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ASSESSING THE IMPACT OF INFLATION, UNEMPLOYMENT ON POVERTY AND HUMAN DEVELOPMENT INDEX IN NIGERIA

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ABSTRACT

This study carefully assessed the impact of inflation and unemployment on poverty and the human development index in Nigeria using an annual dataset from 1991 to 2023. A vector autoregression (VAR) model was used for data analysis. The findings of the analysis indicate that the unit root test for the variables at first difference was stationary at the 5% critical value, the Johansen cointegration test for both trace and maximum eigenvalue had one cointegrating equation, meaning that there is a short- and long-term equilibrium relationship among the variables, while the optimal lag selection criteria showed a lag length of order one. Hence, these results met the requirements for using vector error correction (VEC) model estimation, given that the CUSUM test also indicates the model residual parameters' stability. Meanwhile, the impulse response functions revealed that a unit shock to inflation increases unemployment and poverty, as well as reduces government spending on human development through education and health. Also, the forecast variance decomposition showed the influence of the variability of inflation among variables, demonstrating its negative impact on various facets of the economy, leading to high rates of unemployment and poverty as it hampers human development. In view of this, the empirical study submits that researchers, policymakers, and development practitioners should design effective policies and programs that will help in reducing the effect of inflation and unemployment rates on poverty and the human development index through poverty reduction intervention programs aimed at fostering sustainable economic growth and human development in Nigeria.

Keywords: VAR, Inflation, Unemployment, Poverty, Human Development Index

INTRODUCTION

The 21st-century economy aims to reduce inflation unemployment and poverty while improving human capital development. Smith, J. (2023), highlighted that inflation rates of 2–6 percent have positive impacts on incomes, consumption, investment, creativity, innovation, and output while the double-digit inflation reduces consumer purchasing power resulting to severe economic consequences, causing alarm among economic players and the government. Mohammad *et al.* (2023), investigates how high inflation hinders Nigeria's human development index and economy.

Since 1970s, inflation has been of significant concern in both developed and emerging economies, especially in Nigeria. As an economic phenomenon, inflation has impact on business and government expenditure operations such that it can negatively affect public finances, reduce the purchasing power of money, and encourage a high rate of unemployment as it lowers government expenditure and the standard of living of the populace.

An education-based index, a long and healthy life, and a reasonable standard of living are the important dimensions of human development that the human development index (HDI) measures and uses as a gauge in assessing the quality of human existence. The Human Development Report (HDR) of the annual report was published by the United Nations Development Program (UNDP) in 1990. Accordingly, the UNDP entitlements that the Human Development Indicator (HDI) is a composite indicator made up of three supposedly basic aspects of human development which serve as indicators. (1) Health: life expectancy at birth is used to measure age; (2) Education: mean years of schooling for adults over 25 and expected years of schooling for children entering school are used to measure knowledge; and (3) Economics: gross national income per capita (GNIPC) is used to measure decent living standards.

Nigeria's economic crisis is consistent and largely due to high inflation rates, creating insecurity and likewise discourage investment and saving. It also poses a significant threat to unemployment, poverty reduction, government expenditure, human development, and economic stability. Changes in the rate of inflation can greatly results to the vulnerability of the economy. These relationships between inflation, unemployment, human development and poverty are exact, and their interactions are likening to worsen poverty. Therefore, understanding these interactions is vital for formulating effective policies that can drive the economy and the socio-economic wellbeing of Nigeria. This study aims to provide an empirical analysis of the impact of inflation, unemployment on poverty and human development index in Nigeria.

Meanwhile, the contemporary literature reviews highlight of the global academic community's efforts in examining the impact of high rates of inflation, unemployment and poverty and a declining human development index from various viewpoints are presented as follows:

Yolanda (2017), examined the impact of Indonesian bank rates, foreign exchange rates, money supply, oil prices, and gold prices on inflation and its impact on human development index and poverty. The study used secondary data and multiple regression analyses. Results disclosed significant positive variables affecting the Indonesian rate, foreign exchange rates, money supply, oil price, and gold prices simultaneously, while the exchange rate variable did not affect inflation. Similarly, the impact of inflation on human development index and poverty was significant and positive for both model 2 and 3 respectively.

Dauda &Iwegbu (2022), analyzed Nigeria's human development response to macroeconomic shocks using Sen's capabilities approach. They established education, health, investment quality, technology, and government policies to be determinants of development. Structural vector autoregression was used to estimate responses to inflation, interest rate, government capital expenditure, exchange rate, current account balance, and savings shocks.

Aderounmu *et al.,* (2021) studied on Nigeria's poverty drivers and development, using data from the World Development Indicators, establish that unemployment increases poverty in the short run, likewise inflation reduces in the short run. This suggests that unemployment causes poverty, while inflation boosts public resources for economic growth and poverty reduction.

Obayori and Akpan (2022) investigated the impact of government capital and recurrent expenditure in the education sector on Nigeria's human development index (HDI) from 1990–2020. Data was collected from CBN statistical bulletins and the World Development Index. The study established that government capital expenditure positively and significantly impacts HDI, while recurrent expenditure has a positive but insignificant impact. Hence, the study concluded that increased capital spending in the education sector leads to improved HDI standards and literacy levels.

