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Original Paper

The Impact of Inflation on Economic Growth in Nigeria

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Abstract

This study investigates the impact of inflation on economic growth in Nigeria. The study employs the Autoregressive Distributed Lag (ARDL) model on the selected variables that are GDP, inflation, interest rate, money supply and government consumption expenditure from 1990-2020 (31 years). The findings from ARDL model reveal that inflation, interest rate and money supply exert significant negative impact on economic growth while government consumption expenditure exerts significant positive impact on the economic growth. Based on the findings, a more aggressive effort is needed by the government and monetary authorities to tackle the inflation and interest rate fluctuations to forestall the negative impact on the economic growth by ensuring their appropriate rates that will stimulate economic growth. Also the study recommends that government should ensure an appropriate level of money supply that will keep appropriate level of interest rate to avoid plunging the economy into liquidity trap to achieve an intrusive economic growth.

Keywords

ARDL, economic growth, government consumption expenditure, inflation rate, interest rate, money supply

1. Introduction

It is a known fact that different countries all over the world do experience inflation. The differences lie in the duration, causes, and in their prevailing economic conditions. Enough to say that be it developed, developing economies of the world do witness rise in price. To some economies it could be mere fluctuations, while to others, it is consistent and continuous rise in price. There is a strong accord among many policy makers, economists that one of the essential objectives of economic policies in developed and developing countries is to maintain a sustainable economic growth with one-digit inflation. It is due to the fact that a high level of inflation affects the running of a market economy (Krugman, 1995). Inflation exerts a big blow to fixed income earners; it also favors debtors at creditors expense at individual level. At the level of firm, the impact of inflation is referred as the 'menu cost' Guerrero (2004) because

it has a serious influence on output as firms will have to bear more costs as they adjust to the new price level. On the other hand, much less consensus exists about the nexus between inflation and economic performance, and the instrument by which inflation influences economic activity at the level of macro economy. This has caused a serious argument both empirically and theoretically. Many studies revealed inconclusive empirical fact for either a positive or a negative linkage between inflation and economic growth, prominent among them are Wai (1959); Bhatia (1960); Dorrance (1963, 1966) Johansen (1967). The literature that found a negative nexus between inflation and economic growth comprises of the following studies such as Ficher (1993) De Gregorio (1993) Barro (1995, 1996); Brunno and Easterly (1995); Malla (1997); Faria and Carneiro (2001) Dewan and Hussein (2001). However, another set of literature revealed a positive linkage between inflation and economic growth. In spite of all these, the literature on the effect of inflation and economic growth in Nigeria is inadequate. Thus, the purpose of this paper is to find out the impact of inflation on economic growth in Nigeria from 1990 to 2020. The paper is also structured as follows; section one constitutes the introduction while section two is the review of empirical literature on inflation and economic growth; section three talks about the model and methodology while section four offers analysis of data and empirical evidence and the final section which is section five provides the conclusion and policy suggestions of the study.

In recent times, serious research has particularly focused on the non linearity linkage between the two variables. That is, at higher rates of inflation, the effect is negative and significant, but at lower rate, inflation has a positive and insignificant effect on economic growth. As regards to the non linearity, explaining why inflation and its effect on economic growth have dramatic change over the past ten years can be seen as from 1960-1969, 1970-1979, 1980-1989, 1990-1998 and 1999-2009. The inflation rate was only 2.6% per year in the 1960s and rose rapidly to 9.2% per year in the 1970s and then 10.3% per year in the 1980s. Also, from 1990-1998 the average inflation rate was the 33.31% and from 1999-2009 the average inflation rate was 13.8.

According to the findings from the work of Hossain and Islam (2012), while higher rate of inflation is bad for an economy because of its negative effect on economic performance, zero level of inflation is as well harmful because it will lead to resultant stagnation of the economy since its presence at a much lower level is needed for economic growth. The trouble with inflation is it has no limit to national boundaries neither is it restricted to the level of development in the world; it is also a serious challenge in the developed economies, and since it is by no means a new challenge or phenomenon, over the years, its control has become the unquestioned tune of economic policymakers globally.

