EMPIRICAL INVESTIGATION OF THE EFFECTS OF UNEMPLOYMENT AND INFLATION ON ECONOMIC GROWTH IN NIGERIA (1980-2022)

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Abstract

This paper investigates the Effects of Unemployment and Inflation on Economic Growth in Nigeria (1980-2022). The study explores the relationships between real GDP, inflation, and unemployment, highlighting both short- and long-term effects. Real GDP (RGDP) was used as the dependent variable while Unemployment Rates (UNEM) and Inflation Rate (INF) represent the independent variables to explain how RGDP responds to changes in them. Augmented Dickey-Fuller (ADF) unit root test, Multicollinearity Test and Bounds Test were conducted based on which Autoregressive Distributive model and Error Correction Model (ECM) were employed for estimation. Model Fit and Diagnostics R-squared indicates that about 66.3% of the variation in the change in RGDP is explained by the model. The study revealed that Economic growth (GDP) is more responsive to persistent or structural changes than to short-term volatility, highlighting the limited influence of economic shocks on output. The results also show the presence long-term equilibrium relationship among GDP, inflation, and unemployment, with a slow rate of adjustment back to equilibrium. Also, there is a limited causality between inflation and GDP and a unidirectional causality from unemployment to GDP, suggesting that while unemployment can predict GDP changes, GDP does not significantly influence unemployment. The study recommends that Government should prioritize reducing unemployment rates to sustain economic growth, ensure steady inflation management, which would benefit long-term GDP growth without creating volatility and build flexible mechanisms to adjust gradually to economic shocks.

Keywords: Economic Growth, Economy, Inflation, Real GDP, Unemployment

JEL Code: E24, E31, Q47

1. Introduction

The Nigerian economy has long grappled with the twin challenges of unemployment and inflation, both of which significantly influence macroeconomic stability and growth. Over the years, economists have sought to understand the intricate relationship between these two critical variables, which are central to economic planning and policy formulation. Policymakers universally strive for low levels of unemployment and inflation, with tolerable thresholds often cited as a single-digit inflation rate and an unemployment rate around 5%. Achieving

macroeconomic stability is vital for fostering economic growth, reducing poverty, and advancing sustainable development (Odo et al., 2017).

Despite steady declarations of economic growth in Nigeria, the reality reflects a largely underdeveloped economy characterized by high unemployment, persistent inflation, and significant socio-economic challenges. Although growth rates were projected at 4.5% in 2014 and 5.5% in 2015, surpassing developed economies like the United States (2.2% in 2014), these figures have been described as "exclusive growth." This term underscores the disparity between statistical growth and actual economic inclusivity, as evidenced by low per capita income, economic instability, and recurrent recessions (Abdulsalam & Abdullahi, 2016).

Understanding the relationship between inflation and unemployment has been shaped by key theories such as the Phillips Curve, which suggests a short-term inverse relationship between the two, though this may not hold over the long term. For Nigeria, unraveling this dynamic is crucial for sustainable economic development (Jalloh & Bah, 2023). However, despite various government interventions, both unemployment and inflation continue to rise, exacerbated by the nation's reliance on oil revenue since the 1970s. This dependence has led to rapid urbanization, neglect of agriculture, and diminished manufacturing output, worsening the economic imbalance.

Recent global disruptions, including the COVID-19 pandemic and the Ukraine-Russia war, have further compounded Nigeria's economic vulnerabilities. These external shocks disrupted supply chains, leading to food shortages, increased inflation, and declining GDP growth (Jalingo, 2023; Al-Saadi, 2023). Despite decades of macroeconomic policy attempts, Nigeria continues to face escalating unemployment and inflation, which together pose significant barriers to sustainable growth. The neglect of key sectors like agriculture and manufacturing has exacerbated this crisis, undermining GDP growth and economic resilience. The persistent

rise in inflation and unemployment highlights the urgent need for targeted policies that address these dual challenges.

