IMPACT OF ECONOMIC GROWTH AND INFLATION ON UNEMPLOYMENT RATE IN NIGERIA: 1981-2022

Oniore, Jonathan O.
Department of Economics, Bingham University
jonathanoniore@gmail.com

Aigbedion, Marvelous I.
Department of Economics, Bingham University

Amadi, Justina Nwaneri
Department of Economics, Bingham University

Abstract

The study examines the impact of economic growth and inflation on unemployment rate in Nigeria from 1981 to 2022 using Autoregressive Distributed Lag Model. Findings show that economic growth, inflation have a positive effect on unemployment in the short-run and age dependency ratio affects unemployment negatively in the short run. Study outcomes appears to violates both the Okun law's and Phillips curve in the Nigerian economy in the short run. However, in the long-run, economic growth is positively related to unemployment and inflation negatively associated with unemployment; thereby affirming Phillips curve which holds an inverse relationship between the two variables. While, age dependency ratio affects unemployment negatively. The violation of both the Okun law's and Phillips curve in the Nigerian economy in the short run suggest that there are other factors influencing the level of unemployment rate in Nigeria. Therefore, the study recommended implementation of sound macroeconomic stabilization policies with the of achieving a single inflation, low unemployment rates and high economic growth rates.

Keywords: Economic Growth, Inflation, Unemployment, ARDL Model and Nigeria

Introduction

Numerous studies with a focus on different economies have thoroughly demonstrated the relationship between unemployment, inflation, and economic growth in the literature. Any attempt to re-examine the relationship between these three crucial indicators of an economy's performance is therefore likely to be seen with suspicion for recycling old arguments. However, when implementing economic plans, the strength of the relationship between these variables is crucial. Thus, there may be harmony or contradiction between the policies to be implemented on the issues. For instance, when governments try to reduce inflation, it causes an adverse impact on the economic growth to fall, thereby raising the unemployment rate. Therefore, the alignment or contradictions between the intended objectives and the instruments to be implemented should be taken into account when making policy proposals.

The phrase "Okun's Law" originated from Okun's (1963) theoretical examination of the relationship between the unemployment rate and economic growth, which outlined an inverse relationship between the two. According to Okun's Law, a rise in economic growth relates to a fall in the unemployment rate. Empirically, Okun's coefficient is a useful rule of thumb in forecasting and policymaking. Similar to this, Phillips (1958) established the link between inflation and unemployment, stating that a rise in inflation equals a fall in unemployment; consequently, the phrase "Phillip's curve" was created. According to Phillips' assumption, employers must boost pay more quickly to recruit scarce labour when the unemployment rate is lower since it indicates a tighter labour market.

Economists, however, contend that the relationship between inflation, economic growth, and unemployment is counterbalanced. It is sufficient to argue that attempts by governments to lower inflation have a negative effect on economic growth, which raises the unemployment rate. The "sacrifice ratio," which is the change in the unemployment rate over the change in inflation for a certain period, can be used to evaluate the costs associated with controlling inflation as well (Lis & Muchová, 2014). The paradoxical increase in unemployment might seriously jeopardize social, political, and economic stability. In addition, increased rates of inflation and unemployment may have a negative impact on an individual's quality of life.

Nigeria's economy has grown at a comparatively rapid rate. For instance, from 2000 and 2014, Nigeria's GDP grew at an average yearly rate of 7%. In contrast, the GDP growth rate dropped to 2.7% in 2015. The sharp reduction in GDP growth rate between 2014 and 2016 is associated with the drop in crude oil prices. Nigeria experienced its first recession in 25 years in 2016, when the country's GDP contracted by 1.6% (World Bank, 2019). Growth averaged 1.9 percent in 2018, held steady at 2.20 percent in 2019, and then plummeted to -1.79 percent in 2020. The Covid-19 pandemic epidemic has been linked to a sharp decrease in GDP growth rates; in 2020, the Nigerian economy fell to -1.79 percent. Nigeria's GDP grew by 3.64% in 2021 and 3.25% in 2022 respectively. The rise in crude oil prices and increasing output could be the cause of the recent acceleration of the GDP growth rate. However, Nigeria's economic growth slowed in the first quarter of 2023, with real GDP growth dropping from 3.25% in 2022 to 2.4% in Q1 2023. In a similar vein, the real GDP growth rate of Nigeria in the second quarter of 2023 was 2.51% (year over year) as opposed to 3.54% in the same period in 2022; this decline in growth rate can be attributed to the difficult economic conditions that the country is currently facing (National Bureau of Statistics, 2023).

