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MACROECONOMIC PROBLEMS CHALLENGING THE NIGERIAN ECONOMY: A CASE STUDY OF THE RELATIONSHIP BETWEEN UNEMPLOYMENT AND INFLATION.

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ABSTRACT

Unemployment and inflation are among the macroeconomic problems challenging the Nigerian economy. Economists and researchers have been in search for the relationship between unemployment and inflation to find solutions to these problems. In furtherance of these efforts, this study aimed to investigate the relationship between unemployment and inflation in Nigeria from 1981 - 2022. The model specified has unemployment as the dependent variable and inflation rate, Interest rate, gross domestic product and exchange rate as the independent variables. The study employed the Autoregressive Distributed Lag (ARDL) Model in the estimation of the specified unemployment-inflation model. The estimated model results obtained exceed 5% level of inflation significant coefficient showing that inflation had a negative and significant impact on unemployment The first and second lags of unemployment had a positive and negative significant relationship respectively with the current unemployment as both passed the significance test at the 1% level. The granger causality test showed that there was no causality between unemployment and inflation in Nigeria during the period of the study. In view of the results obtained, we recommend friendly economic policies implementation with the aim of improving economic growth in Nigeria.

Keywords: Macroeconomic, Unemployement, Inflation, Economy

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INTRODUCTION

Macroeconomics has some of its goals, which are of governmental interest , such as, domestic price stability and full employment. Macroeconomics focuses on the performance of economic – output on economic changes, , interest – unemployment – rates amongst others. Unemployment refers to a situation when law abiding citizens are unable to find meaning and well paying work. It is a major factor that shows a healthy economy.

Inflation on its part is refers to the how prices of goods and services rises, which has been a major problem in the Nigeria economy over the years.

Monetarists explain that if the money supply rises faster than the rate of growth of national income then there will be inflation. In their view, unemployment exists naturally in the economy which could be explained through structural unemployment, frictional unemployment, and cyclical unemployment.

The massive migration of youth into other areas as a result of the oil boom of 1970 with a view to getting work, increases the population of the other areas.

In economic literature, there is no precise definition of unemployment

We calculate the rate of unemployment using the formalism of Gbosi (2006).:

$$\text{Unemployment Rate } (U) = \frac{\text{Number of People Unemployed}}{\text{Labour Forces}} \times \frac{100}{1} \quad (1)$$

Inflation can simply be defined as the rate at which more money chases less goods and services. Economists define inflation as an increase in the general price level of goods and services in an economy over time. The Consumer Price Index (CPI) can be calculated using:

$$\text{CPI} = \frac{\text{Current Year Price Index}}{\text{Base Year Price Index}} \times \frac{100}{1} \quad (2)$$

The British Economist, Philips (1958) shows that, when unemployment increases, inflation reduces. However, the above relationship is not linear. This relationship is possibly explained in the following ways, Short – and Long – Run Phillips curve.

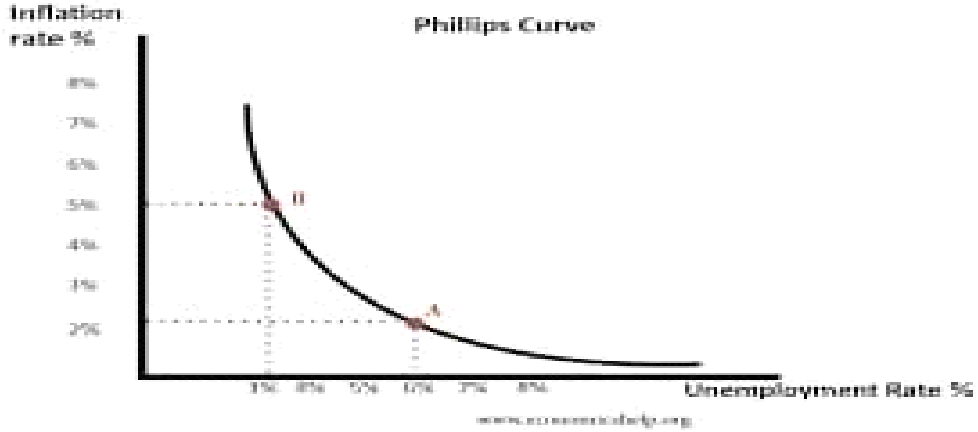

Figure 1: Short-run Phillips Curve (Theoretical Phillips Curve).