1.1 Objectives of the Study

The general objective of the study is to find out the impact of inflation on the economic growth in Nigeria. It is also part of specific objectives to find out the effects of other independent variables such money supply, interest rate and government consumption expenditure on the economic growth in Nigeria.

2. Literature Review

2.1 Theoretical Framework

Many schools of thought have linked inflation with factors that regarded to affect supply and demand which creates tendency in higher prices of goods and services in an economy for a certain period of time. Some of the theories of inflation considered in this study are Fisher's quantity theory of money, Keynesian Theory, Endogenous Growth Theory.

The quantity theory of money is one of the oldest classical economic doctrines which linked the general price level to changes in supply of money in circulation. This indicates that the quantity of money in circulation determines the inflationary or non-inflationary level of an economy. Below is the quantity equation as developed by Fisher.

$$MV = PT$$

Where: M = money supply; V = velocity of circulation; P = price level; T = transactions.

T measures the level of output and because of that is usually substituted for Y (national income). Hence, the equation above changes to (MV = PY), that is, the rate of expenditure must equal the value of output. Nonetheless, they argue that it is unnecessary increases in the money supply that manifest in inflation.

Keynesian theory of inflation as advanced by John Maynard Keynes (1883-1946) and his disciples were of the opinion that an increase in the level of aggregate demand is the cause of demand pull inflation. Such inflation arises when the aggregate demand for goods and services is in excess of the aggregate supply of goods and services in the economy. The components of aggregate demand are the government expenditure, consumption and investment. According to Totonchi (2011), policy that triggers decrease in each component of aggregate demand is effective in tackling inflation. This basically involves reduction in government expenditures, increase in tax as well as controlling interest rate. In Nigeria, where the productive capacity of the economy can hardly meet up with economy's demand due to its dependence on foreign market, may be faced with more inflationary pressures due to excess demand of goods and services.

Endogenous growth theory affirms that economic growth is derived by factors within the production process such as increasing return, economies of scale or induced technological changes; as against factors outside production process such as increase in population.

2.2 Empirical Review

The study on the impact of inflation on economic growth has made many scholars to empirically find out the nexus between inflation and economic growth in both the developed and developing countries. Below are some of the findings:

Jeremiah and Emmanuel (2015) examined the relationship between the rate inflation and the rate of economic growth using secondary data sourced from the Central Bank of Nigeria (CBN), Statistical Bulletin, and the National Bureau of Statistics (NBS). The study made use of Ordinary Least Square (OLS) logged multiple regressions with Gross Domestic Product (GDP) as the dependent variable and Inflation Rate (INFR), Exchange Rate (EXCHR), Input of labor and input of capital as the independent

variables. The findings revealed that inflation rate in line with apriori expectations had an insignificant positive relationship with the rate of economic growth. The study recommended that for sustainable economic growth to be achieved in Nigeria, the level of inflation should be made stable by the government.

Faira and Carneiro (2001) examined the linkage between inflation and economic growth in Brazil for the period between 1980 and 1995. The findings revealed a significant negative relationship in the short run while in the long run revealed insignificant effect on economic growth. This could be a situation where the scope of production can change to absorb the lag of excess demand. Omoke (2010) affirmed the findings of Faira and Carneiro to support the neutrality concept of money but however, found that inflation affects economic growth in the long run as found by some other researchers.

Ahmed and Mortaza (2015) found a statistically significant negative nexus between inflation and economic growth using CPI and real GDP as proxy variables for Bangladesh for the period between 1980 and 2016. This collaborated with the work of Saeed (2007) for Kuwait between 1985 and 2005 which revealed long run and strong negative relationship between CPI and real GDP.

