

DYNAMIC EFFECT OF INFLATION ON ECONOMIC GROWTH IN NIGERIA (1986-2014)

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Abstract

This study examined the dynamic effect of inflation on economic activities in Nigeria between 1996 and 2014. The study employed both the Augmented Dickey-Fuller (ADF) and the Philip Perron unit root tests to determine the properties of the time series. It was found that the variables were of mixed orders of integration. Furthermore, Auto Regressive Distribute Lag (ARDL) system cointegration test indicated the presence of equilibrium among the variables. The results of ARDL showed that real economic growth was not significantly affected by inflation rates, but so did real interest rates and exchange rates. Based on these findings, this study recommends that government should implement policies that would encourage savings through reduction of taxes to enhance investment decisions in the economy. To complement for the loss in economic growth through interest rates, lending rate should be regulated to encourage private investment in Nigeria.

Introduction

Macroeconomic theory postulates that unsustainable economic growth threatens price stability which has capacity to erode financial capability of citizenry and stimulates poverty. It further aggravates balance of payment equilibrium of developing economies, hinders financial system development and capacity of the government to deliver essential goods and services to the citizens. Similarly, many empirical literature have documented the advantages of high inflation to economic growth, revealing that sustainable economic growth depends on the high rate of inflation by stimulating aggregate supply, most especially during recession period. The popular Phillips curve indicates that inflation is not regarded as a problem in the period of recession, but rather a stimulant on the growth of economic activities that translates to increase in employment rates. The curve therefore hypothesizes that high

inflation positively affects the economic growth by lowering unemployment rates (Kasidi&Mwakanemela, 2013).

On the contrary, the persistent increase in general price level coupled with increase in unemployment rates evolved from current recession which started late 2014 in Nigeria has raised more concern about the relationship between inflation and the growth of economic activities of the economy. Then, irrespective of the controversy between the theoretical and economic experience of Nigeria on whether inflation reduces or spurs economic growth, in compliance with the objective of achieving sustainable growth in the country, history has shown that successive governments in Nigeria had employed diverse monetary policies to deal with high inflation phenomenon. Therefore, the issue of whether inflation promotes or harms sustainable economic growth has been a subject of continuous debate among

macroeconomists as several studies have documented mixed effects and diverse relationship between inflation and economic growth for different economies across the world. Most importantly, dynamic effect of inflation on economic growth has not received adequate attention of economic scholars in Nigeria, hence the study. The rest of the paper is organized as follows: section two presents the review of literature, section three shows the methodology and the data while section four gives the analysis and lastly section five hosts the conclusion.

Studies have documented either the relationship or causality between GDP and inflation for several economies. On GDP-inflation relationship, Ayyoub, Chaudhry and Farooq (2011) re-examined the existence of inflation growth relationship in the economy of Pakistan. The authors determined whether different rates of inflation affect economic growth in a diverse ways. Using Ordinary Least Square (OLS) method, evidence from the study shows a negative but significant inflation growth relationship after a certain threshold level. In a similar vein, Faria and Carneiro (2001) investigated the relationship between inflation and output in Brazil, an economy facing persistent high inflation. The result shows that inflation does not impact real output in the long run, but that in the short run there exists adverse effect of inflation on output. Using econometric method, Kasidi and Nwakanemela (2013) discovered a negative relationship between inflation and economic growth in Tanzania.

Mehrara (2007) examines the relation between inflation and economic growth in Iran, using annual data that span forty five years. The results indicate the threshold level of inflation above which inflation significantly slows growth in Iran.

The result conforms to Faria and Carneiro (2001)'s. Also, Datta, and Mukhopadhyay (2011) investigated the relationship between GDP and inflation in Malaysia. The study employed VECM and result shows that there exists short-run causality and direction of causality is from inflation to economic growth, while in the long-run, economic growth granger causes inflation.

In Nigeria, Doguwa (2014) re-examined threshold effect of inflation on economic growth in Nigeria. Using three different approaches that provide appropriate procedures for estimating the threshold level and inference, the result suggests, on average, inflation rates above 10.5 per cent will be harmful for economic growth in Nigeria. Similarly, Okezie, Ebomuche, and Ezeonye (2015) explored the relationship between economic growth and inflation in Nigeria. The study employed Error Correction Method of analysis and Engel-Granger method of cointegration. The results provide the evidence that GDP and inflation are positively related and that causality runs from inflation to GDP, unidirectional.

