seemingly unrelated regression (SUR) estimation technique. The result revealed that growth is inversely correlated with unemployment. In specific terms; the result showed that one percent increase in economic growth will lead to a fall in unemployment rate by 0.16 per cent in some selected Arab countries.

According to Milton Friedman (1960); in Britainica Inflation is determined by the rise in money supply. An increase in the amount of money in circulation will directly cause a proportional increase in the price of goods and services overtime. When consumer goods and services across a wide range or segment of the economy persistently rise we refer to it as inflation. The Demand pull theory of inflation suggests that the cost of goods and services rises when demand is greater than the available supply. On the other hand; the cost push theory attributes inflation to the rising cost of production whether raw materials or wages amid a steady flow in demand. An increase in this input cost will likely decrease producers mark up; therefore producers may decide to transfer this extra cost to the consumer by



charging higher prices for the same unit of goods. However; structural theory of inflation describes a type of inflation that often prevails in developing countries. This expresses a morbid weakness in a country's capacity to produce goods or maintain an adequate flow of supply. This is caused by poor infrastructure; outdated technologies; and inefficient supply chains thereby creating imbalances between supply and demand Gordon (2018).

Economic Growth

Haller (2012) defines economic growth as the process of expanding the size of a nation's per economy; particularly its gross domestic product per capita which has a beneficial impact on the economy. It is a quantitative increase in the real and nominal gross domestic product of a country over a period of time. It is an increase of the national income per capita and it involves the analysis; especially in quantitative terms of this process; with a focus on the functional relations between the endogenous variables such as gross domestic product; gross

national product and national income expressed both in absolute and relative terms per capita comprising all the structural modifications. In another vein; Amos (1990) and Flammang (1979) describe economic growth both changes in the political economy and structural innovations such as new tastes; investments; technology and transportation that increases the quantity of output produced by a country.

Theoretical Framework

Author Okun's Hypothesis of The Relationship between Unemployment And Economic Growth. Arthur Okun "Okun's Law" has been included in a lot of core ideas that are widely accepted in the economics profession. Okun's law which economists have expanded upon since it was first articulated states that real GDP about to equal to the rate of potential output growth usually is required to maintain a stable unemployment rate. Thus; the key to the long run relationship between changes in the rates of GDP growth and unemployment is the rate of growth in potential output. Given; the work of Okun in 1962 on the relationship between economic growth and unemployment; a lot of theoretical issues have emerged on the validity of the law and its suitability in different countries.

Anidiobu; Okolie&Oleka (2018) x-rayed the effect of inflation on economic growth in Nigeria utilizing annual data covering the period (1986-2015) obtained from CBN statistical



Bulletin of various issues. The study employed ex-post research design for the purpose of using OLS method to estimate the effect of inflation on economic growth in Nigeria. The result revealed that inflation rate is positively correlated with economic growth.

When GDP growth equals labor force growth in the presence of productivity growth; more people will be entering the labor force than are needed to produce a given amount of goods and services. The share of labor force that is employed will fall. Expressed differently; the unemployment rate will rise only as long as GDP growth exceeds the combined growth rates of the labor force and productivity will the unemployment rate fall in the long run. Knowing what the rate of GDP growth is or might be; is useful to policy makers interested in undertaking stimulus policies to bring down the unemployment rate. But just as stated; the rate of output growth necessary to lower the unemployment rate requires knowledge of the rates of labor force and productivity growth (Levine 2012).

A.W. Phillips Hypothesis of Unemployment and Inflation relationship

The policy makers of both developed and developing economies have deliberately pursued economic stability in their respective countries; yet the debilitating problems of high inflation and unemployment continue to stare them in the face. Expansionary monetary policy often deployed to raise output that will reduce growth in unemployment consequently increase aggregate demand and in turn trigger inflation upsurge. In the study by Phillip (1958) there exist a negative correlation between unemployment rate and inflation rate. This depicts a trade-off between the two variables; implying that policy makers would perhaps hold inflation constant while tackling the problem of unemployment and vice versa.