Erbaykal and Okuyan (2008) examined the relationship between inflation and economic growth for Turkey from the period of 1987 to 2006 and the findings revealed that there exists a negative and significant relationship in the short run but no significant relationship was found between the two variables in the long run. They further carried out causal relationship between the two variables with the findings showing a unidirectional causality relationship from economic growth to inflation.

Omoke and Oruta (2010) made use of data covering the period of 1970 to 2005 to find out relationship between inflation and economic growth in Nigeria. The study adopted Johansen-Juselius Co-integration technique which is considered superior to Engle and Grager (1987) in establishing co-integration properties of variables in a multivariate context. The results revealed a no co integrating relationship between inflation and economic growth in Nigeria. The study further made use of VAR-Granger causality at two lag periods and found a unidirectional causality running from inflation to economic growth and the study therefore concluded that inflation has an impact on economic growth.

Fakhri (2011) examines the effect of Inflation on economic growth from 2000 to 2009 in Azerbaijan. The variables used were inflation proxy by consumer price index, growth rate of real gross fixed capital formation and real gross domestic product growth. A non-linear nexus of inflation and economic growth was revealed after an estimated threshold model, 13 per cent was discovered as the threshold point of inflation for growth of the economy. When the rate of inflation is above the 13 per cent threshold, its influence on economic growth becomes negative and the reverse is the case when inflation is below the 13 per cent threshold.

Hussain, Shabir and Kashif (2016) examine the impact of macroeconomic variables which includes rate of inflation rate, exchange rate, interest rate on Gross Domestic Product in Pakistan. The study made use of time series data from the year 1980 to 2011; data was sourced from the State Bank of Pakistan and the website of World Bank. Multiple regressions and descriptive statistics were employed. The variables used

in the model consist of Gross Domestic Product, the exchange rate, interest rate and inflation rate. Inflation and interest rate were found to have negative and significant impact on Gross Domestic Product. In Nigeria, the quests for improved economic growth in most cases have twisting effects on upward price movement (Oladipo & Akinbobola, 2011). Ogwu (2010) affirmed that inflation negatively affects the poor the most as they can not protect themselves from the rising commodity prices. The study further affirmed that the cost push inflation arises due to the depreciation of naira which raises the prices of essential commodity as well as other imported commodities. Consequently, more demand for wage increase will be raised to offset the hike in price and the real wages will continue to fall as the price will keep on rising after the increase in wages. This incidence will impact negatively on the low and medium income workers and non-working population who may have not benefited from the income increase or have little income increase that may not match up with the wage increase in the economy.

Anidiobu, Okolie, and Oleka (2018) examine the impact of inflation on economic growth in Nigeria from the period of 1986-2015. Data was sourced from the website of Central Bank of Nigeria (CBN). Descriptive statistics and Ordinary Least Square (OLS) estimation technique were used to estimate the variables. Real Gross Domestic Product is the proxy for economic growth (dependent variable) while, the inflation rate, exchange rate and Interest rate were the independent variables. The findings revealed that the rate of inflation has a positive and insignificant effect on economic growth in Nigeria, a total departure from Idris and Suleiman (2019).

Idris and Suleiman (2019) examine the effect of inflation on economic growth in Nigeria using vector error correction mechanism. Variables used for the study consist of GDP, exchange rate, inflation rate and interest rate. The study was from 1980-2017 and the result was that in the long run inflation and interest are statistically significant and have a negative relationship with economic growth.

Adaramola and Dada (2020) examine the effect of inflation on economic growth from 1980 to 2018. Time series data on inflation rate, government consumption expenditure, exchange rate, supply of money, rate of interest, degree of openness and real GDP was utilized for the study. The study employed ARDL model, test for normality, cumulative sum test, heteroscedasticity test, and serial correlation LM test. Results found that interest rate and money supply have a direct linkage with the economic growth; while, exchange rate and inflation have an inverse relationship with economic growth.