Olaiya, Nwosa and Amassoma (2012) also examined the relationship and causality among GDP, public expenditure and inflation rates in Nigeria. The results suggest that, in the short run, a unidirectional causality exists from economic growth and government expenditure to inflation rate while no feedback from inflation rate is established. Recent studies that have investigated either relationship or causality between GDP and inflation in Nigeria include Chude and Chude (2015), Olu and Idih (2015), Bakare, Kareem and Oyelekan (2015), Shuaib, Augustine and Frank (2015) and many more with diverse findings which might not be unconnected with the disparities in the

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choice of period, methodology and model or auxiliary variables involved. It should be, however noted that, in the literature, serious attention has not been given to analysis of dynamic relationship between GDP and inflation, an attempt that could mar series of solutions that have been proffered on inflation in Nigeria, hence this study fills that gap.

This study contributes to the existing studies that have documented the effect of inflation on economic growth in Nigeria, majorly in two distinct ways: First, Autoregressive Distributed Lag (ARDL) model which has the advantage of determining the dynamic effect has not been used by the previous authors. Second, most of the variables are considered in real values to avoid the influence of inflation on them

because they are equally sensitive to inflation variability. The choice of the period as well was informed by the intent to capture the year that preceded 1987 when Structural Adjustment Programme (SAP) was introduced in Nigeria. In 1987, all importations were nearly proscribed to pave way for the use of locally made industrial materials, which markedly ushered in high rate of inflation in the economy.

Methodology

Following Kasidi and Nwakanemela (2013), to investigate the effect of inflation in Nigeria between 1986 to 2014, the equation below mathematically relates national income that represents economic growth with inflation, thus;

Table 1

Unit Root Test Results

Variables	ADF		Philip-Perron	
	Level	First Diff.	Level	First Diff.
LRGDP	1.909726	-2.971338**	1.571514	-2.842620**
INF	-2.192923	-3.826029*	-1.971285	-3.789432*
REEXCT	-2.134758	-4.309040*	-2.247242	-4.308835*
INTR	-4.977210*		-5.000438*	

* / ** indicates 1% and 10% level of significance respectively

Results of stationarity test from Table 1 indicate that three of the variables were first differenced, while real interest rate was stationary at level. To determine the long run relationship among the variables, ARDL system co-integration test was employed. This co-integration test is more appropriate when the variables involved are not of the same order of integration, though the test does not have the capacity to report more than one cointegrating equation

especially when the variables involved are more than two. According to Gujarati (2004), two or more variables are said to be co-integrated if the variables have an equilibrium relationship between them. This suggests that if two or more variables are non-stationary individually but their residuals are stationary at level, then the variables are said to be co-integrated in the long run. The co-integration result is therefore presented in table 2 below:

Table 2

ARDL Cointegration and Long Run Results

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LRGDP(-1))	0.392827	0.105006	3.740982*	0.0004
D(INF)	936.040892	551.039824	1.698681	0.0936
D(INF)	1267.372753	580.844059	2.181950*	0.0323
D(INTR)	-945.053268	454.064961	-2.081317*	0.0409
D(REEXC)	-214.306406	61.486376	-3.485429*	0.0008
CointEq(-1)	-0.968057	0.124929	-7.748832*	0.0000

Cointeq = LRGDP - (823.3954*INF -976.2371*INTR -221.3779*REEXC + 87477.9486)

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF	823.395418	40.617512	20.271932*	0.0000
INTR	-976.237130	444.174440	-2.197869*	0.0311
REEXC	-221.377860	56.928486	-3.88870*1	0.0002
C	87477.948596	11980.874656	7.301466*	0.0000

Using ARDL system co-integration test, the result pasted in Table 2 above showed the existence of co-integrating equation among real GDP, inflation, real exchange rates and real interest rates. This indicated that the variables have long run relationship. Although the variables might be drifted apart in the short run, still they moved together to equilibrium in the long run. The lower part of Table 2 reveals the long run regression result as well. The result indicated that inflation has significant positive influence on the variation of real GDP, given the values of its t-statistic (20.272) and the probability (0.000) which are statistically significant respectively. However, the negative values of the

coefficients of real exchange rates and interest rates have shown that the variables negatively impacted on real GDP as shown by their t-statistics (-2.198 and -3.889) and probability values (0.031 and 0.002) respectively, which are statistically significant.

Having established the long run relationship among the variables and noted that the variables were different in orders of integration, then the need to employ ARDL technique of estimation to capture the dynamic effect of inflation on real growth of economic activities in Nigeria. The mixed orders of integration has satisfied the conditions for using ARDL econometric technique.