Olawunmi and Adedayo (2017), examined the impact of unemployment on Nigeria's economic growth in the 21st century using a vector autoregressive (VAR) approach. The research used various tests and analyses to analyze the data. The findings suggest that unemployment's impact varies over time, with government efforts aiming to eradicate it. The study aims to inform researchers about the VAR model, encourage academics to understand its dynamics, and provide guidance to the government on policies to address unemployment and inflation.

Musa. and Asare (2013), examined the long- and short-run effects of monetary and fiscal policies on Nigeria's economic growth using a vector error correction (VEC) model. The results showed that money supply and the minimum rediscount rate had the most significant long-term effects on the economy, while fiscal policy had a lower impact with about 35% speed of adjustment to short-run disequilibrium to improved Nigeria's economic growth.

Cüneyt. &Jülide (2022) investigated the impact of inflation on human development and poverty in Turkey using ARDL data of 1990–202. The study establish that inflation and human development are co-integrated and will move together in the long run. Given that, the long-run coefficient estimation showed a negative and positive relationship between inflation and poverty, respectively. However, none of the models had difficulties in terms of autocorrelation, heterosckedasticity, parameter instability.

Musa *et al.,* (2013) examined the impact of monetary-fiscal policies on Nigeria's price and output growth. Results revealed that policy variables like money supply and government revenue had a more positive impact on prices and economic growth in Nigeria, however with some lag. The study also establish that economic activity was dominated by its own dynamics.

MATERIALS AND METHODS

This study utilized Sims, C. A. (1980) vector autoregression (VAR) as an econometric model for the analysis of multivariate time series variables using a single model. Since its introduction, VAR has become a primary focus and widely used technique for time-series modeling, an effective and adaptable user-friendly method for modeling joint dynamics and causal relationships among macroeconomic variables. It treats every variable as endogenous and all the endogenous variables' lagged terms as exogenous. Meaning that, every dependent variable depends on various combinations of independent variables and the error term.

Model Specification

The study uses a four-variable VAR model to estimate the impact of high inflation, unemployment, on poverty and human development index in Nigeria using the basic VAR(p) process as a basis.

$$y_t = \mu + \phi D_t + A_1 y_{t-1} + \ldots + A_p y_{t-p} + u_t \quad (1)$$

where y_t is the set of k time series variables $y_t = (y_{1t}, y_{2t}, \ldots, y_{kt})'$, A_i'sare $(k \times k)$ coefficient matrices, μ is the vector of deterministic terms , D_t is the vector of nonstochastic variables such as economic intervention and seasonal dummies and $u_t = (u_{1t}, u_{2t}, \ldots, u_{kt})'$ is an unobservable error term. The equation (1) model is suitable for variables with stochastic trends and not for cointegration relations. Therefore, our models based on the variables of interest are formulated as follows.

$$INF_t = a_{INF} + a_{41} INF_{t-1} + a_{42} UNEMP_t + a_{43} HDI_t + a_{44} POV_t + u_{INF} \quad (2a)$$

$$UNEMP_t = a_{UNEMP} + a_{11} UNEMP_{t-1} + a_{12} INF_t + a_{13} HDI_t + a_{14} POV_t + u_{UNEMP} \quad (2b)$$

$$HDI_t = a_{HDI} + a_{31} HDI_{t-1} + a_{32} INF_t + a_{33} UNEMP_t + a_{34} POV_t + u_{HDI} \quad (2c)$$

$$POV_t = a_{POV} + a_{31} POV_{t-1} + a_{32} INF_t + a_{33} UNEMP_t + a_{34} HDI_t + u_{POV} \quad (2d)$$

Or following the matrix representation, the regression equation of the multivariate outcome is of the form:

$$\begin{bmatrix} INF_t \\ UNEMP_t \\ HDI_t \\ POV_t \end{bmatrix} = \begin{bmatrix} a_{INF} \\ a_{UNEMP} \\ a_{HDI} \\ a_{POV} \end{bmatrix} + \begin{bmatrix} a_{11} & a_{12} & a_{13} & a_{14} \\ a_{21} & a_{22} & a_{23} & a_{24} \\ a_{31} & a_{32} & a_{33} & a_{34} \\ a_{41} & a_{42} & a_{43} & a_{44} \end{bmatrix} \begin{bmatrix} INF_{t-1} \\ UNEMP_{t-1} \\ HDI_{t-1} \\ POV_{t-1} \end{bmatrix} + \begin{bmatrix} u_{INF} \\ u_{UNEMP} \\ u_{HDI} \\ u_{POV} \end{bmatrix} \quad (3)$$

Where $a_0 = (a_{INF} \quad a_{UNEMP} \quad a_{HDI} \quad a_{POV})$ is the continuous term, $a_i = (a_1 \quad a_2 \quad a_3 \quad a_4)$ are the coefficients to be estimated and u_t is the error term. HDI is the human development index, INF is the inflation, UNEMP is the unemployment and POV is the poverty.