The relationship between inflation and unemployment is established on grounds of demand and supply of labour deficits. If there is excess labour demand above supply of labour; certainly price of labour will rise and demand for goods will increase consequently inflation rate will rise. On the other hand; if there is excess supply of labour above the demand for labour; the price of labour will fall and inflation rate will decline. Esu & Atang (2017) opines that the pressure on wage rate to fall or rise is a function of changes in aggregate demand and supply of labour. In the same vein; Muhammad et al (2022) sees relationship between unemployment rate and inflation as the difference between labour and supply. If the demand for labour is greater than labour supply; the surplus in labour will mount pressure on



wage rate thereby causing rise in inflation and in turn forcing unemployment rate to fall and vice versa. Given this scenario; policy makers try to modulate this paradox to achieve low inflation and full employment by manipulating monetary and fiscal policies.

The ideas of the British economist; John Maynard Keynes in 1930's revolutionized thinking in several areas of macroeconomic; including unemployment; money supply and inflation. Keynesian unemployment also known as demand deficient unemployment occurs when there is no aggregate demand in the economy. It gets its name because it varies with the business cycle; though it can also be persistent as it was during the great depression of the 1930's. Keynesian unemployment rises during economic down turns and falls when the economy improves. His type of unemployment exists due to inadequate effective demand. The Keynesian theory emphasizes that employment depends upon effective demand which leads to an increase in output; output generates income and income provides employment.

Unemployment is seen as income function. Effective demand is resolved by aggregate supply and demand. The relationship between inflation; unemployment and economic growth

The treatise of Phillip and Okun on the relationship between inflation; unemployment and economic growth is explained both in the short run and long run. Keynes opines that in Developing countries there is tendency for unemployment to rise with rising output growth in negation to theory. Policy makers deploy expansionary monetary policy to jerk-up output during economic recession which lowers unemployment but triggers inflation prices. The structuralists' maintain that inflation has positive effect on economic growth whereas; the monetarists argue that inflation has negative effect on output growth.

Nevertheless; It is difficult for unemployment to fall when economic growth takes off after a recession has ended and this is because firms may have to meet certain supply targets of their consumers especially when individuals income seem to have increased following enhanced productivity and higher pay. The long run relationship between the two economic variables was most famously pointed out in the early 1960s by economist Arthur Okun "Okun's Law" apart from investigating the nature of relationship between unemployment and economic growth; he went further to measure the slope or the elasticity of coefficient of the change of unemployment and GDP growth rate.



Endogenous growth theory

Endogenous growth theory is an off shoot of Cobb-Douglas production though with modification and improvements. Endogenous growth theory shows that investments in skill; human capital; innovation; and knowledge are key determinants of economic growth. Chirwa & Odhiambo (2018). The model identified that capital investment is necessary for economic growth through increasing returns to investment. Another strand of capital investment is human capital development that drives it to achieve economic growth. However; interest rate and inflation have their effects on investment capital. low interest rate increases capital accumulation albeit investment capital growth which in turn raises economic growth. Rising inflation negatively affects capital investment and economic growth. Bruno and Easterly (1998) in Chirwa and Odhiambo (2018) and Roman (1994) are endogenous growth model that links labour; inflation and output growth.

$$Y_t = AK_t^\beta P_t^\theta L_t^1 - \theta \quad (1)$$

Where; A is a positive constant that reflects the level of technology; P_t is aggregate price indices; L_t is the amount of labour hired and Y_t = output per capita;

Empirical Study

Basher (2022) in autoregressive regressive distributed lag model (ARDL) investigated the effect of inflation on economic growth in Nigeria for the period of 1990-2020. The result reveals that inflation; interest rate and money supply negatively affect economic growth whereas government consumption spending has positive effect on economic growth in Nigeria. In another work by Dodo & Idris (2022) in a non linear ARDL estimation approach on the impact of inflation on unemployment in Nigeria for the period of (1985-2019); the findings of the study reveals that inflation exerts negative influence on unemployment.

Mohammed; Okoroafor and Omoniyi (2015) in a study of the nexus between unemployment; inflation and economic growth; using standard econometrics estimation techniques finds a positive correlation between inflation and economic growth in one hand and negative correlation between unemployment and economic growth in Nigeria. In the same vein;

Ekpeyong (2023) applied econometrics analysis to estimate the impact of inflation. Unemployment and economic growth on poverty reduction in Nigeria; finds a positive and



negative shock of inflation and unemployment on economic growth but population has a significant impact on poverty. Also; Hjazeen et al (2021) in a study of the nexus between economic growth and unemployment; using the ARDL estimation technique find a negative correlation between economic growth and unemployment.