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Table 3

Dynamic ARDL Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LRGDP(-1)	0.424770	0.105154	4.039497*	0.0001
LRGDP(-2)	-0.392827	0.105006	-3.740982*	0.0004
INF	936.0409	551.0398	1.698681	0.0936
INF(-1)	1128.426	839.3684	1.344375	0.1829
INF(-2)	-1267.373	580.8441	-2.181950*	0.0323
INTR	-945.0533	454.0650	-2.081317*	0.0409
REEXC	-214.3064	61.48638	-3.485429*	0.0008
C	84683.65	16484.67	5.137116*	0.0000
R-squared	0.949066	Mean dependent var		107345.0
Adjusted R-squared	0.944248	S.D. dependent var		43855.44
S.E. of regression	10355.11	Akaike info criterion		21.42082
Sum squared resid	7.93E+09	Schwarz criterion		21.65562
Log likelihood	-870.2535	Hannan-Quinn criter.		21.51509
F-statistic	196.9792	Durbin-Watson stat		1.380548
Prob(F-statistic)	0.000000			
*Note: p-values and any subsequent tests do not account for model Selection				

Source: Authors' computations. The lag length 2, 2, 0, 0 was selected automatically by E-views 9

The results from Table 3 revealed that the previous year's value of real GDP significantly influenced the variation that occurred to the following year's value of real GDP. Statistically, a unit increase/decrease in the last year's real GDP had over 42 percent increase/decrease on the following year's real GDP. The implication is that the subsequent year's real GDP positively depends on previous year's real economic activities. However, previous two year's value of real GDP, given its coefficient (-0.393) and t-statistic (-3.741) asserted negative and significant influence on following year's real GDP.

On inflation rate, the current and the immediate past year inflation rates had positive effect on real GDP, due to the signs of their coefficients. While their t-statistics stood at (1.699 and 1.344), their probability

values were (0.094 and 0.183). They asserted no statistical significance on the variation that occurred to real GDP. However, the previous two year inflation negatively impacted on the real economic activities of the subsequent year as revealed by the result in Table 3. Inflation lagged by two periods had t-statistic (2.182) and the probability (0.032), therefore, both statistics were statistically significant. The result further corroborates the existence of long run relationship discovered among our variable. Furthermore, the result was not inconsistent with the macroeconomic theory that both inflation and economic growth (GDP) are long run issues.

The result was consistent with findings of Kasidi and Nwakanemela (2013) and Ayyoub, Chaudhry and Farooq (2011), while at variant with Okezie,

Ebomuche and Ezeonye (2015)'s and Bakare, Kareem and Oyelakin (2015)'s. Real interest rate negatively influenced real economic activities in Nigeria within the period covered with its t-statistic value (-2.081) and the probability value that was less than the critical value. The value R^2 (0.949) showing the goodness of fit was appropriate, meaning that 95 per cent of the variation in real economic activities was captured by the variations in the regressors. Therefore, the model was well fitted. The F-statistic (196.979) and P-value (0.0000), showed that the model was well explained. Also, the Durbin Watson statistic (1.381) showed that there was no problem of multi collinearity.

Conclusion and Recommendations

This study examined the dynamic effect of inflation on economic growth of Nigeria over the period of 1996-2014. The estimation process started with examining stationarity property of the underlying time series by applying ADF and PP unit root tests. The results of test confirmed that real interest rate was stationary at levels while real GDP, real exchange rates and inflation were first difference variables. This suggested that the variables were of mixed orders of integration. Using ARDL system co-integration test, it was found that there was equilibrium among the variables, which implied that there existed long run relationship among the variables.

To examine the dynamic effect inflation has on real economic activities in Nigerian economy during the period covered; the study used Auto regressive Distribute Lag (ARDL) model. The model has the advantage to capture the dynamic effect of one variable on the other(s). Given the results of this study, therefore, the current and immediate past year's inflation rates positively but statistically insignificantly impacted on real GDP in Nigeria between 1996 and 2014. The implication is that, the purchasing power of money was relative stable in the economy. Also, we observed that the past two years' inflation rates significantly affected the economy of Nigeria. However, current values of the real interest rates and exchange rates statistically and significantly influenced the real GDP of the Nigerian economy during the period.

Based on our findings, the study recommends that government should gear efforts towards total overhauling of financial market to enhance the growth of private sector, which would translate to further economic growth. More importantly, government should concentrate on borrowing from abroad to reduce mopping of funds from circulation. Government should equally reduce taxes to encourage savings. In this wise, the issue of capital flight should be properly addressed.

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