1n 1960, Paul Samuelson and Robert Solow using Phillips Curve of 1958 as shown in Figure 1 to support their Work which reflects the relationship between unemployment and inflation.

Unemployment on its part drops during boom period, because the demand for products and services rises leading manufacturers to increase their output and workers will be needed to enhance production.

Theoretical Framework

The classical theory says that: unemployment depends on the level of real wages.

Keynes (1936) in his unemployment theory says that inadequate overall demand could lead to prolonged periods of high unemployment.

The Insider - Outsider Theory of Unemployment is developed by Blanchard and Summers (1986), where they postulates the segmentation of the labor force between insiders and outsiders and the dominant role of the Insider in wages determination, because, they are already employed. Outsiders are discouraged and wages are set with a view to ensuring the jobs of insiders and they (insiders) ultimately uninterested in expanding the number of jobs available for those who are not employed.

METHODOLOGY

This research employ an experimental research design. Two variables are considered in this paper, viz; the explained and explanatory variables and a combination approach of variables selection was used to accommodate all relevant variables for an efficient representation of these relationship.

UNEMPUnemployment
INF Inflation
INTR Interest Rate
GDP Gross Domestic Product
EXCHR Exchange Rate

3.2 Research Methods:

The time series data required for the study were sourced from World Development Indicator (WDI). The period to cover is from 1981-2022 to empirically evaluate the impact of inflation rate, interest rate, GDP and Exchange rate on unemployment, covering a period of Forty-one (41) years

Model Specification

We write the model as : UNEMP=F (INF, INT,GDP, EXCHR)

While F= Functional relationship

The model can be express in a linear mathematical relationship as

UNEMP=a_0+a_1+INF=a_2 INTR+a_3 GDP + a_4 EXCHR.

However, our econometric model, an error term or stochastic term have to be included, Thus,

UNEMP= a_0+a_1+INF=a_2 INTR+a_3 GDP + a_4 EXCHR.+ e

Estimating Technique

This paper adopted the autoregressive distributed Lag (ADRL) and granger casuality test approaches where the stationary properties of the variables are determinant using the Augmented Dickey-Fuller test, and ARDL bound Co-integrated test was also employed to test for the existence of otherwise of long-run relationship among the variables.

RESULTS

We presented and discuss our results including our findings in this section. Also contained in this section are empirical tests of the validation of hypothesis for the study.

The preliminary analysis are also performed. These include the statistical descriptions of the variables selected for the research and coefficients of Correction among variables as well as Dickey-Fuller unit root test to ascertain the stationarity (Or otherwise) of long run relationships among the variables.

Statistical Description

All the variable results are presented in Table 4.1

Table 4.1. Result of the Descriptive Statistics of Variables

	UNEM	INFL	INTR	GDPGR	EXHR
Mean	4.093875	18.41968	18.53864	4.053702	150.8797
Median	3.899000	12.94178	17.69000	4.212993	130.2483
Maximum	5.633000	72.83550	31.65000	15.32916	425.9792
Minimum	3.507000	5.388008	11.48313	-2.035119	9.909492
Std. Dev.	0.544134	16.24845	3.880924	3.782560	115.7801
Skewness	1.493619	2.159182	1.160651	0.484801	0.830993
Kurtosis	4.162687	6.622813	5.597852	3.786430	2.923761
Jarque-Bera	13.70057	42.36405	16.18303	2.078133	3.690683
Probability	0.001059	0.000000	0.000306	0.353785	0.157971
Sum	131.0040	589.4296	593.2365	129.7185	4828.150
Sum Sq. Dev.	9.178532	8184.378	466.9086	443.5406	415555.9
Observations	42.0000	42.0000	42.0000	42.0000	42.0000