The study of Lyuboslav (2017) on the impact of economic growth on inflation and unemployment in Bulgaria applied standard econometrics to measure the effect of the explanatory variables on unemployment and found positive effects of growth on unemployment but a negative effect of economic growth on unemployment.

In another study; Tugba & Yilmaz (2020) on the relationship between economic growth; unemployment; inflation and current account balance applied asymmetric reserve causality test. The study finds a negative relationship between output growth and unemployment; uni-

directional symmetrical causality relationship from negative shocks to negative inflation shocks.

In a related study of Arshad (2010) investigated the validity of Okun's law in Sweden economy for the period of (1993-2009) using standard econometric estimation technique. The result revealed that unemployment and inflation were inversely correlated which conforms with Okun's law. In another vein; Kreishan (2011) in a study of the relationship between unemployment and economic growth in Jordan the applicability of Okun's law during the period of 1970 to 2008. The study employed cointegration and simple regression analysis; between the results reveal that Okun's law was not consistent with Jordan economy. Thus; economic growth does not correlate with unemployment. Furthermore; the test result showed that there exists long-run relationship unemployment GDP.

Ademola et al (2016) determines the effect of inflation; unemployment and economic growth using ordinary least square (OLS) technique found a long run relationship between RGDP; unemployment and inflation. Their result indicates that unemployment and inflation are positively correlated to economic growth. However; their findings are contradicts Okun's law



of unemployment–output inverse relationship and Phillips hypothesis of negative relationship between inflation and unemployment

Methodology

The study employed multiple regression analysis using autoregression distributed lag model (ARDL) estimation technique to estimate the link and effect of inflation rate and unemployment rate on economic growth. The method is suitable for this paper because regression analysis examines cause and effect of economic phenomena using historical data. The ARDL technique employed is appropriate because of mixed order of integration of the stationary status of the variables used in the estimation.

3.2 Data Sources and Model Specification

Data for this study was sourced from secondary sources such as Central Bank of Nigeria statistical bulletin 2018 and 2021 as well as World Bank Development indicator 2020. The model of the study is an integration of the Cobb-Douglas production function and the modified Phillip’s equation and Okun’s models which include:

$$Y_t = AK_t^\beta K_t^\theta L_t^1 - \theta \quad 2$$

$$RGDP = \beta_0 + \beta_1 U_{ne_t} + U_{t1} \quad 3$$

$$INFR = \beta_0 + \beta_1 U_{ne_t} + U_{t1} \quad 4$$

Modifying and integrating the three equations in one; we have:

$$RGDP_t = \beta_0 + \beta_1 U_{ne_t} + \beta_2 INFR_t + U_{t1} \quad 5$$

Where

β_0 = autonomous change in unemployment rate

β_1 .. β_2 = Coefficient of changes in unemployment rate and inflation rate on real output.

U_t = random element

The log form of the model is specified thus:

$$\ln RGDP_t = \beta_0 + \beta_1 \ln U_{ne_t} + \beta_2 \ln Infr_t + U_t \quad 6$$

Estimation of Procedure

Test of Unit Roots

Before estimating the equation model; the variables were examined for stationarity using the Augmented Dickey Fuller (ADF). The study also used 5 percent as the level of significance. Thus; if P-value is less than 5% critical value; then H_0 is rejected; this means that the time series are stationary at level $I(0)$ or at first difference $I(1)$.



Test of Cointegration

The ARDL bound test is based on the Wald-test (F-statistic). The asymptotic distribution of the Wald-test is non-standard under the null hypothesis of no cointegration among the variables. Two critical values are given by Pesaran and Shin (2001) for the cointegration test. The lower critical bound assumes all the variables are I (0) meaning that there is no cointegration relationship between the examined variables. The upper bound assumes that all the variables are I (1) meaning that there is cointegration among the variables. If the F-statistic calculated is greater than the upper bound critical value; then Ho is rejected; therefore; the variables are cointegrated. If the F- statistics is below the lower bound critical value; then Ho cannot be rejected (then there is no cointegration among the variable). When the computed F-statistic falls between the upper and lower bound; then the result is undermined or inconclusive.

Error Correction Test

The study also employs autoregressive distributed lag (ARDL) model using bound test procedure developed by Pesaran (1980) the ARDL technique of estimation when applied to estimate the error correction model (ECM) form for time series that are not integrated of the same order I(0) and I(1). This technique of estimation is less vulnerable to spurious regression (Pesaran and Shin; 1980).