In Nigeria, inflation is another major economic issue. From 1996 to 2016, the average rate of inflation was 12.17 percent; it peaked in 1995 at 72.8 percent and fell to a record low of 5.4 percent in 2007. Although inflation dropped to 9% in 2015, it reached its highest level since 2007 in 2012,

when it was 12.2%. Nonetheless, inflation increased somewhat, reaching a record high of 18.8% in 2022 (National Bureau of Statistics, 2022). Prior to the current inflationary pressure that began in 2016 and has persisted to this day, Nigeria has seen some degree of economic growth and effective inflation control. The nation's unemployment rate is still a big concern for authorities, so the comparatively strong economic growth that has been observed hasn't helped to lower it. The International Labor Organization (ILO) study states that in 1981 the unemployment rate was 4.2%, and in 2019 it was 22.7%. The unemployment rate in Nigeria is projected to rise further, reaching 27.1% in 2020 and 33.3% in 2022. Unemployment rates are still high despite the study period's remarkable economic growth and effective inflation management. Therefore, it is necessary to investigate how inflation and economic development impacted Nigeria's unemployment rate between 1981 and 2022.

Concept of Economic Growth

When the output of products and services increases over time, it is referred to as economic growth. The most accurate way to measure economic growth is to look at the gross domestic product (GDP), which takes the entire output of the economy into account. For instance, Max (2021) defines economic growth as *an increase in the quantity and quality of the economic goods and services that a society produces.* Widuto, Evroux and Spinaci (2023) argued that economic growth is often regarded as synonymous with its key indicator, the calculation of gross domestic product (GDP) in a very narrow sense. But in broader sense, economic growth can be seen as the main enabler of wealth, driven by investments in labour and capital as well as improvements in the organization of production (division of labour) and innovation.

Concept of Inflation

One of the most commonly used expressions in economic discourse is inflation, although there are several misconceptions about the idea. Although there are several schools of thought on inflation, economists generally agree that it is a continuous increase in prices. Inflation, expressed simply, is the term used to describe a continuous and general increase in the cost of goods and services. In the meantime, Nopirin (2016) clarifies that inflation is the ongoing process of raising the average price of goods, even though the increase in price is not necessarily proportionate. While Höflmayr (2022) defined inflation as a general or broad-based increase in the price of goods and services over an extended period.

Inflation is commonly defined as a persistent increase in the average price of goods and services within a nation over an extended period of time. Inflation can have a simultaneous good and negative effect on an economy. When prices for goods and services rise due to high inflation, there is

a decrease in both aggregate demand and labor demand, which results in low unemployment. Inflation can also be negative when it is low.

Concept of Unemployment

In terms of definition International Labour Organization (ILO) defines the unemployed as numbers of the economically active population who are without work but available for and seeking for work including people who have lost their jobs and those who have voluntarily left work. Specifically, according to the International Labor Organization (ILO), the percentage of the labor force (those between the ages of 15 and 64) who are unemployed yet actively seeking work is known as unemployment. When there is a greater number of job seekers (labor demand) than there are real job offers (labor supply) in the labor market, unemployment results (ILO). The International Labor Organization (ILO) states that in developing nations, where the informal sector typically has a much larger share than the official one, unemployment is related to the formal labor market. 'On the other hand, Chappelow (2020) argues that Unemployment occurs when a person who is actively searching for employment is unable to find work. In a similar vein, National Bureau of Statistics (2023) characterizes unemployment rate as a percentage of those within the labour force (employed and unemployed).

Concept of Age Dependency Ratio

The age dependency ratio, young, is the ratio of younger dependents people younger than 15 to the working-age population (ages 15-64). This variable highlights the number of people of nonworking age, compared with the number of those of working age. This is important to understand the impacts of changes in population structure. A lower ratio is preferred; as dependency ratios indicate the potential effects of changes in population age structures for social and economic development, pointing out broad trends in social support needs.