Threat of unemployment in Nigeria ranged from 3.50 % to 5.63% with a Standard Deviation (SD) of 0.544134 and an average growth rate of 4.09% from 1981 to 2022. Median growth rate within the period was 3.899%. Inflation rate ranged between 72.84 % and 5.3880% with an SD of 16.25 and an average rate of 18.42% from the period 1981 to 2022. Median inflation rate within the period was 12.94%. This suggests that inflation rate in Nigeria has been high inferring from the average inflation rate at 18.42%. Interest rate ranged between 31.65% and 11.48% with an SD of 3.8809 and an average rate of 18.53% between 1981 and 2022. Median inflation rate within the period was 17.69%. This suggests that interest rate in Nigeria has been high too with inference drawn from the average interest rate of 18.53%. The smooth rate Gross domestic product rate ranged between 15.32% and -2.035% with a standard deviation of 3.7825 and an average rate of 4.0537% between 1981 and 2022. Median inflation rate within the period was 4.2129%. Exchange rate ranged between 425.9792 and 9.9094 with SD of 115.780 and an

average rate of 130.2483 between 1981 and 2022. Median inflation rate within the period was 150.8797.

Correlation Coefficients

Table 4.2: Coefficients of Correlation Matrix

Variables	UNEM	INFL	INTR	GDPGR	EXCR
UNEM	1	0.05008	-0.35748	-0.58051	0.61152
INFL	0.05008	1	0.50017	-0.40647	-0.35960
INTR	-0.35748	0.50017	1	0.03508	-0.67381
GDPGR	-0.58051	-0.40647	0.03508	1	-0.08148
EXCR	0.61152	-0.35960	-0.67381	-0.08148	1

Source: Author's Computation

The coefficient is quite low; 0.05008, signifying weak correlation and positive relationship. The correlation between unemployment and interest rate is negative, with correlation coefficient calculated at about 36%. The correlation between unemployment and gross domestic growth rate is negative estimated at about 58%. The correlation coefficient between unemployment and exchange rate was estimated at 0.61 %. The estimate showed a positive correlation between unemployment and exchange rate. Most of correlation coefficients were less than 70%.

Unit Root Tests

Table 4.3: Test Results of Unit Root

Augmented Dickey-Fuller Unit Root Test							
Level				**First Difference**			
Variables	Statistics	Prob.	Status	Statistics	Prob.	Status	Integration Order
UNEM	-3.69769	0.0094	S	-	-	-	(I)0
INFL	-3.05046	0.0385	S	-	-	-	(I)0
INTR	-2.34438	0.1636	N/S	-5.87639	0.0001	S	(I)1
GDPGR	-3.20369	0.0271	S	-	-	-	(I)0
EXCR	2.86306	1.0000	N/S	-4.21131	0.0019	S	(I)1

Source: Author's Computations

Unemployment (UNEM), inflation (INFL) and gross domestic product growth rate (GDPGR) were stationary at level while interest rate (INTR) and exchange rate (EXCR) were stationary at first difference.

Optimal Lag Selection test

Table 4.4 : Result of Optimal Lag Selection test

Sample: 1981 - 2022
Included observations: 41

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-465.00	NA	279092	31.333	31.567	31.4084
1	-374.95	144.07	37520	26.99	28.398	27.445
2	-327.70*	59.861*	99009.*	25.513*	28.082*	26.335*

The optimal lag selection test proved that the optimal lag for our model estimation was two (2) lags. The optimal lag selection result is presented in table 4.4.

Long Run Coefficients (LRC) Estimates

The LRC estimates are presented in Tables 4.5. These estimates are presented to reveal the impacts of inflation rate on unemployment in Nigeria.