Vector Error Correction (VEC) Model

Vector error correction (VEC) models are a special application of vector autoregression (VAR) models, which introduce the error correction terms into VAR models. They are used when variables in a system have a long-term relationship and are cointegrated. The VEC models are specified in terms of differences to account for short-run behavior as well as the error correction terms given that the cointegrating equations account for the short-run adjustments and long-run cointegrating relationships. Thus the general underlying form of VEC models is specified below:

$$\Delta y_t = \Pi y_{t-1} + \Gamma_1 \Delta y_{t-1} + \ldots + \Gamma_{p-1} \Delta y_{t-p+1} + \mu + \phi D_t + u_t \quad (4)$$

Where $\Pi = \alpha \beta'$

In the VEC model, consideration are based on the $(n \times r)$ matrix of cointegrating vectors β, which quantify the "long-run" relationships between variables in the system, and the $(n \times r)$ matrix of error-correction adjustment coefficients α, which load deviations from the equilibrium (that is, Πy_{t-1}) to Δy_t for correction. The Γ_i coefficients in equation (4) estimate the short-run effects of shocks on Δy_t allows the short-run and long-run responses to differ. The term $\Pi y_{t-1}$is the only one that includes $I(1)$ variables. Hence, Πy_{t-1}must also be $\mathrm{I}(0)$ which encompasses the cointegrating relations. The$\Gamma_{js}(j = 1,2,\ldots,p-1)$ are often stated as the short-run or short-term parameters, and Πy_{t-1} is occasionally called the long-run or long-term part.

Unit Root Test

Analysis of a time series data set requires testing for its stationarity properties. As such, a range of unit root tests were employed based on Augmented Dickey Fuller (ADF) tests and Phillips-Perron (PP) tests to check if each data series observe is integrated and stationary.

CUSUM Test of Ordinary Least Square Residuals

The CUSUM test was first developed by Brown *et al.*, in 1975 as a method for evaluating the null hypothesis of cointegration in statistics and econometrics to assess the structural stability of residuals in a cointegrating regressions. The test, was further expanded to include OLS residuals by Ploberger and Kramer in 1992, to identify structural changes and data breakpoints. By modifying the OLS regression with semiparametric corrections for serial correlation and endogeneity. To this effect, a valid cointegrating CUSUM test is obtained by highlighting the structural changes and data breakpoints in statistical analysis.

Data used for the Study

The study employs four datasets (inflation, unemployment, poverty, and human development index) from Central Bank of Nigeria Statistical Bulletin of 2019 and 2022 on Public Finance (www.cbn.org.ng), World Bank Development Indicators (data.worldbank.org), and the Global Economy.com (www.theglobaleconomy.com). The data on inflation is based on the consumer price index (CPI), poverty is based on the poverty headcount, and the human development index is based on government recurrent expenditure on education and health. The analysis uses VAR approach and Eviews9 as analytic software, with the variables measured in percentages except for HDI in billions of naira.

RESULTS AND DISCUSSION

In this study, we employ a Vector Autoregression (VAR) model to analyze the dynamic relationships and the impact of inflation, unemployment on poverty and human development index. The VAR model is particularly well-suited for this analysis as it allows for the endogenous interaction between multiple time series variables without requiring a strong and priori assumptions about causal relationships while offering insights into their interdependencies and potential policy implications.

Descriptive Statistics

These statistics provide insights into the average values, variability, and distributional characteristics of the data, which are crucial for understanding the initial properties before proceeding to further analyses.

Table 1: Individual Sample Descriptive Statistics

	INF	GEXPE	GEXPH	UNEMP	POV
Mean	18.60878	250.8998	157.8089	4.175625	50.54879
Median	13.00697	150.7793	90.20000	3.900000	46.30000
Maximum	72.83550	767.2500	630.6300	6.000000	88.00000
Minimum	5.388008	0.291298	0.150161	3.700000	30.90000
Std. Dev.	16.02941	247.5089	170.0741	0.668102	14.65819
Skewness	2.143502	0.773824	1.040127	1.793194	0.888910
Kurtosis	6.664349	2.276252	3.155610	4.861925	3.093863
Jarque-Bera	43.73305	4.013658	5.983551	21.77192	4.358002
Probability	0.000000	0.134414	0.050198	0.000019	0.113155
Sum	614.0896	8279.692	5207.694	133.6200	1668.110
Sum Sq. Dev.	8222.139	1960341.	925606.9	13.83719	6875.600
Observations	33	33	33	32	33

Table 1 displays the mean values of INF, UNEMP, GEXPE, GEXPH, and POV with a right-skewed distribution of the variables, exhibiting a large range in the maximum and lowest values. Despite the insignificantly reduced median values compared to the mean, the data reveal an asymmetric distribution and a large fluctuation non the maximum and lowest values. The study demonstrated that UNEMP 0.67, POV 14.66, and INF 16.03 had various degrees of dispersion around the means, with UNEMP having the lowest standard deviation and INF having the greatest. However, in the Jarque-Bera tests for normalcy, revealing tendencies that warrant additional exploration.

Unit Root Test

To avoid measurement error and misleading findings, it's necessary to establish the time series characteristics of all variables to be employed in VAR/VEC model estimation. Tables 2 and 3 give the results of the Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) unit root tests on INF, GEXPE, GEXPH, UNEMP, and POV.