Empirical Review

Shiferaw (2023) uses the multivariate Student-t generalized autoregressive score (GAS) model, the autoregressive distributed lag (ARDL) model, and the cross-wavelet transform (XWT) methodology to investigate the dynamic link between unemployment, inflation, and GDP in Ethiopia. The Toda–Yamamoto (TY) causality test was also used to examine the dynamics between the three indicators. Though the link fluctuates by time and frequency, the empirical results from the XWT approach point to a relationship between GDP, inflation, and unemployment. The association between inflation and unemployment (total, male, female, and young) is extremely significant and dynamic, according to the estimation findings from the multivariate Student-t GAS model. The GDP and unemployment rate have a dynamic relationship, with the exception of young people and women. The results of the ARDL technique demonstrated that unemployment had a large negative impact on

GDP. On the other hand, it was discovered that inflation greatly raised GDP. The results of this study generally indicate that unemployment has a major impact on GDP and inflation. As a result, the government ought to move quickly to put policies in place to lower unemployment, particularly among young people.

In order to investigate the relationship between income inequality, economic growth, inflation, and unemployment in West Java Province, Fauzan, Amalia, Ali and Hutajulu (2023) use panel data analysis and regression analysis. The panel data analysis's findings show that unemployment, inflation, and income inequality have a major detrimental impact on economic growth. Regression analysis reveals that while inflation and economic growth have a considerable positive impact on unemployment, income disparity has a significant negative impact on it. The study contends that the West Java Province's unemployment rates and economic growth are significantly influenced by inflation, income inequality, and unemployment.

From 1991 to 2021, Ibrahim et al. (2023) made an effort to empirically validate the applicability of the Phillips curve theory (the trade-off between unemployment and inflation) in Nigeria. Ordinary Least Squares was used in the study's data analysis. Inflation is statistically significant in explaining unemployment, according to the model's result. This suggests that there is a trade-off relationship between the variables, supporting the validity of the Phillips curve hypothesis for the Nigerian economy from 1991 to 2021. Given that there is a negative correlation between the variables, it is advised that the Nigerian economy adopt a policy-mix that will optimize labor employment while providing buffers against inflationary trends.

Okeowo (2023) examines the trade-off between inflation and unemployment in Nigeria with reference to the Philip curve. Autoregressive Distributed Lag Model (ARDL) estimate was utilized in the investigation. According to the study, the Nigerian economy follows the Philip Curve, which shows an inverse link between the two variables (unemployment rate and inflation rate). According to the data, inflation rates decrease over the course of a decade, from 34% to 12.2% and then to 12.0%. On the other hand, the unemployment rate went up from 3.3% to 13.7% and then to 15.6%. Thus, in Nigeria, this investigation supports Philip theory. It was suggested that when inflation presents a significant threat, a surplus budget and a reduction in government spending can be effective fiscal policies, while credit restriction and the demonetization of higher denomination money can be effective monetary policies.

Ben-Amor (2023) uses an augmented autoregressive distributed lag (ARDL) bounds testing approach in conjunction with linear regression to examine the relationship between unemployment and economic growth in Tunisia. Only for the difference model do the findings point to a cointegrated link between the variables. Additionally, important, the related equilibrium correction supported the

long-run relationship's existence. Over an extended period, the findings demonstrated a noteworthy unidirectional causal relationship between the rate of unemployment and actual output. For the difference model, a 1% rise in real output results in a 1.6% drop in the unemployment rate. The study's empirical findings demonstrate the applicability of economic policy choices pertaining to employment in the context of Tunisia.

Within Ethiopia's least developed, transition-undertaking economy, Niken, Haile and Berecha (2023) look into the relationship between inflation, unemployment, and economic development over the years 1980 to 2020. The study employs three independent regressions on VAR and ECM models to account for the possible impulse of other series. Long-term data show that neither inflation nor unemployment rates have a significant impact on Ethiopia's economic growth, which may indicate that the country's growth environment is unique. However, their transient responsibilities are expected. Conversely, there is a non-trivial long-term relationship between inflation and economic growth, with inflation and unemployment being inversely correlated. Apart from some recent moves on renovating Ethiopia's agriculture, it would be of substantial influence to promptly sustain income growth and calm-down price spikes by reassuring, at best, labor-intensive venture and incentivizing productivity in the rest sector.