3. Methodology

This study examines the impact of inflation on economic growth of Nigeria from the period 1990-2020. The time series data was sourced from the database of Central Bank of Nigeria statistical bulletin and that of World Development Indicators. The study made use of other variables that are directly linked with inflation such as interest rate, money supply, government consumption expenditure. The study employs autoregressive distributed lag model (ARDL) and Augmented Dickey Fuller to test the existence of unit root of the variables.

3.1 Model Specification

In an attempt to find out the impact of inflation on economic growth of Nigeria, the study modifies the model in the work of Olugbenga A.A and Oluwabunmi Dada (2020). The model for this study is as follows:

$$GDP = f(INFR, INTR, MS, GCE) \ldots\ldots\ldots\ldots\ldots 1$$

$$LGDP_t = \propto_0 + \beta_1 LGDP_{t-1} + \beta_2 INFR_{t-1} + \beta_3 INTR_{t-1} + \beta_4 LMS_{t-1} + \beta_5 LGCE_t + \mu_t \ldots 2$$

4. Estimation Technique

4.1 Unit Root Test

Macroeconomic variables are generally known with their random walk nature, which can be mitigated when converting it into first differencing. Datta and Kumar (2011) note that regressing a non-stationary series on another would generate spurious results. In an attempt to guide against this, Augmented Dickey-Fuller (ADF) technique developed by Dickey and Fuller (1979) was employed. This test is necessary as it guides the study on the selection of appropriate estimation techniques required for the analysis.

4.2 Bounds Test

The study conducted co integration test to find out whether the dependent and independent variables have a long run association using ARDL Bounds Test to co integration method.

4.3 Autoregressive Distributed Lag

Following the unit root test, the study proceeds to examine short- and long run relationship among the variables. This is done using autoregressive distributed lag (ARDL) known as the bound test approach to co-integration. ARDL model developed by Pesaran, Shin and Smith (1996) and later popularized by Pesaran, Shin and Smith (2001) is more advantageous to other co-integration procedures as it can be used when the variables under consideration are integrated of order zero I(0) and order one I(1) but will crash when integrated stochastic trend of I(2) is found. With this, bound test eliminates the variability in the order of integration against co-integration approach.

5. Results and Discussion

5.1 Descriptive Statistics

Below Table 1 showed the descriptive statistics of the variables of the study. The variables statistics are depicted in terms of their mean value, maximum value, minimum value as well as standard deviation. The maximum value of log (MS) for the period under study is $31.28498 which was recorded in 2020, while the minimum value is $24.77598 which was recorded in 1990. The mean value log (MS) is $28.63007. Likewise, the maximum value of (INFR) is 72.83550 which were recorded in 1995 while the minimum value is 5.388008 which were also recorded in 2007. The mean value of INFR for the period under study is $18.03692. For the descriptive statistics of the log GDP, the maximum value stands at $27.02712 which was recorded in 2014 while the minimum value is $24.04658 which was recorded in 1993. The mean of the log value of GDP for the period under study is $ 25.74475.

Table 1. Descriptive Statistics of the Variables

	LGDP	LGCE	LMS	INTR	INF
Mean	25.74475	27.00653	28.63007	7.570580	18.03692
Median	25.89451	27.68055	28.59148	7.415833	12.21778
Maximum	27.02712	30.22865	31.28498	11.06417	72.83550
Minimum	24.04658	22.52090	24.77598	3.268333	5.388008
Std. Dev.	1.000395	2.473152	2.027976	1.669945	16.65557
Skewness	-0.167369	-0.322603	-0.288499	-0.061577	2.131277
Kurtosis	1.403135	1.565771	1.778393	3.340140	6.408361
Jarque-Bera	3.438451	3.194684	2.357615	0.169030	38.47395
Probability	0.179205	0.202434	0.307645	0.918958	0.000000
Sum	798.0872	837.2024	887.5321	234.6880	559.1446
Sum Sq. Dev.	30.02370	183.4945	123.3806	83.66151	8322.245
Observations	31	31	31	31	31

Source: Author's Computation using Eview 9. LFDI = Log Foreign Direct Investment, LGDP = Log Gross Domestic Product, EX = Exchange Rate, INF = Inflation, TRADE = Trade

5.2 Unit Root Test

Table 2 below depicted that LGDP, LGCE, INFR were not stationary at level until after taking the first difference at 5% level of significance. Log Money Supply, interest rate (INTR) were stationary at level at 5% level of significance even before taking the first difference. As a result, all the variables under this study were stationary and therefore integrated of order I(I) or I(0).

