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# Testing the Asymmetric Relationship between Interest Rate and Inflation in Nigeria: An Empirical Analysis (NARDL) Approach

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A R T I C L E I N F O

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A B S T R A C T

The asymmetric relationship between interest rates and inflation in Nigeria is a complex issue that requires further investigation. The Nonlinear Auto Regressive Distributed Lag Model (NARDL) was used to examine this relationship using annual time series data from 1986 to 2023. The NARDL Bound test revealed cointegration among variables, with long-run coefficients indicating that a 1% increase in inflation leads to a -0.568 decrease in interest rates and a -0.483 increase in interest rates. The study also found that the short-run asymmetric effect of inflation to inflation decreases by (-.898) percent in the current period, while maintaining a decrease rate in subsequent periods. The ECM(-1) term satisfies the condition of its negative and statistical property of convergence from a long-run disequibrium. The study recommends tight monetary measures to avert inflationary tendencies during monetary crises and expansionary measures during recessions to curtail uncertainties. Governments should use inflation rates to service outstanding debts and address idle cash balances, fostering efficiency in the financial system through key indicators of interest rate and inflation.

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**INTRODUCTION**

Developing countries have recorded a considerable degree of economic liberalization since the mid-1980s and occurring simultaneously with high interest rate and inflation rate. In sub-Saharan Africa for example, in more than two decades, inflation and interest rate are high and remains at double digits or more (IMF, 2019). In fact, there seems hardly any time in the last 40 years when the inflation rate or interest rate is as low as they are in developed countries. A single digit rate hardly persists for a long time. Main reasons given include monetary expansion, exchange rate depreciation, economic deregulation and liberalization as well as rise in government expenditure largely financed by foreign debt (Olayinka, 2021).

Interest rate is one of the important policy instruments that can be used as a transmission channel to achieve inflation targeting. Other key instruments include exchange rate, money supply and credits. Interest rates may include monetary policy rate (MPR), lending rate and deposit rate. On the other hand, inflation rate is the general rise in price level not counterbalanced by rise in production of goods and services. Inflation rate is an indicator of economic performances while interest rate is a transmission channel to achieve an objective or a target (Olayinka, 2021).

Nigeria has been challenged to keep the inflation rate low and maintaining single digit rate, but this has proved unsuccessful. When one considers monetary policy underpinning for over a decade in Nigeria, short term interest rate has always been set monthly or quarterly by the CBN monetary policy committee to check inflation rate. Nevertheless, since the 2008 global economic meltdown, inflation has remained at double digits despite periodic adjustment by the CBN. The rate has hovered between 11.0% and 13.0% year - on - year. It was higher in the period before the global economic meltdown (Olayinka, 2021).

On the otherhand, Inflation in Nigeria has been accelerating since 1960s and has become a major concern to the government. Several policies were introduced to control inflation in the economy,yet inflationary trends continue to fluctuate (Raymond, 2014).The nature of the effect of interest rate on inflation in Nigeria is not yet settled. The theoretical ground of this argument is conflicting, because the monetarist perceived interest rate to have inverse effects on inflation. Whereas, the fiscalist argued that the nature of the effect of interest rate on inflation is direct and positive. Moreover, reports from empirical findings by researchers are more conflicting, because, in addition to positive and negative effects of the interest rate on inflation found, some researchers also reported the insignificant effect of interest rate on inflation (Danlami et al., 2018).

The theoretical argument concerning Nigeria's position to justify the use of interest rate to check high inflation rate appears not yet producing any positive outcome in policy making. Inflation rate continues to portend hyper-inflation (Bernanke, 2020). Furthermore, the high rates of inflation and interest have continued to be of intense concern to government and policy-makers hence the effectiveness of monetary policy in taming inflationary trends in

developing economies such as the Nigerian economy has been in doubt although appreciable progress has been made in this regard since the introduction of various financial sector reform programs in 1986(Henry & Sabo, 2020).