While many studies like those by Ademola et al. (2016) and Ekpeyong (2023) examine relationships between variables, they often fail to provide detailed, actionable insights into the policy mechanisms that could mitigate unemployment and inflation effectively. The findings of inflation's impact on GDP vary significantly, with some studies (e.g., Nnachi & Ugochukwu, 2023) showing a positive relationship and others (e.g., Dodo & Idris, 2022) indicating a negative one. This inconsistency suggests the need for a more nuanced understanding of inflation's dual effects under different economic conditions. Al-Zeaud (2014), investigate causality and the directional influence between unemployment and GDP or inflation and GDP comprehensively, leaving critical questions unanswered just like Jalingo (2023), who briefly mention external factors (e.g., global pandemics, wars) in his study without incorporating them into empirical models to evaluate their direct and indirect effects on Nigeria's economic growth. This study seeks to address this gap by investigating the impact of inflation and unemployment on Nigeria's economic growth. Specifically, it aims to explore the causal relationships among these variables, providing insights for the formulation of effective monetary and fiscal policies. Given the critical role of inflation and unemployment in shaping economic outcomes, understanding their interplay is essential for achieving macroeconomic stability and sustainable development.

2. Review of Literature

2.1 Conceptual Review

Unemployment is commonly defined Defined as surplus labour supply over demand, it arises when wages exceed market-clearing levels. The International Labour Organization (2009) identifies unemployment as active job-seeking without employment in the past four weeks, measured as a percentage of the labour force. The Central Bank of Nigeria (CBN, 2013)

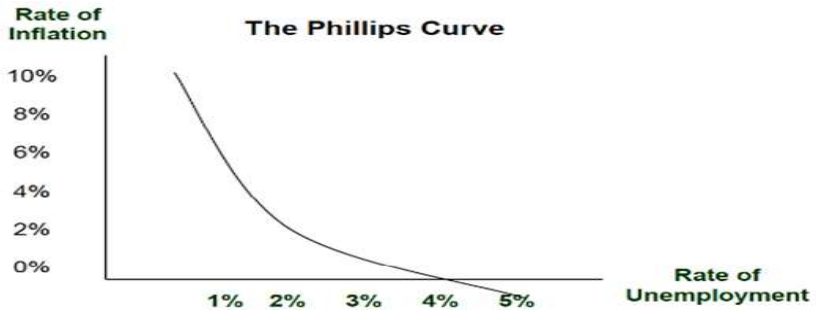
highlights disguised unemployment, where labor productivity is negligible. Unemployment, therefore, encompasses educated and uneducated individuals of working age who lack employment opportunities (Okeke, 2020).

Inflation is defined as a sustained increase in the general price level of goods and services over time. Balami (2006) describes it as a rise in prices measured over a specific period, often quantified using indices like the Consumer Price Index (CPI). Scholars like Olapinwa & Esan (2013) and Ademola et al. (2016) emphasize that inflation affects the overall price basket, not isolated commodities, and must demonstrate sustained upward trends to qualify as inflation. This phenomenon reduces purchasing power, leading to the assertion that inflation arises when "too much money chases too few goods."

Economic growth Sustained increases in real per capita income and goods/services production. Jhingan (2003) links growth to living standard improvements, structural economic changes, and technological innovations. It encompasses improving living standards and reducing income inequality. Zhattau (2013) ties growth to capital accumulation and innovation, resonating with Solow's (2002) model, which attributes growth to population increases, technical progress, and investment.

2.2 Theoretical Review: The Phillips Curve

A.W. Phillips (1861–1957) analyzed the inverse relationship between unemployment and inflation, concluding that high unemployment leads to slower wage growth, while low unemployment accelerates wage increases. Using UK data, Phillips observed that during low labor demand, workers are less inclined to accept lower wages, and employers may reduce wages, resulting in layoffs and higher unemployment. Conversely, during high labor demand, employers raise wages to attract workers, leading to inflation (Ugwuanyi, 2004).



The Phillips Curve illustrates this relationship, showing that a 10% rise in inflation could reduce unemployment by 1%, whereas an 8% fall in inflation might increase unemployment by 2%.

2.3 Empirical Literature

Numerous studies have explored the relationship between unemployment, inflation, and economic growth using various econometric techniques and data spanning different periods and regions. For instance, Ekpeyong (2023) and Nnachi & Ugochukwu (2023) highlighted mixed impacts of inflation and unemployment on economic growth in Nigeria, with the latter showing a negative relationship between unemployment and growth and a positive one for inflation. But, Dodo and Idris (2022), using nonlinear ARDL, found inflation negatively influenced unemployment, while Odo et al. (2017) identified both short- and long-term impacts of inflation on unemployment through VECM analysis.