The error correction model (ECM) of the ARDL version can be expressed as

$$\Delta \text{RGD} = \alpha_0 - \alpha_1 \Delta \text{RGD}_{t-1} + \sum \Delta \text{Une}_{t-1} + \text{INFR}_{t-1} + \sum \Delta \text{INFR}_{t-1} + \text{EC}_{t-1} + U_t \quad 7$$

Where Δ = speed of adjustment parameter and ECT is the residual that are obtained from estimated cointegration model.

The ARDL model is thus

$$\Delta \text{GDP}_t = \alpha_0 + \text{Une}_{t-1} + \pi \text{InRGDP}_{t-1} + \sum Y_i \Delta \text{Une}_{t-1} + \sum \theta_i \Delta \text{GDP}_{t-1} + \sum 1_t$$

$$\Delta \text{Une}_t = \alpha + \pi_i \text{Une}_{t-1} + \pi \text{InUnr}_{t-1} + \sum Y \Delta \text{GDP}_{t-1} + \sum \theta_i \Delta \text{GDP}_{t-1} + \sum 2_t$$

$$\Delta \text{INFR} = \alpha + \pi_i \text{GDP}_{t-1} + \pi \text{InINFR}_{t-1} + \sum Y \Delta \text{GDP}_{t-1} + \sum \theta_i \Delta \text{INFR}_{t-1} + \sum 2_t \quad 5$$



Where Δ Une is the change in unemployment rate; Δ INFR is change in unemployment and InRGDP is the natural log real gross domestic output i.e output growth rate. Δ = Difference operator α_0 = drift component e_t = white noise residuals.

Result Presentation and Analysis

The Unit root test for all the variables was conducted using the Augmented Dickey Fuller (ADF) test statistics

Unit Roots Test

Table 1: Summary of Augmented Dickey Fuller (ADF) unit root test results

Series	ADF Test	5% critical	P-value	ADF Test	5% critical	P-value	Order of Integration
RGDP	-0.1793	-3.5266	0.9970	-3.6744	-3.5266	0.036	I(1)
UNEP	-0.5017	-3.5266	0.9974	-7.3165	-3.5266	0.000	I(1)
INFR	-4.1021	-3.5266	0.0132	-	-	-	I(0)

Source: E-Views 10 results as presented

The result in Table 1 presents a summary of the unit root test results based on the ADF method. The variables used in the analysis are Real Gross Domestic Product (GDP); unemployment rate (UNP) and inflation rate (INFR). The result shows that only INF is stationary at level because the ADF Test statistic is greater than its 5% critical value in absolute terms; and the p-value of the Test statistic is less than 0.05. Also; the variables of GDP and unemployment rate are stationary at the first difference because the ADF test statistic is greater than the five percent critical value and the p-value is less than 5 per cent.



This means that the series are a mixture of order zero (0) and order one (1) integrations based on statistical 5% level of significance.

Consequently; the Autoregressive Distributed Lag (ARDL) model was employed to estimate the regression model of the study.

Co-integration Tests

The existence of long-run relationship between the variables was checked using the bound test developed by Pesaran et al (2001).

Table 2: Bound Test Results

F-statistics	Lag	Critical Values		
		Sig level	lower bound I(0)	upper bound I(1)
73.15	1	10%	2.63	3.35
		5%	3.10	3.87
		1%	4.13	5.00

From the result in table 4.0; the critical values used in the study are extracted from Narayan (1999). The calculated F-statistics is 73.15 while the upper critical bound is 3.87. Thus; the null hypothesis (H0) of no co-integration is rejected. This implies that there is long-run relationship between unemployment and inflation and economic growth over the period of 1982-2022

Estimated long run paramaters using ARDL Techniques Using ARDL

Table 3. ARDL Long –run Coefficient test

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOG(GDP(-1))	1.004865	0.005338	188.2527	0.0000
UNP	-0.019392	0.006765	-2.866567	0.0069
INF	0.004975	0.000746	6.671140	0.0000
C	0.138892	0.058655	2.367936	0.0234
R-squared	0.999120	Mean dependent var	8.892633	
Adjusted R-squared	0.999047	S.D. dependent var	2.386220	
S.E. of regression	0.073663	Akaike info criterion	-2.283999	
Sum squared resid	0.195343	Schwarz criterion	-2.115111	
Log likelihood	49.67997	Hannan-Quinn criter.	-2.222934	
F-statistic	13629.68	Durbin-Watson stat	1.974000	



Prob(F-statistic) 0.000000

Source: computation from E-view 10

$$GDP_t = 0.138 - 0.019UNP_t + 0.004INF$$

(0.0067) (0.0007) (0.0586)

$R^2 = 0.61$; $DW = 1.97 \simeq 2.0$; $F(\text{Prob}) = 0.13692 (0.0000)$.