Thus, this study is motivated by investigating the asymmetries and non-linearity effects of interest rate on inflation in Nigeria; this is because, by observation from previous studies on interest rate and inflation in Nigeria is too narrow and restrictive. Therefore, by virtue of importance, inadequate consensus on the exact relationship between interest rate and inflation and filling the gap in the contemporary related literature in Nigeria on the impact of interest rate on inflation. The findings from this study would be of great importance to the government and policy makers in understanding the effect of interest rate on inflation in the economy and also help in designing policies that would curb the effect of hyper- inflation in Nigeria.

Therefore, the main objective of this study is to investigate the asymmetric effect of interest rate on inflation in Nigeria from (1981-2022). Gross savings is chosen as additional control variable in assessing the non linear relationship between interest rate and inflation in Nigeria. Savings has an increasing function or direct relation to investment and could have significance influence in relation to the level of the rate of interest. As such, this paper will investigate the asymmetric effect between interest rate and inflation in Nigeria using the non linear econometric modeling to capture the positive and negative effect of the variables.

The remaining segment of the paper will be organized in to sections. Section two establishes the conceptual, theoretical and empirical reviews, thereby establishing the gaps in the study for the purposes under review.

## LITERATURE REVIEW

The two theories of inflation reviewed, that is; the Monetarist and Keynesian theories of inflation

To Monetarist, Inflation is caused by excessive money supply. They contend that inflation is always and everywhere a monetary phenomenon. They employ the familiar identity of fishers equation of exchange i.e (MV=PT) to explain how an increase in the money supply cause inflation. From the equation, if V-velocity and T-transaction are hold constant, doubling M-money supply will double the P-price level. In this analysis aggregate supply is assume to be fixed and there is always full employment in the economy. When money supply increase, the nominal income of people increases. The immediate effect will be to increase the demand for goods and services. Similarly, there is a possibility that low interest rate can cause inflation, as consumers will prefer to spend their money on purchase of good that yield return in the feature rather than enjoying low interest on their saving. If Sellers anticipate this demand and raise prices then inflation is created in the form of "demand-pull" inflation especially when supply is not keeping up with demand, prices can become even higher. If consumers expect further inflation in the future, they may make purchases sooner in order to avoid higher prices down the road.

Furthermore, Fisher (1930) describe the relationship between inflation and interest rate (real and nominal), where he postulates that; the real interest rate equals the nominal interest rate minus the expected rate of inflation , this mean that as the real interest rate falls , inflation rates increases, unless the nominal interest rate increases at the same rate as inflation. This mean that, the following relationship among nominal interest rate, real interest rate and inflation is expressed as:

$$r = i - \pi^e \quad (1)$$

Where $r$ is the real interest rate, which is equals to $i$= nominal interest rate minus $\pi^e$ = inflation.The accurate equation can be expressed using periodic compounding as

$$1 + i = (1 + r) \times (1 + \pi^e) \quad (2)$$

If the real interest rate r is assumed to be constant, the nominal rate I must changed point for point when $\pi^e$ rises or falls, thus the fisher effect states that there will be a one for one adjustment of the nominal interest rate to the expected inflation rate. This theory will be used as the theoretical frame work of the study, this is due to its relevance of in cooperating the variables thereby including the additional variable of gross savings in to the model in the subsequent section of the study.

*Keynesian theory inflation*

According to Keynesian theory**,** Inflation is caused by excessive aggregate demand. Keynes emphasize that increase in aggregate demand as the sources of demand-pull inflation. The sources of aggregate demand are; consumers, investment and government. When the value of aggregate demand exceeds the value of aggregate supply at full employment level, the inflationary gap arises. The larger the gap between aggregate demand and aggregate supply, the more rapid the inflation.

Thus, in an attempt by suppliers to respond to the increase aggregate demand, the demand for input would increase which in turn lead to increase in the cost of production (high interest rate, higher wages, high rent and high cost of exports) hence increase the rate of inflation further.