The natural rate of unemployment in the US from 1960 to 2021 was estimated by Crump et al (2022). According to the study model, in the medium term, significant pay growth will only slowly slow down and continue to drive inflation higher. Even if long-run inflation expectations stay firmly anchored, the analysis projects that by the end of 2023, underlying inflation will still be 0.5 percentage points over its long-run trend. Specifically, using data from Burning Glass Technologies, the study created a composition-bias free measure of wage growth at the employer-job level and found high salary growth for both telework-able and non-telework-able jobs. Additionally, the study discovered that following the epidemic, workers' reservation salaries significantly increased. According to empirical research, the robust wage gain is probably not the result of a one-time adjustment of higher pay for jobs that put employees' health at risk; rather, it is a reflection of a competitive labor market and shifting work-leisure trade-offs.

Özen (2022) examined the causal relationship between variables related to economic growth, unemployment, and inflation for a selection of nations between 2010 and 2020. The panel causality test by Dumitrescu and Hurlin (2012) revealed that while there was a bidirectional causal relationship between the variables related to growth and unemployment, there was only a unidirectional association between the variables related to unemployment and inflation. For at least one of the countries in this scenario, it is known that the variables (economic growth, inflation, and

unemployment) have a cointegration connection. With the use of modern data and newly developed econometric tests, it is anticipated that this study will add to the body of literature.

The study conducted by Hjazeen, Seraj and Ozdeser (2021) examines the effects of unemployment on the economy of Jordan from 1991 to 2019. In this work, the Auto-regressive Distributed Lag (ARDL) was employed. The empirical result showed a long-term correlation between Jordan's female population, urban population, economic growth, and unemployment rate. Additional research indicates a negative correlation between jobless growth and unemployment in Jordan and a positive correlation between unemployment and education, the proportion of women in the population, and the urban population.

Using symmetric and asymmetric reserved causality tests, Dayıoğlu and Aydın (2021) investigate the relationship between unemployment, inflation, economic growth, and current account deficit between the 2000Q1 _ 2020Q4 period. Using the Hatemi-J (2012) approach, which is based on the Toda-Yamamoto (1995) test, the asymmetric hidden causation links between the series were investigated in this work. An inverse association between growth and unemployment is found in Turkey when the growth rate and unemployment rate are compared between these years, particularly during times of crisis. To determine this association, the study also used symmetric and asymmetric causality. Growth also has a one-way symmetrical causality relationship from negative shocks to negative inflation shocks as a result of the estimates. If the relationship between them is merely assessed in terms of one-way or two-way causation, there might not be a relationship at all, hence even to accurately capture the assumption of Okun's law for Turkey, the causality needs to be examined asymmetrically.

Chuttoo (2020) investigates the relationship between unemployment and economic growth in Mauritius. To estimate the long- and short-term relationships between economic growth and unemployment, Okun's law-gap version and the Autoregressive Distributed Lag (ARDL) bounds cointegration test are used. The test results indicate that there is a negative cointegration between unemployment and economic growth in the short and long terms, although it is not statistically significant. On the other hand, the outcome of Okun's law-gap version demonstrates that Okun's law is applicable to Mauritius's small economy. Based on the obtained Okun's coefficient, it can be deduced that a 4 percent change in the GDP growth rate in Mauritius results in a 1 percent change in the unemployment rate in the opposite direction. Because labor-intensive industries like agriculture and craft manufacturing are continuing to decline and knowledge-intensive industries like FinTech, real estate, offshore, and tourism are increasing, the study suggested ongoing structural reforms.

Using the Autoregressive Distributed Lag (ARDL) modeling approach, Diakhoumpa (2020) investigates the relationship between Senegal's unemployment rate, economic growth, and inflation

rate during the years 1991–2018. In order to determine if there is unidirectional or bidirectional causality between variables, the Granger Causality Test was also performed. The results indicate that while there appears to be a positive association between unemployment and inflation in both periods, there is a negative long-run and short-run relationship between unemployment, growth, industry, and age dependence ratio. Additionally, it is shown that there is no Granger causation connection between inflation, economic growth, and unemployment. Conversely, the industry experiences a Granger causal relationship between unemployment and economic growth. The study suggested that in order to lower unemployment, policymakers should work to increase economic growth, but this growth should be managed so that it is more inclusive than exclusive.