From the long run result; it is estimated that unemployment rate is negatively related to economic growth in Nigeria. The result is consistent with Okun's law.

The result also shows that one percent increase in GDP brought a decrease in unemployment rate of about -0.019 percent. Although; the study's elasticity coefficient varies with Okun's coefficient; but the result reveals the actual impact of increasing rate of GDP on unemployment rate in Nigeria.

Table 4 ARDL Error Correction Regression

ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CointEq(-1)*	0.004865	0.000273	17.80440	0.0000
R-squared	0.615409	Mean dependent var		0.178549
Adjusted R-squared	0.615409	S.D. dependent var		0.114122
S.E. of regression	0.070773	Akaike info criterion		-2.433999
Sum squared resid	0.195343	Schwarz criterion		-2.391777
Log likelihood	49.67997	Hannan-Quinn criter.		-2.418733
Durbin-Watson stat	1.974000			

Sources: computation from E-view 10.

The result in table 4 indicate that the error correction term ECT (-1) has a value of 0.0048 with a p-value of 0.0000. the result indicate that the annual speed of adjustment to correct short run disequilibrium towards long run equilibrium relationship is 4.8 per cent

Post Estimation Tests



The validity of the ARDL model estimation results is tested to determine the stability; reliability and goodness of fit of the underlying model and parameters by examining the status of the variables through investigating the presence of heteroscedasticity; autocorrelation and non-stability in the equation. Every diagnostic test is employed primarily to determine whether or not the parameters of the model are stable as suggested by Pesaran and Pesaran (1997). Hence; the results of the diagnostic tests are presented in table 4

Result of Autocorrelation Test

Table 5. LM Serial Correlation Test

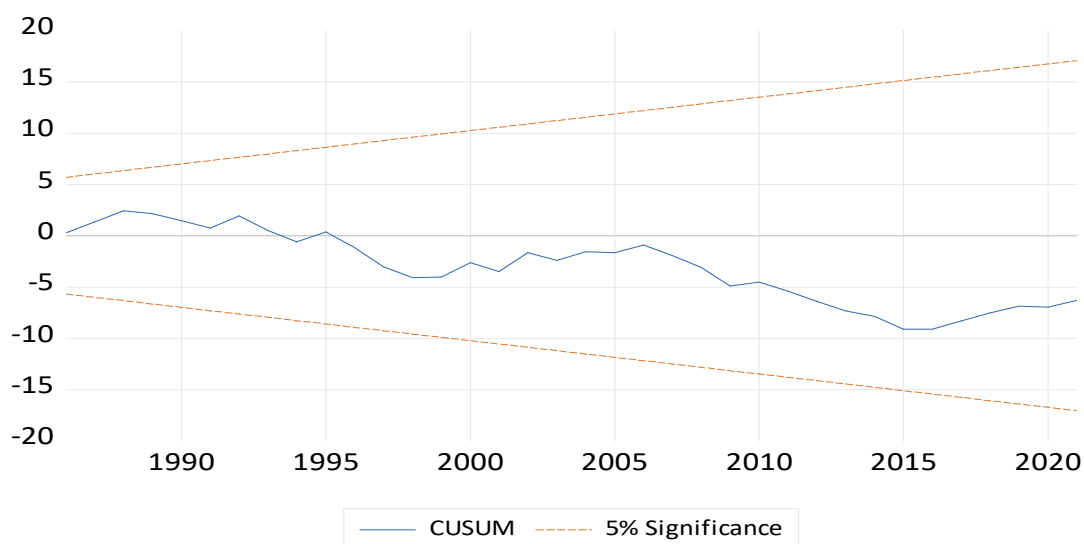
F-statistic	0.515118	Prob. F(2;34)	0.6020
Obs*R-squared	1.176395	Prob. Chi-Square(2)	0.5553

Sources: Researcher’s computation from E-views

From the result in table 5; the Obs R-squared statistics of LM test is 1.17 with p-value of (0.5553) is greater than 0.05 critical value; the study therefore does not reject the null hypothesis of no autocorrelation in the model. Hence; the study concludes that there is no presence of autocorrelation.