*Empirical Issues*

Numerous researcher over time have investigates the impact of interest rate on inflation rate using different method of analysis. For instances, scholars such as Inam & Isaac (2022) employ Vector Error Correction (VEC) model in examining the linkage among inflation, interest rate and exchange rate, money supply and GDP of Nigeria from 2010 to 2018. Their findings from the study indicate that, interest rate have statistically insignificance negative effect on inflation in both short and long run all things being equal. Similarly, Inim, Samuel, & Prince (2020) uses the autoregressive distributed lag (ARDL) method to explore the determinants of inflation in Nigeria using on quarterly data from January 1999- December 2018. The ARDL result shows a positive and

significant short run relationship between monetary policy rate and inflation in Nigeria. Also, poor infrastructural development, exchange rate, monetary policy rate, and double taxation significantly affect inflation rather than just money supply.

Furthermore, Khan (2020) apply vector autoregressive (VAR) and Granger Causality test to analyse the relationship between interest rate and inflation of United Kingdom (UK) over the period of 1989 to 2017. Results of VAR shows that, when inflation is a dependent variable interest rate is positive and statistically insignificance while when interest rate is a dependent variable, inflation is negative and insignificance. For Granger causality test, bidirectional causality between inflation and interest rate of UK was discovered. Likewise, Ebipre & Amaegberi (2020) employ ordinary least squares (OLS) method to examine the relationship between money supply and inflation in Nigeria for the period of 1971 to 2015. The result shows that there is a positive relationship between money supply, deficit financing and inflation while GDP growth rate have negative impact on inflation in Nigeria.

In the same vein, Akoto (2019) determine the relationship between interest rates and inflation rates and their resultant effect on the economic growth of Ghana for the period of 2006-2015 using correlation analysis. Result from the study shows that, interest rates and inflation rates in Ghana were positively correlated and they had strong impact on the economic growth of Ghana. But, Mirza & Rashidi (2018) employ Hsiao causal test evaluation of the causal relationship between interest rate and inflation rate for panel of Sub-Saharan African Countries (SAARC) for the period of 2006 to 2013. The obtained results show that there is no causal relationship from changes in inflation rate to the changes in lending rate but there is causal relationship between real interest rate and inflation rate.

In a similar study, Yolanda (2017) analyses the determinant of inflation in Indonesia for the period 1997 up to 2016 using ordinary least square method. The results also shows that BI rate, money supply, oil price and gold prices have positively and significantly impact on the level of inflation, while the exchange rate variable does not affect the rate of inflation. On the other hand, Khumalo, Mutambara, & Assensoh-Kodua (2017)assess the relationship between inflation and interest rates of Swaziland for the period of 2010 to 2014. A descriptive approach, using Microsoft excel, was used to and positive relationship between interest rates and inflation was found.

Furthermore, Amaefula (2016) employ vector error correction model (VECM) and granger causality to analyses the dynamic relationship between interest rate and inflation in Nigeria for the period of 1995 to 2014. Findings from the study indicate that, long-run equilibrium relationships exist between interest rate and inflation, changes in interest rate exhibit negative effect on inflation and causality exist from interest rate to inflation.

Thus the major gaps in the literature is that, most of the studies used either OLS, ARDL, VECM and VAR. Despite some instances like (Khan, 2020), there is inappropriate use of methodology were all variables in his research are integrated one I (1) but VAR is used to analyses the relationship. Similarly, in

the literature reviewed, little or no emphasis has been given to test the asymmetric relationship between interest rate and inflation, this is because , result of the previous studies rely heavily in testing the linear relationship between interest rate an s inflation hence creating gap for employing non-linear ARDL which previous researches gave little emphasis in their studies. In addition, this study uses interest rate spread to differ from the previous studies that used nominal and real interest rate in their studies. Interest rate spread is the (lending rate minus deposit rate, %) and will equally serve a good proxy for the purpose of investigating a new panacea in investigating the relationship among the variable.

## METHODOLOGY

*Source of Data*

The study employs annual time series data on interest rate spread (INTRS), inflation rate (INF), and gross savings (GSAV). All data were sourced from world development indicators (WDI, 2021). The data ranges from 1981-2022 comprising 41 observations to study the asymmetric relationship between interest rate and inflation in Nigeria.