Tiwari et al. (2019) use wavelet correlation, wavelet cross-correlation, and the scale-by-scale Granger causality test to revisit the inflation-growth relationship in India. Analysis using wavelet cross correlation reveals that, at the shortest sizes, inflation and economic growth were independent; at the medium and larger scales, a feedback effect is present; and at the highest ranges, inflation is solely caused by economic growth. The study also discovered that: (a) there is a strong and growing correlation between inflation and economic growth, especially after mid-2002; and (b) high-frequency components of economic growth Low-frequency Granger-cause component of CPI-based inflation and vice versa, as well as economic growth at all scales Granger-cause inflation at scales of 4-6 and the absence of any evidence linking WPI-based inflation to economic growth; (c) the findings suggest that there isn't a causal relationship between inflation and growth over the long term. This research offers fresh perspectives on how Indian policymakers might use inflation as a weapon to maintain economic growth.

Tenzin (2019) used the Autoregressive Distributed Lag (ARDL) to investigate the relationship between economic growth, inflation, and unemployment from 1998 to 2016. The empirical analysis's findings imply that economic expansion has no effect on Bhutan's unemployment rate decline over the long or short term. In reality, the unemployment rate rose in tandem with economic growth; however, the relationship between inflation and unemployment rate was positive in the long run and negative in the short run, meaning that an increase in the employment rate caused an increase in inflation in the short run. Similarly, if inflation is not tracked or managed, the uncertainty around it may result in less investment and slower economic growth, which ultimately raises unemployment. Therefore, this study suggests that policymakers consider the employment elasticity in relation to economic output and concentrate on industries that have a higher capacity to absorb and engage young people entering the labor market.

Oniore and Anzaku (2016) used the Autoregressive Distributed Lag Model to examine the relationship between inflation and unemployment in Nigeria. The Philips curve that that posited a

negative association between inflation and unemployment is confirmed by the paper's findings. Moreover, the long-term estimated coefficients are each negligible, meaning that a rise in inflation has no appreciable impact on Nigerian unemployment over the long term. As a result, it is suggested that in order to lower Nigeria's steadily rising unemployment rate, policymakers should concentrate on fostering economic activity in the country's real economy, which is the foundation for the government's goals of inclusive growth and the eradication of poverty. This will create job opportunities for both educated and uneducated people.

The impact of growth in GDP and inflation on unemployment in Sri Lanka from 1990 to 2012 is examined by Thayaparan (2014). The Granger Causality test methods using Ordinary Least Squares were used in the investigation. The findings of the regression analysis showed that while the gross domestic product has a positive coefficient but no statistically significant impact on unemployment, the coefficient of inflation is negative. At last, the research comes to the conclusion that only inflation considerably lowers unemployment, while the GDP has a favorable but little impact on unemployment. The results of the causality analysis demonstrated that, in Sri Lanka, there is bidirectional causation between unemployment and GDP and between inflation and GDP, but only unidirectional causality between inflation and unemployment.

Theoretical Framework

The study uses the Phillips curve hypothesis and Okun's rule as guidelines because they both predict some degree of linearity between unemployment and output growth rates compared to rates of inflation and unemployment. The relationships between output, employment, and unemployment are as follows, according to Okun's law. Businesses need to hire more workers in order to produce more outputs. Insufficient consumer demand for products and services reduces output, which in turn reduces the need for inputs used in production (Thanh, 2015 and Tang, 2003). However, employment fluctuates directly with and similarly to output growth in a typical economic event (at potential GDP), indicating an inverse relationship between unemployment and output growth (Sadiku, Ibraimi & Sadiku, 2015 and Tatoglu, 2011). The algebra of Okun's law can be specified as:

$\mu = a + b\dfrac{y - y^*}{y^*}$ Where: u denotes actual unemployment; y is actual output; y^* is potential output;

'a' denotes the natural rate of unemployment; 'b' is Okun's coefficient; $y - y^*$ gives output gap; &

output gap percentage ($\dfrac{y - y^*}{y^*}$), Okun's coefficient, b, can be derived by rearranging terms in the

equation above. Hence, this coefficient together with the output gap percentage is given below:

$$b = \frac{(\mu - a)}{\frac{y - y*}{y*}} ; \{ (\frac{y - y*}{y*}) / \frac{(\mu - a)}{b}$$

In essence, Okun's law predicts the real rate of unemployment as the product of the output gap multiplied by Okun's coefficient, b, which is potentially negative, and the natural rate of unemployment. In general, Okun's law shows an inverse relationship between unemployment and the production gap.