Table 2: ADF & PP Test at Level with 5% critical value

Variables	Intercept				Intercept & Trend			
	ADF Test		PP Test		ADF Test		PP Test	
	t-statistics	Prob.	t-statistics	Prob.	t-statistics	Prob.	t-statistics	Prob.
INF	-2.103582	0.2446	-2.362796	0.1598	-2.411054	0.3673	-2.769583	0.2180
GEXPE	1.367953	0.9984	2.916946	1.0000	-1.429753	0.8323	-1.033584	0.9247
GEXPH	3.878271	1.0000	7.825035	1.0000	-0.483799	0.9792	3.464061	1.0000
UNEMP	-1.759797	0.3902	0.982780	0.9953	-0,572695	0.9715	-0.274113	0.9879
POV	-2.065515	0.2591	-1.904714	0.3260	-3.045124	0.1363	-3.045124	0.1363
	5% critical value -2.967767		5% critical value -2.957110		5% critical value -3.557759		5% critical value -3.557759	

Table 2 displays the results of ADF and PP unit root tests for INF, GEXPE, GEXPH, UNEMP, and POV. The findings fail to accept the null hypothesis due to the considerable evidence that our P-value for both intercept and trend with intercept above 5% crucial levels, demonstrating the presence of a unit root in the variables.

Table 3: ADF & PP Test at 1st Difference with 5% critical value

Variables	Intercept				Intercept & Trend			
	ADF Test		PP Test		ADF Test		PP Test	
	t-statistics	Prob.	t-statistics	Prob.	t-statistics	Prob.	t-statistics	Prob.
INF	-5.443252	0.0001	-5.852067	0.0000	-5.464354	0.0007	-8.647221	0.0000
GEXPE	-4.693655	0.0007	-4.632545	0.0008	-5.181375	0.0011	-8.820712	0.0000
GEXPH	-4.813116	0.0005	-4.709985	0.0007	-5.433698	0.0007	-7.141308	0.0000
UNEMP	-3.439480	0.0194	-3.458963	0.0165	-3.978213	0.0240	-3.725618	0.0359
POV	-7.854877	0.0000	-8.094978	0.0000	-7.723473	0.0000	-7.965453	0.0000
	5% critical value -2.991878		5% critical value -2.960411		5% critical value -3.612199		5% critical value -3.568379	

Table 3 displays the results of ADF and PP unit root tests for intercept-only and intercept, together with trend models for INF, GEXPE, GEXPH, UNEMP, and POV. The data demonstrated that all variables were stationary, with a significant P-value of a smaller amount than the 5% critical threshold. As a result, the unit root accepts the alternative hypothesis in order to ensure the estimate's robustness.

Cointegration Test

The cointegration test is a crucial tool in time series analysis, used in economics and finance to identify and model long-term equilibrium relationships between non-stationary variables.

Table 4: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.714799	70.01824	69.81889	0.0482
At most 1	0.433914	33.63597	47.85613	0.5218
At most 2	0.344656	17.13473	29.79707	0.6301
At most 3	0.131856	4.879465	15.49471	0.8215
At most 4	0.026502	0.778916	3.841466	0.3775

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 4 shows the result of the unconstrained cointegration rank test (Trace). The test demonstrates one cointegrating equation at the 5% critical value, with a p-value of 0.0482 and a trace statistic of 70.01824. Hence, we fail to accept the null hypothesis at the 5% significance level, indicating that the trace test revealed a long-term effect.

Table 5: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.714799	36.38227	33.87687	0.0246
At most 1	0.433914	16.50125	27.58434	0.6229
At most 2	0.344656	12.25526	21.13162	0.5227
At most 3	0.131856	4.100549	14.26460	0.8486
At most 4	0.026502	0.778916	3.841466	0.3775

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 5 presents the outcome of the unrestricted cointegration rank test using the Maximum Eigenvalue criterion. The 36.38227 maximum eigenvalue statistic at 5% significant level indicates a long-term relationship between variables, consistent with the trace test's results of at least one cointegration equation.

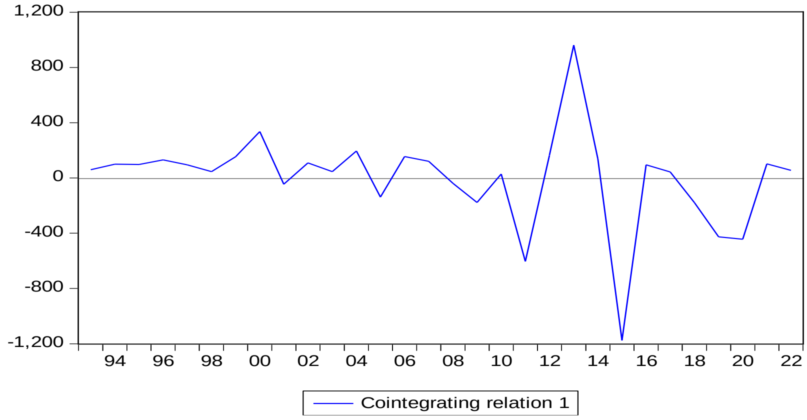

Figure 1: Graph of Cointegrating Relation

In view of the Johansen co-integration test findings, Figure 1 illustrates the graphical trend representation of the trace statistic and maximum eigenvalue, each with one co-integrating component, necessitating the conclusion that there is a long-term link between the variables. Hence, fitting into a VAR/VEC model for feasible estimate since the cointegrating equation is present within an acceptable range of unit root tests at orders of one.