*Model Specification*

The study adopts the Fisher (1930) equation model, to determined the following relationship among interest rate and inflation. Gross savings variable will also be included as control variable due to its relevance in influencing the interest rate in either positive or negative magnitudes. Fisher equation model is expressed as:

$$r = i - \pi^e \quad (3)$$

Where $r$ is the real interest rate, which is equals to $i$= nominal interest rate minus $\pi^e$ = inflation.The accurate equation can be expressed using periodic compounding as :

$$1 + i = (1 + r) \times (1 + \pi^e) \quad (4)$$

If the real interest rate r is assumed to be constant, the nominal rate $i$ must changed point for point when $\pi^e$ rises or falls, thus the fisher effect states that there will be a one for one adjustment of the nominal interest rate to the expected inflation rate. This theory will be used as the theoretical frame work of the study, this is due to its relevance of in cooperating the variables with little modification by including gross savings in to the mode. The functional model of the relationship is expressed in equation 3 with modification by including the GSAV variable in to equation 4 as:

$$Intrs = f(Inf, Gsav) \quad (5)$$

The mathematical model is expressed as:

$$INTRS_t = \alpha_0 + \beta_1 INFL_{t-1} + \beta_2 GSAV_{t-1} \quad (6)$$

The econometric model is presented in the subsequent equation 5 below as

$$INTRS_t = \alpha_0 + \beta_1 INFL_{t-1} + \beta_2 GSAV_{t-1} + \mu_t \quad (7)$$

Where INTRS = interest rate spread is measured as lending rate minus deposit rate %, INFL = measured by the annual growth rate of the GDP implicit deflator and GSAV= gross national income less total consumption, plus net transfers %

of GNI. All Data are in current local currency (WDI, 2021). $\alpha_0$ and $\beta_{1\&2}$ are elasticities, t= time lag periods and $\mu$ = stochastic random term error.

The nonlinear ARDL model which is developed by (shin et. al, 2014) is used to test the presence of cointegrataion between interest rate and inflation in Nigeria, there by analyzing the asymmetries among the variables. The shin et al. (2014) specifies the NARDL by decomposing the independent variable in to positive and negative partial sums as shown in equation 8 below:

$$INTR_t = \alpha_0 + \alpha_1 INFL_t^{+\prime} + \alpha_2 INFL_t^{-\prime} + \alpha_3 GSAV_t^{+\prime} + \alpha_4 GSAV_t^{-\prime} + \varepsilon_t \quad (8)$$

Where INTR and GSAV are the interest rate and Gross savings, that is$INFL_t^{+\prime}$, $INFL_t^{-\prime}$,$GSAV_t^{+\prime} and\ GSAV_t^{-\prime}$constitute the positive and negative changes, meaning the decomposition of the series in to the partial sums to be estimated in the study. Previous studies consider the symmetric relationship between interest rate and inflation. Thus; $\alpha_{1,2,3\ and\ 4}$ captures the long run positive and negative changes in interest rate on inflation. $INFL_t^{+\prime}$, $INFL_t^{-\prime}$,$GSAV_t^{+\prime} and\ GSAV_t^{-\prime}$ are therefore calculated as:

$$INFL_t^{+\prime} = \sum_{i=1}^{t} \Delta\, INFL_t^{+\prime} = \sum_{i=1}^{t} \max(\Delta\, INF_{i,} 0) \quad (9)$$
$$INFL_t^{-\prime} = \sum_{i=1}^{t} \Delta\, INFL_t^{-\prime} = \sum_{i=1}^{t} \min(\Delta\, INF_{i,} 0) \quad (10)$$
$$GSAV_t^{+\prime} = \sum_{i=1}^{t} \Delta\, GSAV_t^{+\prime} = \sum_{i=1}^{t} \max(\Delta\, GSAV_{i,} 0) \quad (11)$$
$$GSAV_t^{-\prime} = \sum_{i=1}^{t} \Delta\, GSAV_t^{-\prime} = \sum_{i=1}^{t} \min(\Delta\, GSAV_{i,} 0) \quad (12)$$