Omitogun and Longe (2017) emphasized that unemployment and inflation significantly influence growth patterns, necessitating focused economic policies to mitigate downturns. In a more detailed study, Ademola et al. (2016) found a long-term relationship among the variables but reported positive correlations between unemployment and economic growth, challenging Okun's Law and the Phillips Curve. Moreover, While, Mohammed et al. (2015) revealed inflation positively correlates with economic growth, while unemployment negatively impacts growth, Al-Zeaud (2014) found no causal relationship between inflation and unemployment in

Jordan, underscoring the need for targeted policies that address one without aggravating the other. These studies collectively emphasize the complex interplay of unemployment, inflation, and economic growth, with mixed findings influenced by regional and methodological differences. The need for tailored, evidence-based policy recommendations remains a recurring theme.

3.0 Research Methodology

This study used annual time series data on Real Gross Domestic Product (RGDP) for economic growth to stand as the dependent variable while unemployment and inflation rates were used as explanatory variables. The study covers period from 1980 to 2022. The study utilized secondary data sourced from the Central Bank of Nigeria (CBN) statistical bulletins and the National Bureau of Statistics (NBS). Economic modeling was used to quantify the relationship between unemployment, inflation, and economic growth. The model was specified as follows:

$$GDP_t = F(UNEMP_t, INFL_t) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

The Log-Linearized Model is given as: $LRGDP_t = \beta_0 + \beta_1 LUEMP_t + \beta_2 LINFL_t + \mu_t)$ …….2

Where: LRGDP = Logarithm of RGDPt , $LINFL_t$ = Logarithm of LINFLt , β_0 = Intercept

$\beta_1 and \beta_2$ = coeffiients of unemployment and inflation μ_t = error term

3.2 Methods of Estimation

The study utilized the Autoregressive Distributed Lag Model (ARDL) and **Granger Causality Test** to estimate regression coefficients and determines the direction of causality between variables respectively. The ARDL approach captures both short-run dynamics and long-run relationships. The error term (ε_t) included variables not quantified in the model. The regression equation for ARDL was specified as:

$$\Delta LRGDP_t = \beta_0 + \sum_{i=1}^{n} \alpha_i LRGDP_{t-1} + \sum_{i=1}^{n} \alpha_i b_i INFL_{t-1} + \sum_{i=1}^{n} c_i UNEMP_{t-1} + l_i LRGDP_{t-1} + l_2 INF_{t-1} + l_3 LUNEM_{t-1} + \in_t \quad \text{..... ....} \quad 3$$

Where; β0= the intercept while; $\propto_i$, b_i, c_i are the slopes (short run coefficients) of the ARDL model. They are the parameters capturing the short run dynamics. Thus, in the ARDL, the error correction model (ECM) is denoted by $\beta_0 + \sum_{i=11}^{n} \alpha_i LRGDP_{t-1} + \sum_{i=11}^{n} \alpha_i b_i INFL_{t-1} + \sum_{i=11}^{n} c_i UNEMP_{t-1}$ in equation 3. The long run part is denoted by $l_i LRGDP_{t-1} + l_2 INF_{t-1} + l_3 LUNEM_{t-1}$ representing long run relationship. Where; $l_1, l_2, and\ l_3$ are the long run coefficients and ε_t = the error term

Pre Estimation tests were conducted using Unit Root and Multicollinearity Tests whereas Normality and Stability test (using CUSUM and CUSUMSQ) were conducted as post estimation tests. This methodology ensured a robust analysis of the relationships between unemployment, inflation, and economic growth.

3.3 A priori expectations:

$\beta_0 > 0$, and $\beta_2 < 0$, i.e. the more the unemployment rate the less the growth rate of RGDP since more factors of production especially labour will not be engaged in production thereby reducing output and hence RGDP.

3. Results and Discussion

Data from the World Bank's World Development Indicators, Central Bank of Nigeria Statistical Bulletin and Annual Records (1980–2022) were applied to the model developed for this study.

4.1 Unit Root Test

In order to find out whether the variables in the model are stationary, Augumented Dickey-Fuller (ADF) unit root test was conducted as shown in table 1 below:

Table 1: Unit Root test results using the ADF Procedure.

	Critical Values	
1%	-3.6496	-3.6576
5%	-2.955	-2.9591

Variables	**Level I(0)**	**1st Diff I(1)**	**Order of integration**
RGDP	-6.553405*		I(0)
INF	-1.864150	-5.357948*	I(1)
UNEM	-2.279399	-4.875902*	I(1)

(*)(**)(***) indicates significance at 1%, 5%, 10% level respectively
Source: Author's computation using E-View 10

The Augmented Dickey-Fuller (ADF) test revealed mixed stationarity levels showing that RGDP is stationary at level (I(0)) while INF and UNEM become stationary at the first difference (I(1)).