Table 4.5: Long Run Coefficients Estimates

Dependent Variables: UNEMPLOYMENT (UNEM)

Independent Variables	Coefficients	t- statistics	Probabilities
UNEM(-1)	2.372772	5.904040	0.0000
UNEM(-2)	-1.530038	-5.106210	0.0001
INFL	-0.008873	-2.178952	0.0415
INTR	0.036551	2.375294	0.0276
INTR(-1)	-0.023123	-1.332661	0.1976
INTR(-2)	0.037074	2.113932	0.0473
EXHR	-0.000242	-0.302511	0.7654
GDPGR	-0.056933	-4.561991	0.0002
GDPGR(-1)	0.047754	2.238121	0.0367
C	-0.132314	-0.180432	0.8586
R- Squared = 0.9414 Adjusted R- Squared =0.8861 Durbin Watson = 2.0677			

Table 4.5 show the estimated R-Squared is 0.9414. This figure shows that all the independent variables in the model explained about 94 per cent variation in the dependent variable (UNEM). The remaining 6 per cent variation in the dependent variable is explained by other determinants which are not included in the model.

The coefficients of the first and second lags of unemployment were estimated as 2.372772 and -1.530038 respectively. These figures are positive and negative respectively. They indicate direct and inverse relationship with the dependent variable (UNEM). The positive sign of the first lag is in agreement with our a priori expectation, the negative sign of lag two failed a priori expectation. The first and second lags of unemployment passed the significant test at the 1% level of significance. These findings are minimal to the findings of Ani, et al (2019).

The coefficient of inflation was estimated at -0.008873 with a probability value of 0.0415. This shows that inflation is negatively related with unemployment in Nigeria. It shows that as inflation goes up by 1%, unemployment goes down by 0.008873 %. This agrre with the results obtained by Odo, Elom- Obed, et al (2017).

The coefficients of interest rate and its first and second lags were estimated as 0.036551, -0.023123 and 0.037074. The result showed that interest rate has positive relationship with unemployment. The first lag of interest rate showed negative relationship with unemployment, but it failed significance test at the 5% level of significance. The second lag of interest rate showed positive relationship with unemployment and passed significance test at the 5% level. These results are in agreement with the results obtained by Babalola, 2022.

The coefficient of exchange rate was estimated at -0.000242 with a probability of 0.7654. Exchange rate has a negative relationship with unemployment, but it failed significance text at the 5% level. The coefficient of gross domestic growth rate and its first lag were estimated as -0.056933 and 0.047754 with probability values of 0.0002 and 0.0367 respectively. Gross domestic growth rate (GDPGR) and unemployment (UNEM) had negative relationship. GDPGR passed significance test at the 1% level. The first lag of GDPGR showed positive relationship with

unemployment during the period of the study and passed significance test. Our results agrees with Ani, Joel and Baajon, 2019.

The estimated model did not exhibit evidence of auto correction as the Durbin Watson statistic was estimated at 2.07. This shows that the estimated model was good and has good fit (coefficient of determination was about 94%). It also shows that the estimated model can be used for policy-making and forecasting of the dependent variable- unemployment.

Short Run Coefficient Estimates

The results are presented to show the short run effects of the variables on economic growth.

Table 4.6: Short Run coefficient Results for Model one

Dependent Variables: UNEMPLOYMENT (UNEM)

Independent Variables	Coefficients	t- statistics	Probabilities
D(UNEM(-1))	1.530038	8.037599	0.0000
D(INTR)	0.036551	3.152880	0.0050
D(INTR(-1))	-0.037074	-2.957960	0.0078
D(GDPGR)	-0.056933	-5.985200	0.0000
CointEq(-1)*	-0.157266	-5.936417	0.0000
R- Squared = 0.7756 Adjusted R- Squared = 0.7397 Durbin Watson = 2.0677			

Source: Author's computation

From the short run coefficient estimation results in Table 4.6, the estimated R-Squared was estimated at 0.7756. This figure showed that all the independent variables in the estimated model explained about 78 per cent variation in the dependent variable (UNEM). The remaining 22 per cent variation in the dependent variable was explained by other growth determinants which were not included in the model.

The coefficient of the difference of the first lag of unemployment was estimated as 1.530038 with a probability value of 0.0000. The estimate showed that it was statistically and positively significant at the 1% level. It showed further that I% rise in the first difference of unemployment rate would lead to a about 1.530038rise in unemployment. It was rightly signed and meets a priori expectation.