However, the asymmetric relationship among the variables exhibits dynamic changes; therefore, the unrestricted NARDL model is used in estimating the dynamicity nonlinear relationship between interest rate, inflation and GSAV. Following the shin et. al (2014) the general NARDL asymmetric model is presented below in equation 13 as follows;

$$\Delta Y_t = \partial y_{t-1} + \theta^{+\prime} X_{t-1}^{+} + \theta^{-\prime} X_{t-1}^{-} + \sum_{j=1}^{p-1} \varphi j \Delta Y_{t-j} + \sum_{j=0}^{q-1} (\delta j^{+\prime} X_{t-1}^{+} + \delta j^{-\prime} X_{t-1+}^{-}) + \mu_t \quad (13)$$

The general model in equation 13 above, is therefore integrated to produce the partial asymmetry to both long and short run of the NARDL of this study as:

$$INTR_t = \gamma + \alpha_0 INTR_{t-1} + \beta_1 INFL_{t-1}^{+} + \beta_2 INFL_{t-1}^{-} + \beta_3 GSAV_{t-1}^{+} + \beta_4 GSAV_{t-1}^{-} + \sum_{i=1}^{p} \varphi \Delta \mathrm{INT}_{t-1} \sum_{j=0}^{q-1} (\delta_i^{+} \Delta INFL_{t-1}^{+} + \delta_i^{-} \Delta INFL_{t-1}^{-} + \gamma_i^{+} \Delta GSAVL_{t-1}^{+} + \gamma_i^{-} \Delta GSAVL_{t-1}^{-}) + \mathrm{ECT}_{t-1} + \mu_{t-1} \quad (14)$$

Where $\beta$ p represents the optimal lag length of the (interest rate) dependent variable, whereas the q stands for the (inflation and gross savings) independent variables optimal lag length selection criteria. The coefficients, $\delta_{i,}^{+and-}, \gamma_i^{+and-} and\ \Delta$ captures the short run dynamics, while the coefficients $\beta_{1.2.3\ and\ 4}$, represents the long run relationships. The ECM stands

for error Correction mechanism and it is the speed of adjustment term, $\mu$ is the stochastic term error

## RESEARCH RESULT AND DISCUSSION

The results of the NARDL bound test to cointegration results were estimated and presented, these comprises the unit root results, Optimal lag selection criteria, the long and short run NARDL Error correction model with their respective diagnostic tests.

*Unit root test*

The unit root test of the series for stationarity of the process was conducted by employing the ADF, PP and KPSS, the result of the ADF and PP unit root displayed in the Table 1 reveals that interest rate and gross savings are a non stationarity series at 5%, ie; I(1), while inflation rate exhibit stationarity level form at 5% level of significance, that is I(0). Thus, going by the result, the null hypotheses is rejected; stating that the series has unit root is not true, for the inflation the null hypotheses of unit root of the series is true. In addition the KPSS reveals that inflation is stationary at level form, meaning that; the series is non stationary without unit root which is not true and the null hypotheses is rejected, with regard to interest rate and gross savings, the KPSS results indicates that; the series are therefore stationary at level form, confirming that the null hypotheses is true.

*Lag Length Selection Criteria*

Tale 2 indicates the optimal lag selection criteria of the model and by default, the output of the series have selected lag order of one across the variables, and it is established that the lower the optimal lag criteria, the better the model, therefore, AIC criteria (18.95837*) is selected against the HQ and the SC (19.14156*), (19.46503*) respectively.