4.2 Multicollinearity Test

Pair wise correlation matrix was used to check for the problem of multicollinearity among the independent or explanatory variables.

Table 2: Correlation Metrics

	GDP	INF	UNEM
GDP	1.000000		
INF	-0.354561	1.000000	
UNEM	0.425729	0.153984	1.000000

Source: Author's computation using E-View 10

From the result in table 4.2 above, the correlations between the variables are less than 0.8. Hence, we conclude that there is no problem of multicollinearity.

4.3 ARDL Long Run Form and Bounds Test

The F-Bounds Test was used to check whether there is a long-run relationship between the dependent variable (RGDP) and the independent variables (inflation and unemployment).

Table 3 ARDL Bounds Test

Test Statistic	**Value**	**Level of Significance**	**I(0)**	**I(1)**

F-statistic	3.968802	10%	2.63	3.35
		5%	3.1	3.87
		1%	4.13	5

Source: Author's computation using E-View 10

The results in table 3 show that The F-statistic (3.968802) is above the upper 10% and 5% critical bounds, suggesting evidence of a long-run relationship between RGDP, inflation, and unemployment.

4.4 Method of Data Estimation

The study used ARDL model for estimation. This technique was used to examine the effects of inflation and unemployment on economic growth in Nigeria?

4.4.1 ARDL Estimated results (Long Run)

Table 4: ARDL Estimated results (Long Run)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RGDP(-1)	1.521394	0.146975	10.35138	0.0000
RGDP(-2)	-0.533094	0.150544	-3.541122	0.0014
INF	-2.255795	66.52168	-0.033911	0.9732
INF(-1)	106.2629	66.82203	1.590238	0.1226
UNEM	-8.246958	49.28913	-0.167318	0.8683
UNEM(-1)	-115.7490	49.88647	-2.320248	0.0276
C	-1122.078	1072.903	-1.045833	0.3043
R-squared	0.997825	DW stat	2.024347	
Adjusted R-squared	0.997375	F-statistic	2217.693	

Source: Author's computation using E-View 10

Table 4 shows the estimated results of the ARDL. The dependent variable is the RGDP. From the results, RGDP lags were significant, showing persistence in GDP growth but diminishing effects over time. Inflation and unemployment were mostly insignificant, with only lagged unemployment showing a significant negative impact on GDP. Model diagnostics: R-squared (0.9978) and Durbin-Watson (2.02) suggest a strong fit and no autocorrelation.

4.4.2 ARDL Error Correction Regression

The ARDL Error Correction Regression output provides insight into the short- and long-term relationships between real GDP (RGDP) and its determinants (inflation and unemployment). This is shown in table 5 below:

Table 5: Error Correction Regression (ECM)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RGDP(-1))	0.533094	0.122520	4.351088	0.0002
D(INF)	-2.255795	45.61337	-0.049455	0.9609
D(UNEM)	-8.246958	44.90189	-0.183666	0.8556
CointEq(-1)*	-0.011699	0.003347	-3.495843	0.0015

Source: Author's computation using E-View 10

Table 5 reports short-run coefficients that describe how changes in inflation and unemployment affect changes in RGDP. D(RGDP(-1))**:** This is the lagged difference of RGDP, showing how past changes in RGDP impact the current change. The error correction term (-0.0117, p=0.0015) confirmed a long-run equilibrium relationship, with about 1.17% of disequilibrium corrected per period. Short-run effects of inflation and any deviation from this equilibrium is corrected over time as indicated by the significant error correction term (seen in the ECM regression earlier). The coefficient for the error correction term is -0.0117 and is statistically significant (p = 0.0015). This negative and significant value suggests that there is a long-run equilibrium relationship between RGDP and the independent variables (inflation and unemployment), and about 1.17% of the disequilibrium is corrected each period. In other words, RGDP adjusts slowly toward its long-run equilibrium.

4.4.3 Granger Causality

The study used the Pairwise Granger Causality Tests for sample ranging from 1980 to 2021 to determine the causal relationship between unemployment, inflation and economic growth in Nigeria.