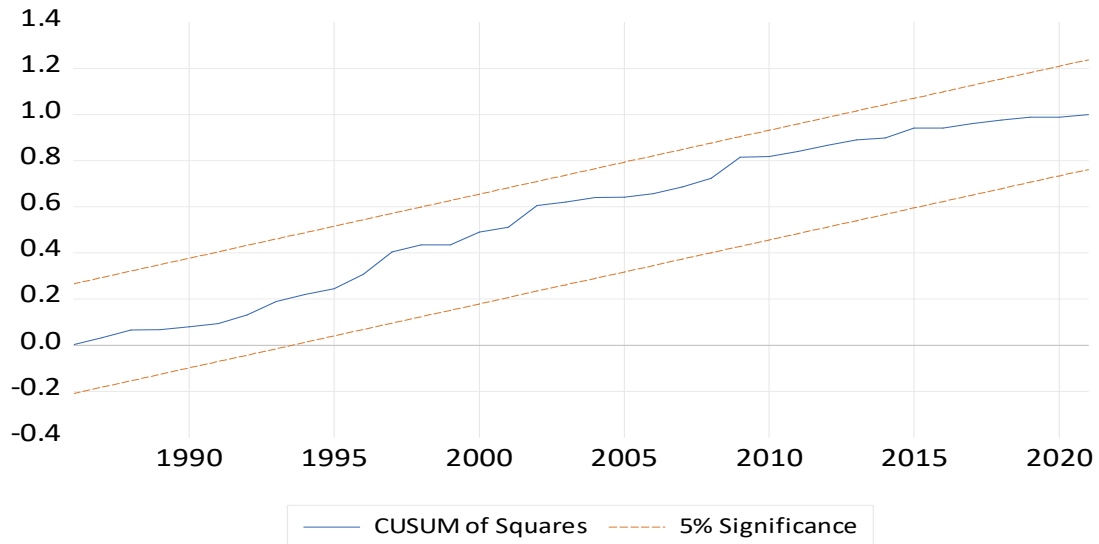
4.7 Test of Stability of the Equations

Figure 1 CUSUM Stability Test



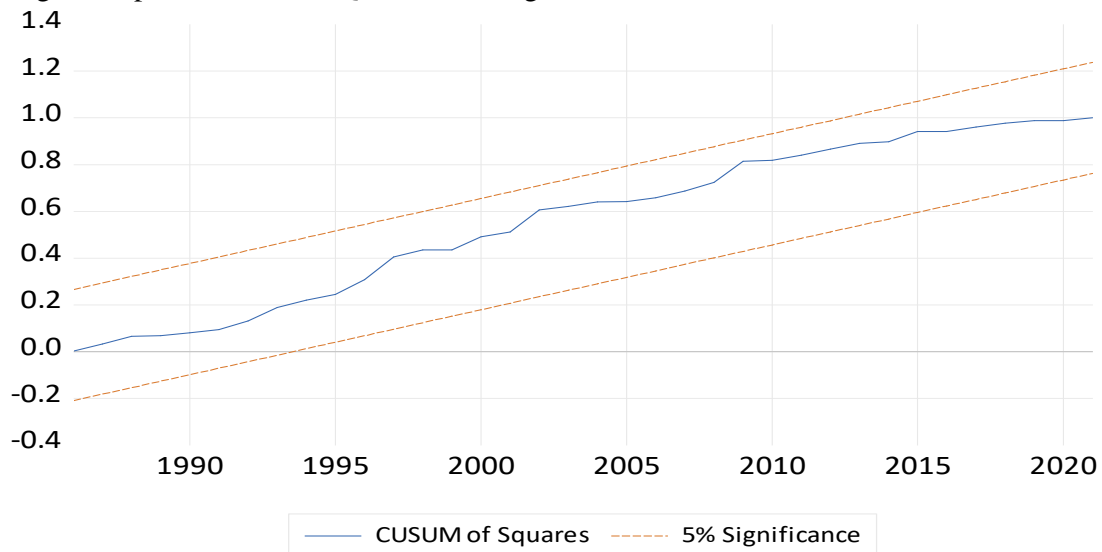
Source: Compilation from E-view 10

Figure 2: CUSUM of square Stability Test



Compilation from E-views

Fig. 2 Graph of CUSUM SQUARE Test



From the result in fig1 and fig 2; the CUSUM of residuals and CUSUM of square residuals tests were used to determine the level of stability and constancy of the error term. The CUSUM square is specifically used to identify systemic variations in the parameters of a