Table 1. Unit root Result

| Variables | ADF STAT | Critical Values at 5% | PP Stat | Critical Values at 5% | KPSS Stat | Critical Values at 5% |
|---|---|---|---|---|---|---|
| INFL | -3.093192 | 0.0347** | -2.959060 | 0.0472** | 0.309069 | 0.463000 |
| ΔINFL | -6.073377 | 0.0000* | -12.82969 | 0.0000* | 0.500000 | 0.463000 |
| GSAV | -2.728686 | 0.0777*** | -2.878416 | 0.0564*** | 0.793401 | 0.463000 |
| ΔGSAV | -7.571263 | 0.0000* | -8.270281 | 0.0000* | 0.305413 | 0.463000 |
| IRS | -2.274469 | 0.1847 | -2.143657 | 0.2294 | 0.463268 | 0.463000 |
| ΔIRS | -6.750080 | 0.0000* | -8.431078 | 0.0000* | 0.299181 | 0.463000 |

*Note: *,**,*** indicates statistical significance at 5% level of significance Authors computation (2023)*

*Bound Test to Cointegration*

The result of the bound test is presented in Table 3, The F-statistics value (7.151287) is greater than (2.56) and (3.49), both at lower I(0) and upper I(1) band limit as tabulated by Pesaran et.al (2001). This reveals presence of cointegration among the variables, indicating the presence of a long run relationship between interest rate, inflation and gross savings in Nigeria.

*The NARDL Long run Estimates*

The result of the NARDL of the long and short run estimates is presented in Table 4 panel A and B respectively, Diagnostic test is also presented in Table 5, indicating absence of serial correlation, normally distributed data and the residuals are not heterostkedastic

Table 3. The NARDL Bounds Test to Cointegration

| Test Statistic | Value | Signif. | I(0) | I(1) |
|---|---|---|---|---|
| F-statistic | 7.151 | 10% | 2.2 | 3.09 |
| K | 4 | 5% | 2.56 | 3.49 |
| | | 2.5% | 2.88 | 3.87 |
| | | 1% | 3.29 | 4.37 |

*Author's computation (2023)*

Table 4: NARDL: Model (3, 3, 2, 3, 1) Short and Long Run Estimates

| **PANEL A: LONG RUN ESTIMATES** | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| INFL_POS | -0.568401 | 0.045544 | -12.48032 | 0.0000 |
| INFL_NEG | -0.482728 | 0.055731 | -8.661724 | 0.0000 |
| GSAV_POS | 1.46E-12 | 5.03E-13 | 2.907225 | 0.0122 |
| GSAV_NEG | 1.93E-12 | 7.98E-13 | 2.418567 | 0.0310 |
| C | 17.28589 | 5.812092 | 2.974126 | 0.0108 |
| **PANEL B: ECM Regression (SHORT RUN ESTIMATES)** | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(RINTR(-1)) | 0.706828 | 0.213183 | 3.315599 | 0.0056 |
| D(RINTR(-2)) | 0.224816 | 0.093077 | 2.415371 | 0.0312 |
| D(INFL_POS) | -0.897527 | 0.133327 | -6.731769 | 0.0000 |
| D(INFL_POS(-1)) | 0.466058 | 0.139330 | 3.345002 | 0.0053 |
| D(INFL_POS(-2)) | 0.325325 | 0.096279 | 3.378974 | 0.0049 |
| D(INFL_NEG) | -0.389406 | 0.083450 | -4.666363 | 0.0004 |
| D(INFL_NEG(-1)) | 0.359669 | 0.134384 | 2.676429 | 0.0190 |
| D(GSAV_POS) | -2.59E-12 | 5.54E-13 | -4.675480 | 0.0004 |
| D(GSAV_POS(-1)) | -5.78E-12 | 1.24E-12 | -4.674332 | 0.0004 |
| D(GSAV_POS(-2)) | -1.67E-12 | 5.91E-13 | -2.829986 | 0.0142 |
| D(GSAV_NEG) | 1.70E-12 | 1.11E-12 | 1.537604 | 0.1481 |