Table 6: Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic		Prob.
INF does not Granger Cause RGDP	36	0.88936		0.4211
RGDP does not Granger Cause INF		2.74840		
			0.0796	
UNEM does not Granger Cause	36	4.59091		0.0179
RGDP		1.63044		
RGDP does not Granger Cause UNEM			0.2122	

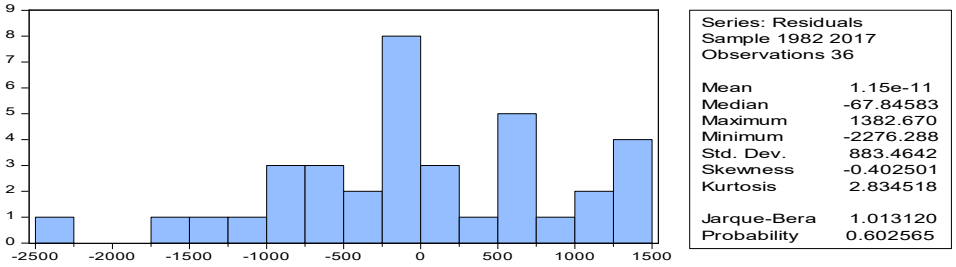
Source: Author's computation using E-View 10

In table 6, Pairwise Granger Causality Test results examine the causal relationship between inflation (INF) and real GDP (RGDP) over the period from 1980 to 2021 with a lag of 2 years. From the table, Inflation does not Granger-cause RGDP(p=0.4211), but weak evidence suggests RGDP might Granger-cause inflation at a 10% significance level (p=0.0796). Unemployment Granger-causes RGDP (p=0.0179), but RGDP does not Granger-cause unemployment (0.2122) implying that, the presence of a unidirectional causality from unemployment to RGDP (Economic Growth).

4.5 Post Diagnostic Test

4.5.1 Normality Test

The histogram below shows the distribution of residuals (the differences between the observed and predicted values of the dependent variable).



Source: Author's computation using E-View 10
Figure 1: Normality Test

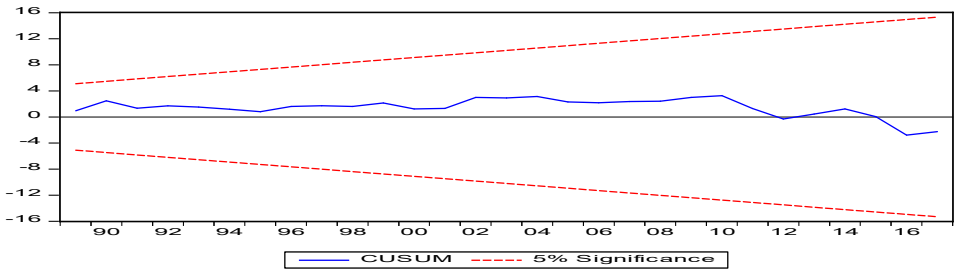
In figure 1 above, Residuals displayed an approximately normal distribution with no extreme outliers. Skewness (-0.4025) and kurtosis (2.8345) values were close to those of a normal

distribution. The Jarque-Bera test (p=0.6026) confirmed the residuals were normally distributed.

4.5.2 Stability Test

Cummulative Sum (CUSUM) and Cummulative Sum of Square (CUSUMSQ)

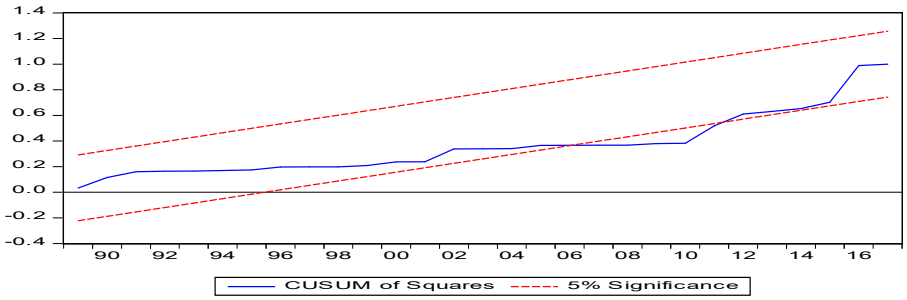
For the stability of the model, Cummulative Sum (CUSUM) and Cummulative Sum of square (CUSUMSQ) were employed by the study. The CUSUM (Cumulative Sum) plot along with the 5% significance boundaries, which is typically used to test the stability of the coefficients in a time series model as shown in figure 2:



Source: Author's computation using E-View 10

Figure 2: Cummulative Sum (CUSUM)

The CUSUM plot, shown in Figure 2, assesses the stability of the model's coefficients by tracking the cumulative sum of residuals over time. The CUSUM line stayed within the 5% significance boundaries throughout the sample period (1990–2017), indicating that the model's coefficients were stable. Although a slight drop in the CUSUM line was observed toward the end of the sample period (2015–2017), it did not cross the significance boundaries, suggesting no significant structural breaks or parameter instability.