model. Whereas; the CUSUM test focuses on the stability of the model; the CUSUM of squares measures the stability of the error terms. The result indicated evidence of stability in the parameters of the model and constancy of the error terms since the blue lines lie within the critical region at 5 per cent level of significance.

Empirical Findings

Impact of Unemployment on Nigeria's economic growth

From the result; the coefficient of unemployment is (-0.019) with a corresponding P-value of (0.0007) in the long run. This implies that unemployment exerts negative influence on economic growth proxied by GDP in Nigeria. One percent increase in GDP lowers unemployment rate by -0.019 per cent given the period under study.

Impact of inflation on Nigeria's economic growth

The hypothesis is tested using the coefficient of inflation and the p-value which indicated that the coefficient of INFL of the estimated result is (0.04) and the p-value is approximately (0.05); this implies that inflation has positive effect on Nigeria's economic growth and one per cent increase in GDP increases inflation rate by about 0.04 given the period under study.

The nexus between unemployment; inflation and economic growth in Nigeria.

The F-value of 73.15 greater than 3.87 upper bound at 5 per cent critical value indicated that the variables of economic growth and inflation and unemployment are cointegrated and have long run relationship among them. Thus; the nexus between the independent variables of inflation and unemployment and the dependent variable gross domestic product is established.

Discussion of Results

This section discusses the empirical results estimated through the application of the ARDL.



The impact of Unemployment on Economic growth

The results estimated from the ARDL long-run coefficient test showed the coefficient of unemployment in -0.019 and its associated p-value as (0.007) greater than (0.05). The result implies that unemployment has negative correlation with GDP as well as a significant effect with economic growth. This result is in line with Okun's hypothesis (1961) which postulated an inverse relationship between unemployment and economic growth. It emphasizes that any policy that pursues and achieves economic growth is sine qua non for achieving a reduction of unemployment since the goal of full employment is elusive. The result is also in conformity with the finding of Dodo and Idris(2022); Hjeeen et al (2021) and Mahmoud and Rumman 2012 whose findings posit that unemployment is a negative function of economic growth. The result therefore validates the hypothetical work of Okun and empirical works previously done in the field

Effect of Inflation on Economic Growth

The results obtained via the ARDL long-run estimation method reveals that the coefficient of inflation variables is 0.004 with a p-value of (0.000) less than (0.05) indicating that there exist a significant long-run relationship between inflation and economic growth in Nigeria. The result also indicated that there exist a positive relationship between inflation and

economic growth. The findings are not consistent with A.W Philips hypothesis and findings of Muhammed (2021). The results obtained are an aberration with theory and empirical findings of previous works. The theoretical trade-off is not found in Nigeria; probably because of ineffective monetary policies and weak institutions.

Conclusion

The result obtained from the study reveals that there is long run relationship between unemployment and economic growth. The result also shows that Okun's coefficient of -2 percent is less than Nigeria's -0.19 percent. Thus; our results have an important policy implication. Economic policy should be tailored toward structural transformation through diversification of the economy as well as training the labour force to become adaptive to the labour demands in all sectors of the economy that has become technological sophisticated.

Recommendations



Policy making should be directed towards structural changes diversity economy such that all the sectors of the economy should be contributing in relative proportion the growth of the economy; if this is achieved; the economy actual production function Nigerian factor market is characterized by high mass of labour force. Since Okun's law is premised on increasing output in the economy through more labour in production. Also; since empirical results show that Okun's law is valid for Nigeria.

It can be suggested that labour oriented output should be strengthened to reduce the high rate of unemployment in Nigeria.

Also; labour should become more skilled and right qualifications to fill the available job vacancies.

The increase in output powered by rise in labour force participation will not guarantee slow growth of prices as aggregate demand will rise but the policy makers should rise to their responsibilities by modulating appropriate tradeoff between the consequences of price rise and unemployment. Since inflation is multifaceted; it is better to deal with unemployment issues first before reverting to inflation.

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