| | | | | |
|---|---|---|---|---|
| ECM(-1)* | -2.456252 | 0.318670 | -7.707833 | 0.0000 |

*Source: Authors computation (2023)*

The long run coefficients (partial sums) of the positive and negative changes in the INF rate indicates a negative (-0.568 And -0.483) response to INTR respectively. This shows that a 1 percent increase in inflation ($INF^+$) will lead to -0.568 decrease in interest rate, conversely, a 1 percent change decrease in ($INF^-$) will also lead to -0.483 increase in Interest rate, both the positive and negative sum of INF to Interest rate are highly and statistically significant even at 1% level of significance in the long run horizon. For the GSAV variables, the positive and negative partial sums reveals a positive functional relation to INTR (1.461 and 1.931) respectively. This indicates that a 1 percent increase in the ($GSAV^+$) will lead to 1.461 increase in Interest rate, while a reduction in ($GSAV^-$) by 1 percent will leads to an increase to INTR by 1.93 percent, all things being equal. Similarly, both the positive increase and negative decrease are statistically significant in the long run. Moreover, the results of the long run relationship of the partial sums in Inflation are consistent with the findings of Inam &Isaac (2022); Khan (2020) and Ameaefule (2016). In addition findings are also in tandem to the Fishers hypotheses postulations of an inverse relationship between interest rate and inflation.

Consequently, the short run asymmetric effect of inflation on interest rate at current period (INFL POS)) shows a negative impact, meaning that in the current period of INF, a 1% increase in ($INF^+$) will resulted to (-0.898) decrease in INTR, indicating a high statistical significance at even 1%.In the same vein the asymmetric effect of (INFL_POS)) across remaining periods; D(INFL_POS(-1)) and (-2)) exhibits a positive effect to INTR, a 1% increase in D(INFL_POS (-1)) and (-2)) will resulted to an increase in INT by 46% and 32.5% increase in INTR and the coefficients are statistically significant at 1% level of significance also. For the negative asymmetric partial sums of D(INFL_NEG) to INTR, the short run coefficient asymmetry in the current period is negative (-0.389) though statistically significant at 1%, meaning that; a 1% decrease in D(INFL_NEG) in the current period, will leads to a reduction in INTR by -38.9% in the short run, but in the subsequent periods of D(INFL_NEG(-1)) in the past period will result to an increase in INTR by 35.10%, and the coefficients at current and past lags are all statistically significant, all things being equal. In addition, the ECM(1))term, has a corrected expected sign of negative and statistical significance at coefficent (-2.456), t = (-7.708) and p values of (0.0000) respectively. This indicates convergence of the model to the long run tranquility from the dynamic disturbance by an adjustment speed of 24.5% annually, to the long run equilibrium. The result is consistent with the Fishers theory of interest rate and Inflation, the theory posits positive relationship between INT and INF in either way of the two partial sums of inflation response to Interest rate. Findings of the short run results also complies to the previous studies mention of the long run justification supports.

Table 5. Diagnostic Test

| Test | Test Ststistics | P- Values |
|---|---|---|
| LM serial correlation | 0.693 | 0.551 |
| Normality test | 0.489 | 0.783 |
| White Heterocekedasticy test | 1.443 | 0.256 |

*Sources:Authors computation using eviews 2023*

The diagnostic tests for the estimation reveals a satisfactorily result, indicating the model is free from serial auto correlation, for the residual, also exhibits normality distribution of the data sets and in addition, the residylas are also homokedastic.