Lag Length Selection Criteria

In analyzing time series models involving lagged variables, selecting the most fitting lag length is essential for model accuracy and robustness.

Table 6: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-579.6127	NA	5.81e+10	38.97418	39.20771	39.04889
1	-475.8612	166.0024*	3.13e+08*	33.72408*	35.12528*	34.17233*
2	-457.5661	23.17376	5.70e+08	34.17107	36.73994	34.99287

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Table 6: present the optimal lag length selection criterial for the VAR/VEC model estimation. The findings identified the best lag order for the model variables of lag order one based on the AIC optimal lag selection criteria because it demonstrates the most appropriate optimal lag length criteria for the VAR/VEC model estimation.

VAR Model Estimation

The vector error correction (VEC) model is a multivariate series model used to study long-term connections among variables and their short-term dynamics. Its estimations are unique and effective under identical and independent normalcy assumptions. The VEC model covers a range of measures, including the R-square of 0.450460 and the modified R-square of 0.094875. The AIC of 7.786791 shows a better match given the model's complexity and goodness of fit, while the 10.77842 standard deviation helps discover mistakes in the coefficient estimations, showing that the chance of accuracy falls with higher standard errors.

Cointegrating Equation

D(POV) = 1.000000 + 0.062027*INF(-1) - 1.967978*GEXPE(-1) + 3.378784*GEXPH(-1) - 67.29391*UNEMP(-1) + 206.0023 (5)

The cointegrating equation (5) shows a long-term relationship between variables with t-statistics greater than the p-value, as shown by the coefficients of [0.22822] and [-4.09799].

Error Correction Equation Estimate.

D(POV) = 0.296834 + 0.014415*D(POV(-1)) + 0.062300*INF(-1) – 0.222623*GEXPE(-1) + 0.549562*GEXPH(-1) – 5.073092*UNEMP(-1) – 0.011655*D(POV(-2)) - 0.088973*D(INF(-2)) – 0.271449*D(GEXPE(-2)) + 0.432173*D(GEXPH(-2)) – 15.12920*D(UNEMP(-2)) – 2.308200 (6)

The error correction terms captured short-term dynamics and modifications to the long-term equilibrium, resulting in a coefficient value of 0.2968. Demonstrating that the long-run connection between the variables diverged is rectified at a rate of 29.68% over the periods, as the initial difference of each variable is regressed on delayed data.

CUSUM Test of OLS Residuals

The parameter stability test employs the CUSUM and CUSUM square tests to assess if the vector error correction model of the parameters is stable assuming that the statistical trend curve falls within the 5% significance bounds.

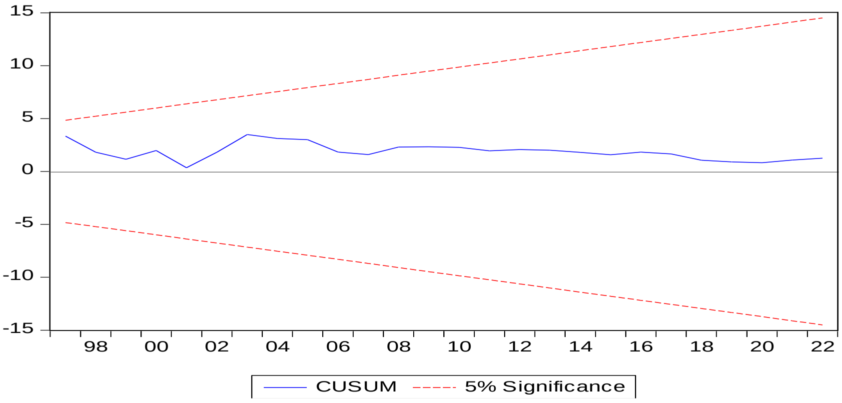

Figure 2: CUSUM Test

Figure 2 shows a CUSUM test statistical trend curve of a stable residual variances, as the cumulative sum test of recursive residuals demonstrates systematic changes in the regression coefficients within the 5% significance limits.