Methodology

Research Design

This study adopted a time series expo facto research design. Time series expo factor research design is a method of research that can truly test hypotheses concerning cause-and-effect relationships, as well as combines the theoretical consideration with empirical observation. In summary, the design of this study is quantitative as it is meant to collect and analyse given data on the relationship amongst the three variables, namely, economic growth, inflation and unemployment

Nature and Sources of Data

The World Development Indicator, the Central Bank of Nigeria Statistical Bulletin, and the National Bureau of Statistics provided secondary data for the study.

Model Specification

Based on the theoretical framework and extant literature, the study model is specified as follows:

$$UEMP_t = \beta_0 + \beta_1 RGDP_t + \beta_2 INFR_t + \beta_3 ADR_t + \varepsilon_t \tag{1}$$

Where UEMP – unemployment rate, RGDP be real gross domestic GDP growth, INFR – inflation rate, ADR- age dependency ratio added as predictor variable; ε_t - other variables not explicitly included in the model.

Method of Data Analysis

Time series analysis requires the unit root test, which establishes the stationarity of the variables, to be performed in order to verify which method to employ and prevent selecting the wrong method. To verify if the data were stationary, a unit root test was conducted. The unit root in a time series can be tested using a number of methods, including the Dicker-Fuller Test, the Augmented Dicker-Fuller Test (ADF), Phillips Perron (PP), and Kwiatkowski, Phillips, Schmidt, and Shin (KPSS). The stationarity of the variables and their order of integration were examined for this study using the Augmented Dickey-Fuller and Phillips Perron methods.

Subsequently, the study employed the Autoregressive Distributed Lag (ARDL) Model to investigate the impact of inflation and economic growth on Nigeria's unemployment rate between 1981

and 2022. Three modifications were needed to apply the bound test technique. First, start with the recommendation made by Pesaran et al. (2001) to estimate the relationship level using the ARDL approach. The ability to perform the analysis with a mixed variable is the second. For instance, when variables are in I(0) and I(1) but not I(2) order of integration. Johansen & Juselius (1990) state that the Johansen cointegration test is not applicable when dealing with mixed variables.

Finally, ARDL is the best technique for small and finite-size data sets, according to Pesaran et al. (2001). In order to determine whether a long-term link exists in a series analysis with a different order of integration, Pesaran's bound test is the most effective method. If the series are co-integrated, the short-run and long-run should be stated for the bound test findings. To ascertain the short- and long-term in this situation, the ECM should be utilized. Otherwise, only the short-run should be done. In that case of non-cointegration, the short-run is obtained in ARDL regression. The ARDL model is specified as follows to run the bound test for cointegration:

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{p} \beta_i \Delta y_{t-1} + \sum_{j=0}^{q} \partial_j \Delta X_{t-J} + \phi_1 y_{t-1} + \phi_2 X_{t-1} + \mu_t \tag{2}$$

Where Δ denotes the first difference operator, β_i, ∂_j stand for the short-run coefficients, ϕ_1, ϕ_2 are for the long-run coefficients and μ_t is the disturbance(white noise) term. In the ARDL model framework, the study provided policy variables as follows:

$$\Delta UEMP_t = \beta_0 + \sum_{i=1}^{m} \beta_{1i} UEMP_{t-i} + \sum_{j=0}^{n} \beta_{2i} \Delta RGDP_{t-j} + \sum_{k=0}^{o} \beta_{3i} \Delta INFR_{t-k} + \sum_{l=0}^{p} \beta_{4i} \Delta ADR_{t-l}$$
$$+ \beta_5 UEMP_{t-1} + \beta_6 RGDP_{t-1} + \beta_7 INFR_{t-1} + \beta_8 ADR_{t-1} + \varepsilon_t \tag{3}$$

There are two primary processes in the bound test. In order to determine whether there is a long-term link between the variables, we first estimate the ARDL equation. The F-statistic is calculated in the second stage, and the following decision rule will be applied:

The null hypothesis ($H_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$) of no long-run relationship is rejected if the calculated F-statistic is greater than the critical value for the upper bound I(1). In this case, the alternative decision($H_0 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$) is accepted, we conclude that there is cointegration or a long-run relationship. If the F-statistic is less than the critical value for the lower bound I(0), we cannot reject the null hypothesis ($H_0 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$), this means that no cointegration and the long-run relationship cannot be established. Finally, an inconclusive result occurs where the F-statistic falls below between the lower bound I(0) and upper bound I(1). Hence, the short-run and long-run can be conducted. Finally, the series error correction is as follows:

$$\Delta UEMP_t = \beta_0 + \sum_{i=1}^{m} \beta_{1i} \Delta UEMP_{t-i} + \sum_{j=0}^{n} \beta_{2i} \Delta RGDP_{t-j} + \sum_{k=0}^{o} \beta_{3i} \Delta INFR_{t-k} + \sum_{l=0}^{p} \beta_{4i} \Delta ADR_{t-l} + ECT_{t-1} + \varepsilon_t \quad (4)$$

Where;

ECT_{t-1} = lagged Error correction term. The output evolution process that agents use to react to the prior period of prediction errors is captured by the ECT.

Results and Discussion of Findings

The study started with descriptive statistics as presented in Table 1:

Table 1: Summary Statistics Results

	UEMP	RGDP	INFR	ADR
Mean	8.209524	39021.18	18.93095	89.47991
Std. Dev.	7.171856	21116.40	16.45438	2.053262
Skewness	2.695314	0.528292	1.876022	0.094825
Kurtosis	9.146479	1.641295	5.431657	2.169159
Jarque-Bera	116.9666	5.184281	34.98387	1.270963
Probability	0.000000	0.074860	0.000000	0.529680
Observations	42	42	42	42

Source: Researcher's computations (2023).

Table 1 includes descriptive data on Nigeria's economic growth rate, inflation, age dependency ratio and unemployment rate. The means of the four variables in this study are all found to be positive. Nigeria has an average inflation rate of 18.93% with a standard deviation of 16.45, which is lower than the country's unemployment rate. Table 1 further suggests that the average RGDP growth rate in Nigeria during the study period is 39021.18. The stochastic characteristics of the study variables were then examined using two conventional unit roots tests. The Phillips-Perron (PP) and Augmented Dickey-Fuller (ADF) tests are the conventional ones that are used. The two tests were used to determine which choice was the most appropriate in cases of dispute and to check for consistency (Hamilton, 1994). The results of unit root tests are presented in Table 2:

Table 2: Traditional Unit Root Test Results (Trend and Intercept)

Variables	ADF	Critical Values	Order of Integration	PP	Critical Values	Order of Integration
UEMP	-5.273	-4.205*	I(1)	-5.278	-4.205*	I(1)
RGDP	-3.627	-3.527**	I(1)	-3.627	-3.527*	I(1)
INFR	-4.131	-3.527**	I(0)	-10.822	-4.205*	I(1)
ADR	-4.119	-3.544**	I(1)	-4.119	-3.544*	I(1)

Note: *,** Indicates stationary at the 1% and 5% level.

Source: Researcher's Computations Using E-views 12.

With the exception of the external debt (INFR) variable, which tends to be stationary at level in the ADF test, all of the variables in Table 2 according to the conventional tests of the ADF and PP likely to be stationary in first difference. The purpose of testing for the stationarity properties of the variables in bounds approach to cointegration is because the (ARDL) bounds testing approach becomes applicable only in the presence of I(1) and I(0) variables or a mixture of both. This means that the assumption of bounds testing will collapse in the presence of I(2) variable. Both the ADF and PP unit root results presented in Table 2, implies that the bounds testing approach is applicable in this study, as all the variables are a mixture of I(1) and I(0). The study's next objective is to use the ADRL-bound testing approach to determine a long-term link between the variables and the integration sequence. The results of the cointegration test are displayed in Table 3.

ARDL Cointegration- Bound Test Result

In order to carry out the long-run relationship, the bound test was applied. The results are as presented indicates in Table 3:

Table 3: Result of ARDL Bounds Test for Cointegration

Null Hypothesis: No Long-run Relationships Exist		
Test Statistic	Value	K
F-Statistic	3.638296	3
Critical Value Bounds		
Significance	Lower Bound	Upper Bound
10%	2.37	3.2

Source: Researcher's Computations (2023).