Source: Author's computation using E-View 10

Figure 3: Cummulative Sum of Square (CUSUMSQ)

The CUSUMSQ plot, presented in Figure 3, evaluates the stability of the residual variance by examining the cumulative sum of squared residuals. The CUSUMSQ line remained within the 5% significance boundaries, indicating that the residual variance was stable throughout the sample period. However, from 2010 onward, the CUSUMSQ line showed an upward trend, suggesting increased residual volatility in the later years of the sample. Despite this, the trend did not breach the critical boundaries, implying no significant structural instability.

4.6 Discussion

The study explores the relationships among real GDP (RGDP), inflation, and unemployment, aligning its findings with previous research. For instance, RGDP exhibits high persistence, with positive effects from the first lag and negative correction from the second, reflecting typical economic cycles. Current inflation's insignificance ($p = 0.9732$) indicates negligible short-term GDP effects, particularly at moderate levels, aligning with Ekpeyong (2023) and Dodo & Idris (2022), who found inflation's long-term impacts more pronounced when persistent or high. The significant negative coefficient for lagged unemployment (UNEM(-1), $p = 0.0276$) confirms an inverse relationship with GDP, consistent with Okun's Law and supported by Basher (2022), who linked higher unemployment to reduced GDP growth.

Short-term changes in inflation (D(INF), $p = 0.9609$) and unemployment (D(UNEM), $p = 0.8556$) are insignificant, highlighting GDP's greater sensitivity to structural changes than

short-term volatility. The error correction term (CointEq(-1), p = 0.0015) confirms a long-run equilibrium among RGDP, inflation, and unemployment, with 1.17% of disequilibrium corrected per period. This challenges Nnachi & Ugochukwu (2023) as this study suggested slower correction mechanisms.

Granger causality tests show no strong causality between inflation and RGDP but suggest weak evidence of RGDP Granger-causing inflation at a 10% significance level. Unidirectional causality from unemployment to GDP supports theories emphasizing unemployment's predictive role over GDP. Overall, the findings align with economic theories on GDP persistence, the inverse unemployment-GDP relationship, and long-run equilibrium. However, they reveal limited short-term impacts of inflation and unemployment on GDP and weak causality between inflation and GDP, providing nuanced insights.

4. Conclusion and Recommendations

The study highlights the dynamic interplay between economic growth (RGDP), inflation, and unemployment in Nigeria. Findings reveal that past values of RGDP strongly influence current growth, reflecting economic cycle dynamics. While moderate inflation has negligible short-term effects on RGDP, its long-term influence is more pronounced under persistent or high inflation. Unemployment significantly impacts GDP in the short term, consistent with Okun's Law (1962) emphasizing the importance of labour market conditions. Additionally, GDP is more responsive to structural changes than short-term economic shocks, with a significant error correction term confirming gradual equilibrium adjustments among the variables.

Based on the findings of this study, recommendations aiming to leverage the findings of the study, encouraging a long-term approach to economic growth that addresses structural factors, unemployment, and stable inflation management to foster a resilient economy have been proffered as follows:

i. Policymakers should focus on reducing unemployment through targeted job creation programs, skills development initiatives and Incentives for industries with high employment potential. Effective labor market policies can yield sustained positive effects on GDP by addressing the significant impact of past unemployment on present output.

ii. Monetary authorities should prioritize steady, low inflation over aggressive short-term adjustments. This can be done by establishing predictable and gradual inflation targets to foster a stable economic environment conducive to growth. Balance inflation management strategies with long-term GDP growth objectives.

iii. Policymakers should focus on structural reforms to drive long-term growth, including: Investments in infrastructure, education, and technology to boost productivity and resilience as well as building policies that allow gradual responses to economic shocks:

iv. Since unemployment causes changes in GDP, labor market trends should be closely monitored for forecasting economic conditions. Thus, preemptive policies to counteract potential economic slowdowns or encourage growth based on unemployment data trends should be developed.

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