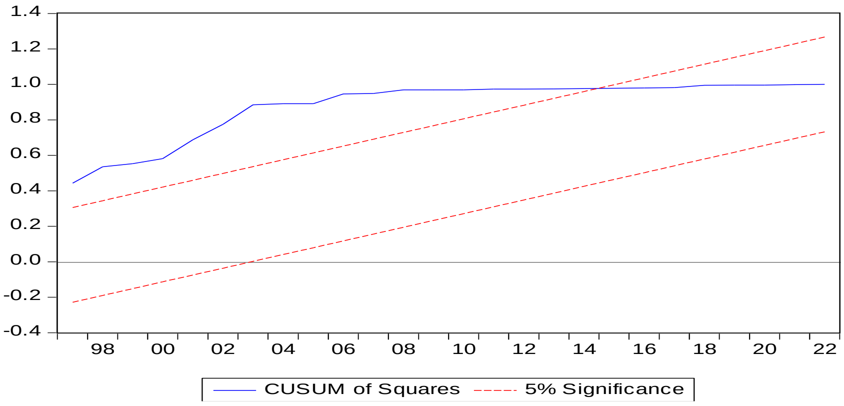

Figure 3: CUSUM of Squares Test

Figure 3 presents a statistical trend curve for the cumulative sum of squares test of a recursive coefficients that is outside of 5% significance limits, indicating instability of the regression coefficients.

Impulse Response Function

Impulse Response Functions (IRFs) are graphical representations that illustrate the response of endogenous variables to a shock over period, often including confidence intervals.

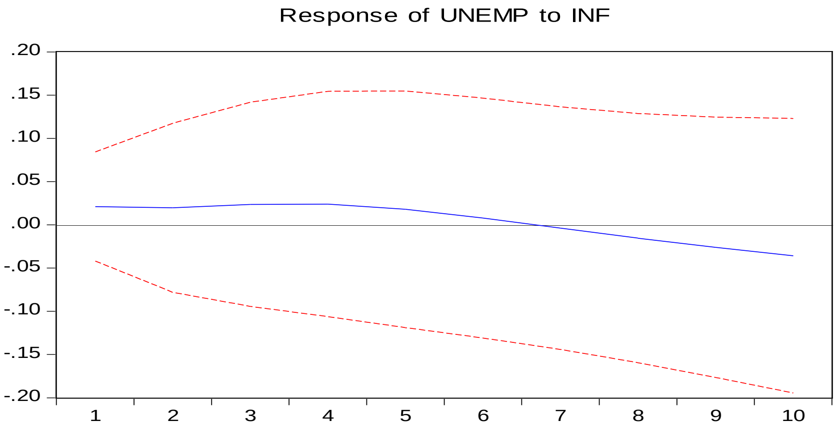

Figure 4: Response of UNEMP to Cholesky One S.D Innovations ±2 S.E.

Figure 4 demonstrates unemployment's response to the effect of a unit shock on inflation over time. The positive response decreased until the sixth period, which continued in the negative until the tenth period. indicating a higher percentage of the unemployed population due to the increasing rate of inflation.

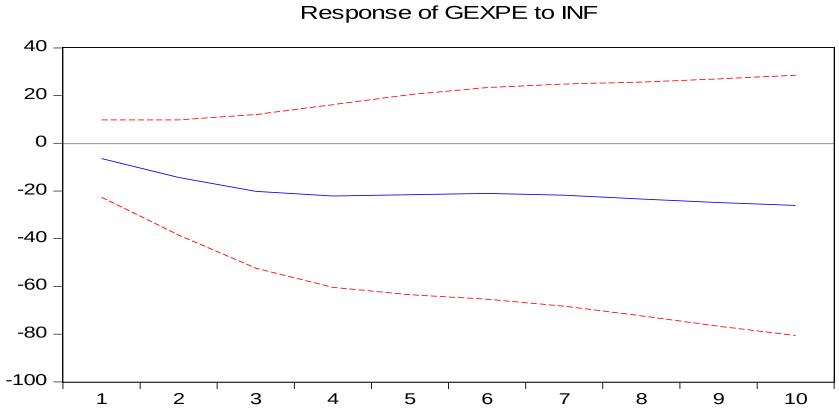

Figure 5: Response of GEXPE to Cholesky One S.D Innovations ±2 S.E.

Figure 5 shows the response GEXPE to a unit shock of INF. The negative response fell progressively and continued in the negative horizon through the tenth period. Suggesting a unit shock to inflation have an irregular effect on GEXPE over the long and short term, leading to increased spending on innovation and education.

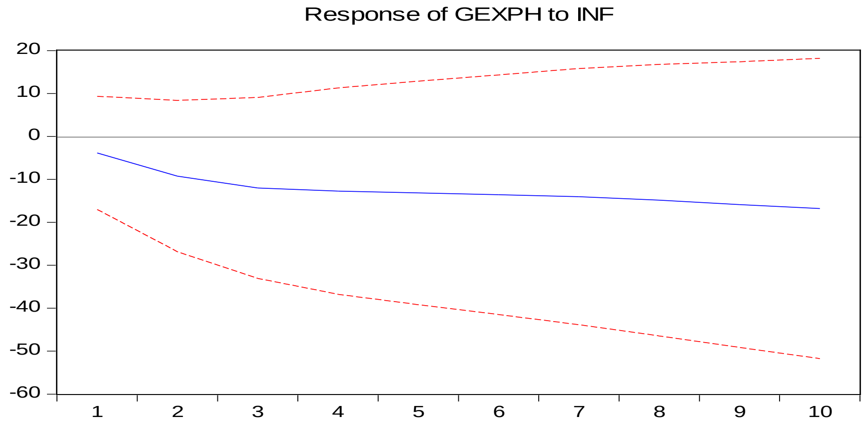

Figure 6: Response of GEXPH to Cholesky One S.D Innovations ±2 S.E.