The outcome demonstrates that at 10%, the computed F-statistic (3.638296) is higher than the lower and upper bounds (2.37) and 3.2, respectively. As a result, cointegration between the age dependence ratio, inflation, economic growth, and unemployment is found. Consequently, there is a long-term link between the variables.

4.2 ARDL Regression Results

The study evaluates the long-term models and error correction in light of the dependent variable's cointegration with the regressors. The results of the estimations are shown in Table 3.

Table 3: ARDL Regression Result

Dependent Variable: D(UEMP)			
Selected Model: ARDL(ARDL(4, 4, 4, 4)			
Cointegrating Form (ECM)			
Variable	Coefficient	t-Statistic	Prob
D(RGDP)	0.030	0.951	0.35
D(RGDP(-1))	0.047	1.244	0.22
D(INFR)	0.038	1.296	0.21
D(INFR(-1))	-0.050	-0.177	0.86
D(ADR)	-13.298	-1.432	0.16
D(ADR(-1))	30.148	1.579	0.13
ECM(-1)	-0.881	-4.715	0.00
Long Run Coefficients			
C	2068.449	0.113	0.91
RGDP	0.020	0.090	0.93
INFR	-0.221	-0.100	0.92
ADR	-23.005	-0.113	0.91

*Note: *, ** indicate significance at 1 percent.*

***Source*: *Researcher's Computations (2023)*.**

The short-run results in Table 3 shows that any increase by one unit in economic growth will lead to an increase in unemployment rate by 0.030 units. This confirms also that the Okun law's in Nigeria was violated. In addition, an increase in inflation rate by one unit will raise unemployment by 0.038 units which are not suitable for an economy and it is risky for policymakers. The results of this study run contrary to the Phillips curve theory, which maintains that there is an inverse relationship between the two variables. But, one period lag inflation is negatively related to unemployment. This outcome, however, is consistent with the Phillips curve theory, which maintains that the two variables have an inverse relationship. Conversely, a one-unit rise in the age dependence ratio as a significant control policy variable will result in a -13.298-unit decrease in unemployment. But, the age dependency ratio is positively correlated with unemployment by one period lag age.

In the short-run, the ECM coefficient was -0.881 and statistically significant at 1% level. This implies that any deviation happened in the short-run will be corrected by 88.1% over the next period. In the long-run, all variables have an effect on the dependent variable (unemployment), but they are statistically insignificant at the 1% level. According to the long-run coefficients, the unemployment rate will rise by 0.020 units for every unit increase in economic growth. Furthermore, a one-unit increase in inflation will result in a -0.221 decrease in unemployment. The results of the long-term study are consistent with the Phillips curve theory, which states that there is an inverse relationship between the two variables. While, an increase in age dependency ratio by one unit will led to reduction in unemployment by -23.005 during the study period.

Conclusion and Recommendations

Prior to the current inflationary pressure that began in 2016 and has persisted to this day, the Nigerian economy has seen comparatively rapid growth and effective inflation control. The country's unemployment rate remains high despite the comparatively strong economic growth that has been observed, as authorities continue to find the rate of unemployment to be of great concern. Hence, the need to examines the impact of economic growth and inflation on unemployment rate in Nigeria from 1981 to 2022 using the Autoregressive Distributed Lag Model.

Findings show that economic growth, inflation have a positive effect on unemployment in the short-run and age dependency ratio affects unemployment negatively in the short run. Study outcomes appears to violates both the Okun law's and Phillips curve in the Nigerian economy in the short run. However, in the long-run, economic growth is also positively related to unemployment and inflation negatively associated with unemployment; thereby affirming Phillips curve which holds an inverse relationship between the two variables. Finally, age dependency ratio affects unemployment negatively.

The short-term violations of the Phillips curve and Okun law in the Nigerian economy imply that there are more factors impacting the country's unemployment rate. As a result, the study suggested the following policy options:

i.   Implementation of sound macroeconomic stabilization policies with the aim of achieving a single inflation, low unemployment rates and high economic growth rates.

ii.   The establishment of new industries in the real sector of the economy will contribute to lowering the nation's unemployment rate as well as output, prices for goods and services, and inflation generally.

iii.   Programmes of education and training should be routinely evaluated and focused on productivity and innovations in order to lower the nation's unemployment rate.

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