## CONCLUSIONS AND RECOMMENDATIONS

The study investigated the asymmetric relationship between interest rate and inflation in Nigeria by employing the NARDL modeling technique, developed by shin et al (2014) , from 1981-2022, the results of the NARDL bound test confirmed the nonlinear asymmetries existing between interest rate and inflation in Nigeria, the asymmetric impact of the partial sums (positive and negative) of inflation reveals a negative response to INTR, mening that, the partial sums of (INF_POS & INF_NEG) leads to a decrease and increase to interest rate in Nigeria in the long run, while maintaining the statistical significance even at 1%. For the short run estimates, the partial sums exhibits the partil sums of (INF_POS & INF_NEG) shows a decrement function to INTR in the current periods, but in the subsequent periods of (INF_POS & INF_NEG) lag (1&2)) retains positive (increment) response to INTR. Furthermore, the Error correction term satisfies the atheoretic condition of negative signs and statistical significance even t 1% in adjusting the short trun turbulences to a long run equilibrium relationship of the variables, indicating a high speed of adjustment of 45.6%, all things being equal. Therefore, the research recommends tight monetary measure to avert inflationary tendencies/uncertainties during a monetary crises and expansionary monetary measures in the period of recession to curtail the uncertainties that may hamper the economy in the short and long periods. To maintain a stable price and ascertainment of full employment in the close and distant periods, government should use the inflation rate as an instrument to service its outstanding debts there by also addressing the old way of keeping too much money in an idle cash balances instead of giving it out for productive ventures by individuals, accomplishing these policies will foster efficiency in the financial system through the key indicators of interest rate and Inflation

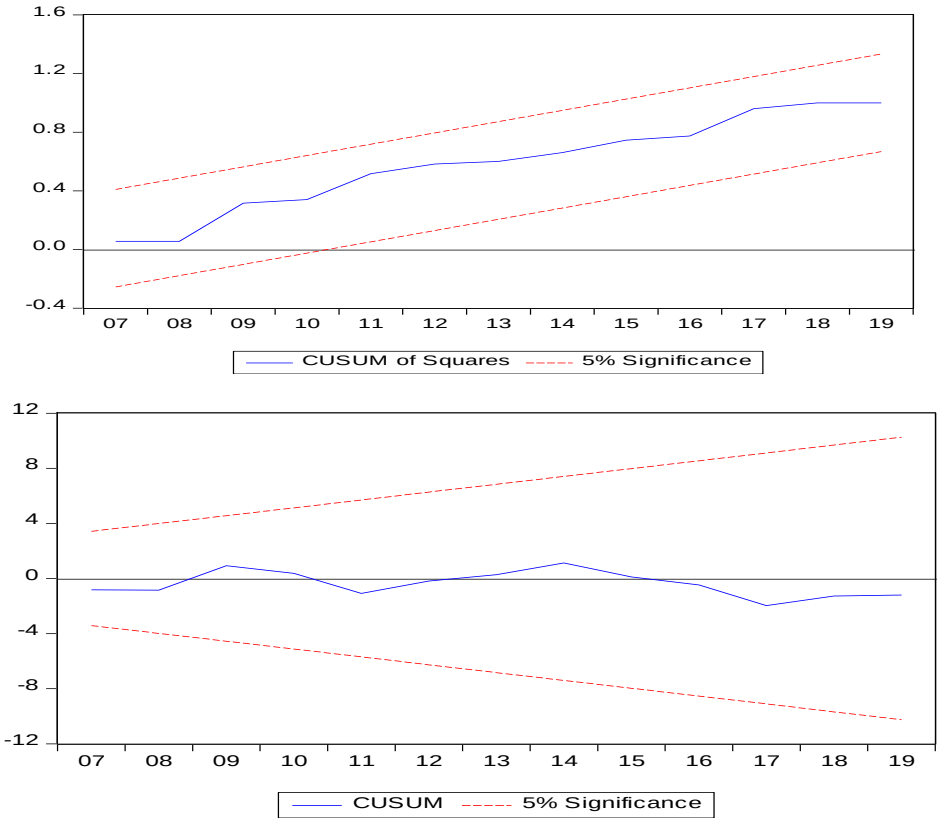


Figure 1. Stability Test For Cusum/Cusum of Squares Test

**ADVANCED RESEARCH**

We recommend policymakers to adopt tight monetary measures during monetary crises to avert inflationary tendencies. This will help maintain stability in the economy and prevent excessive inflation. Conversely, during recessions, expansionary measures should be implemented to stimulate economic growth and curtail uncertainties.

Additionally, governments should utilize inflation rates as a tool to service outstanding debts and address idle cash balances. This will foster efficiency in the financial system and contribute to overall economic stability. Key indicators such as interest rates and inflation should be closely monitored to ensure effective policy implementation.

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