Figure 6 depicts GEXPH's response to a one-standard deviation shock to INF within a 95% confidence interval. On the negative horizon, the GEXPH decreased continuously, reaching a steady state in the tenth period. Indicating high inflation rates cause asymmetric effects on GEXPH over long and short-term periods, leading to increased health expenditure.

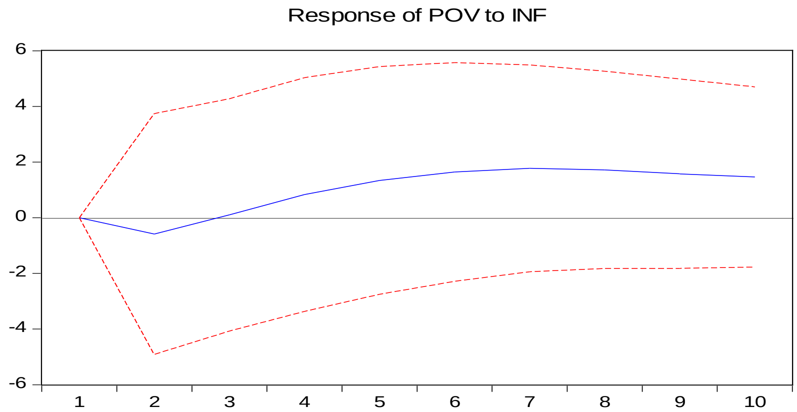

Figure 7: Response of POV to Cholesky One S.D Innovations ±2 S.E.

Figure 7 shows the response of POV to a unit shock to INF. The negative response increased through the positive horizon in a steady state to the 10th period. Demonstrating an increasing tendency for the effect of a high inflation rate on poverty, resulting in a short-term and long-term trend impact on the increasing general cost of living expenses.

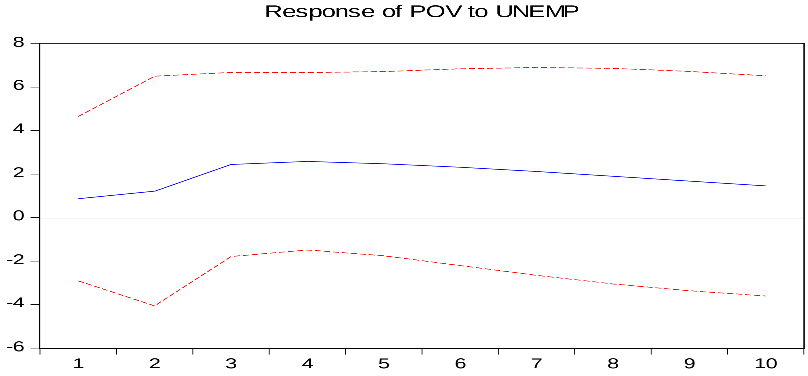

Figure 8: Response of POV to Cholesky One S.D Innovations ±2 S.E.

Figure 8 depicts the POV's response to a unit shock to one standard deviation of UNEMP at a 95% confidence interval. POV grew from the first to the third period and steadily stayed positive until the 10th period. Indicating that shocks to UNEMP have a consistent influence on POV outcomes over long and short times due to negative swings in the inflation rate.

Forecast Error Variance Decomposition

Forecast Error Variance Decomposition (FEVD) examines the influence of each variable on other variables in vector autoregression while assessing how an exogenous shock is explained by the prediction error variance.

Table 7: Forecast Variance Decomposition POV Cholesky Ordering

Period	S.E.	POV	INF	GEXPE	GEXPH	UNEMP
1	10.68604	100.0000	0.000000	0.000000	0.000000	0.000000
2	11.78477	96.24194	0.246662	1.246724	0.602668	1.662001
3	12.99723	91.66249	0.208775	4.860395	0.578238	2.690104
4	13.94586	88.51327	0.537439	6.487913	1.333652	3.127725
5	14.62585	84.12230	1.324986	8.951693	1.741419	3.859599

Table 7 provides the predicted variance decomposition of POV to a Cholesky ordering of 100% contribution of variation to its own shock at the first period. From the 2nd to the 5th period, POV contribution to shocks dropped as INF, UNEMP, GEXPE, and GEXPH contributed more to explaining POV. Indicating that POV internal dynamics have a bigger and more substantial influence on its own forecast variance decomposition.

Table 8: Forecast Variance Decomposition INF Cholesky Ordering

Period	S.E.	POV	INF	GEXPE	GEXPH	UNEMP
1	10.46948	2.161659	97.83834	0.000000	0.000000	0.000000
2	14.15810	3.033793	92.06169	4.683908	0.214571	0.006042
3	15.76784	4.279804	84.32114	9.953341	1.265577	0.180137
4	16.52551	4.817981	79.27511	13.75557	1.547168	0.604173
5	16.81440	4.811144	77.50876	15.35624	1.513820	0.810029

Table 8 shows that INF accounted for 97.84% of the forecast variance decomposition to its own shock, while POV contributed 2.16% in the short-run of period 1, given that UNEMP, GEXPE, and GEXPH explained averagely insignificant forecast error variance to shock in INF, indicating weak influence in predicting INF. In the long run of periods 2–5, INF's effect declined from 92.06% to 77.51%, while GEXPE, POV, UNEMP, GEXPH, and INF displayed great influence.