The coefficient of the first difference of interest rate was estimated at 0.03655 with a probability value of 0.0050. The result showed that it was statistically significant at the 1% level. It is rightly signed and it did meet our a priori expectation. It showed that 1% rise in interest rate would lead to 0.03655rise in unemployment. The coefficient of the difference of first lag of interest rate was estimated as-0.037074 with a probability value 0.0078. The result showed that it was statistically significant at the 1% level. The coefficient of the first difference of GDPGR was estimated at -0.056933 with a probability of 0.0000. The result showed that it was statistically significant at the 1% level.

The error correction term estimated at -0.1573 with a probability of 0.0000 shows that it was statistically significant at the 1% level. The error correction term was valid; it was rightly signed (negative), it was less than one and statistically significant. It shows that the model returns to equilibrium of about 0.17% at every 100 per cent disequilibrium in the previous year. The rate of adjustment is about 17%. Though the rate of adjustment was low, but turned out significant.

Granger Causality Test

Table 4.7: Granger Causality Test Results

Pairwise Granger Causality Tests

Sample: 1981-2022

Lag: 2

Null Hypothesis:	Obs.	F-Statistic	Probability
INFL does not Granger Cause UNEM	30	0.29607	0.7463
UNEM does not Granger Cause INFL		0.03295	0.9676

The interpretation of a Granger causality test p-value is that a low p-value indicates that the null hypothesis is rejected, and a high p-value indicates that the null hypothesis is accepted. The usual cut off for a p-value is less than 0.05.

In a Granger causality test, the null hypothesis (H_0) is that there is no causality from the independent/dependent variable to the dependent/independent variable, and the alternate hypothesis (H_0) is that there is causality from the independent/independent variable to the dependent/independent variable. If the p-value is less than 0.05, the null hypothesis is rejected, and there is a conclusion that there is causality. If the p-value is greater than 0.05, the null hypothesis is accepted, and the conclusion is that there is no short-run causality.

The results in table 4.7 indicates that there is no causality from UNEM/INFL to INFL/UNEM based on the probability values which are greater than 0.05. The conclusions drawn from the granger causality tests are, inflation does not granger cause unemployment and unemployment does not granger cause inflation in Nigeria.

Diagnostic and Stability Tests

The cumulative sum of recursive residuals (CUSUM) was applied to assess parameter stability (Pesaran and Pesaran, 1997). Figure 1 in appendix 3 plot the results of the CUSUM test. The results showed the absence of any instability in the coefficients since the plot of the CUSUM statistic fell into the critical bands of the 5% confidence interval of parameter stability (Iheanacho, 2017).

Test of Hypotheses

The study utilizes the t-statistic of the estimated model to test the hypotheses specified in the introductory chapter of the study.

Hypothesis 1: Inflation (INFL) does not have significant effect on unemployment in Nigeria

This hypothesis was not rejected as the t-ratio passed the test of statistical significance at the 5% level.

Hypothesis 2: No granger causality between unemployment and inflation in Nigeria

This hypothesis was accepted as the F-Statistic failed the test of statistical significance at the 5% level.

CONCLUSION

The concern of the government is to devise more results oriented strategies that would reduce in unemployment in Nigeria. Our results which showed that inflation, interest rate and gross domestic product growth rate has significant impact on unemployment in Nigeria is an indication that Nigeria government need to strategize to improve on inflation, interest rate and GDP in Nigeria with the aim of improving economic growth in Nigeria. We also observed that Unemployment and inlation did not granger cause inflation.

RECOMMENDATIONS

Given the findings of this study, we recommend as follows:

i Government should design economic policies targeting inflation with the aim to reduce unemployment towards achieving economic growth in Nigeria.

ii Government needs to strategically improve gross domestic growth rate with the aim of reducing unemployment in Nigeria.
iii There is need to improve on the Nigerian business environment by curbing inflation in order to promote high employment level and economic growth in Nigeria

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