Table 9: Forecast Variance Decomposition UNEMP Cholesky Ordering

Period	S.E.	POV	INF	GEXPE	GEXPH	UNEMP
1	0.168413	3.082969	0.762218	4.049156	23.79791	68.30775
2	0.259244	5.893322	0.642726	2.101604	36.73134	54.63101
3	0.326316	3.931474	0.626445	1.597628	44.70620	49.13826
4	0.367992	3.606720	0.617096	1.694403	45.05647	49.02531
5	0.398443	4.072933	0.547786	2.827905	44.49034	48.06103

Table 9 demonstrates the anticipated variance decomposition of UNEMP using Cholesky ordering, with UNEMP providing 68.31% of the forecast variance decomposition to its own shocks, whereas GEXPH has around 23.80% of the first short-run period. POV, GEXPE, and INF similarly explained averagely minor forecast error variance to shocks in UNEMP, demonstrating a poor role in forecasting UNEMP. In the long run of periods 2–5, UNEMP impact declined from 54.63% to 48.06%, whereas POV, GEXPE, GEXPH, and INF exhibited an increasingly significant influence.

CONCLUSION

Using the VAR approach, this research offers insight on the long-term equilibrium connection, the dynamic influence of inflation and unemployment on poverty, and the human development index in Nigeria. The data demonstrated that all the variables were stationary at the first difference of the unit root test. The Johansen cointegration test also discovered the long-term associations between variables. The vector error correction model accounted for the error correction term of roughly 29.68% rate deviation owing to the long-run link between the effect of a high inflation rate. The CUSUM test also demonstrated a consistent trend in the residual coefficients of the model. The dynamic associations of the variables were captured via the analyses of impulse response functions, given that forecast variance decomposition indicated the fluctuation of the anticipated error variance of the variables. In conclusion, inflation has had a considerable and negative influence on the unemployment rate, raised poverty levels, and encouraged poor human development index output. Therefore, this empirical study suggests that researchers, policymakers, and the government should prioritize research areas and policy intervention programs that are more solution-driven towards addressing the impact of inflation and unemployment rates on poverty levels and the low human development index in Nigeria as a way of mitigating these effects and improving human development.

REFERENCES

Aderounmu *et al.,* (2021). Poverty drivers and Nigeria's development: Implications for policy intervention. *Journal of Cogent Arts & Humanities.* No. 8, Vol. 1927495.

Brown*et al* (1975). Techniques for Testing the Constancy of Regression Relationships over Time.*Journal of the Royal Statistical Society*. Series B, 35, 149-192.

Cüneyt .K and Jülide Y.K. (2022). The Long-run Impact of Inflation on Human Development and Poverty in Turkey. *Balkan and Near Eastern Journal of Social Sciences.* No. 03, Vol. 08.

Dauda & Iwegbu (2022). Human Development and Macroeconomic Shocks in Nigeria: An Empirical Investigation. *Journal of Social, Behavioral, and Health Sciences.* Volume 16, Issue 1, Pages 371–391 https://doi.org/10.5590/JSBHS.2022.16.1.25.

Muhammad *et al.,* (2023). Analysis of Inflation and Standard of Living in Nigeria. *Journal of Oil Gas Resource Revision.* No. 1, Vol. 3: 52-58.

Musa *et al.,* (2013). Effect of Monetary-Fiscal Policies Interaction on Price and Output Growth in Nigeria. *CBN Journal of Applied Statistics*. No.1, Vol. 4.

Musa Yakubu and B.K. Asare (2013). Long and Short Run Relationship Analysis of Monetary and Fiscal Policy on Economic Growth in Nigeria: A VEC Model Approach. *Research Journal of Applied Sciences, Engineering and Technology.* No. 5, Vol. 10.

Obayori J.B. and Akpan J.I. (2022). Government Spending in Education and Human Development Index in Nigeria: *British International Journal of Education and Social Sciences*. No.6, Vol.09.

Olawunmi O. and Adedayo E.L. (2017). Unemployment and Economic Growth in Nigeria in the 21st Century: VAR Approach: *Journal of Acta Universitatis Danubius. Œconomica.* No 5, Vol 13.

Ploberger, W., & Krämer, W. (1992). The CUSUM test with OLS residuals. *Econometrica*, 60(2), 271-285.

Sims, C. A. (1980). Macroeconomics and reality. *Econometrica*, 48(1), 1-48.

Smith, J. (2023). The Impact of Inflation on Economic Growth. *Journal of Economic Perspectives*, 35(4), 45-67. https://doi.org/10.1234/jep.2023.0045

United Nations Development Programme (UNDP). (1990). *Human Development Report 1990*. Oxford University Press.

Yolanda (2017). Analysis of Factors Affecting Inflation and its Impact on Human Development Index and Poverty in Indonesia. *European Research Studies Journal.* Volume XX, Issue 4B, pp. 38 – 56.