Table 2. Summary of Augmented Dickey Fuller Unit Roots Test

Variables	Test Statistic at Level	5% Critical Value at Level	P-Value at Level	Test Statistic at First Diff	5% Critical Value at First Diff	P-Value at First Diff	Order of Integration
LGDP	-0.442708	-2.963972	0.8890	-4.216943	-2.967767	0.0027	I(I)
LMS	-3.217815	-2.963972	0.0287	-2.907648	-2.967767	0.0567	I(0)
INFR	-2.056721	-2.963972	0.2626	-4.442191	-2.967767	0.0015	I(I)
LGCE	-1.413785	-2.963972	0.5623	-5.615604	-2.967767	0.0001	I(I)

INTR	-3.792030	-2.963972	0.0074	-6.198973	-2.971853	0.0000	I(0) I(I)

Source: Author's Computation using Eview 9 LGDP = Log Gross Domestic Product, LMS = Log Money Supply, INFR = Inflation Rate, LGCE = Log Government Consumption Expenditure, INTR = Interest Rate, Log = Natural Logarithms.

Table 3. Autoregressive Distributed Lag Bounds Test

Computed F Statistic	**K**	5% critical bound test value Lower Bound	Upper Bound
0.883047	4	2.56	3.49

5.3 Bounds Test

The variables used for this investigation were either integrated of order I(0) orI(I) or both as revealed by the result of Augmented Dickey Fuller unit root test in Table 2 above. The study applied the bounds test to co integration to discover whether the variables have long run relationship as presented in Table 3 above. The F statistic value of 0.883047 from the result of ARDL bound test depicted in Table 3 above is less than the lower bound value of 2.56 at 5 percent level of significance. Hence, on the basis of this, the null hypothesis that states no long run relationship is therefore accepted and conclude that log GDP, log MS, log GCE, Inflation rate and Interest rate have no long run relationship over the period under study.

5.4 Autoregressive Distributed Lags (ARDL) Short-Run Estimate

To study made use of Autoregressive Distribution lag (ARDL) model as formulated by Pesaran and Shin (1998) for the data analysis because of its fitness and the fact that the variables employed for this study are integrated of the order one of as revealed by the unit root test in Table 2 above. This method was applied based of its applicability irrespective of whether the repressors in the model are purely I(0) or I(1) or mixed. In addition, to estimate the variables in the model, the study selected ARDL (1, 4, 4, 4, 4) as the result depicted in Table 4 below.

Table 4. Autoregressive Distributed Lag Result

D/Variable:GDP	ARDL	(1,4,4,4,4)		
Variable	Coefficient	Std. Error	t-Statitic	Prob.*
LOG(GDP (-1))	-0.893029	0.665917	-1.341050	0.2376
LOG(MS)	-0.947662	0.340948	-2.779494	0.0389
INF	-0.006688	0.002296	-2.912882	0.0333
INTR	-0.065686	0.026312	-2.496441	0.0447
LOG(GCE)	0.207569	0.058284	3.561357	0.0162
C	39.79030	14.77761	2.692607	0.0432

R-squared	0.998998
Durbin Watson st	2.615435
F- statistic	0.000004

Source: Author's Computation making use of Eview 9

Table 4 shown above indicated that the ARDL estimation has an R-square value of 99 percent. It revealed that 99 percent of the variation in GDP is explained by inflation rate, interest rate, money supply and government consumption expenditure for the period under study while the remaining 01 percent is explained by other variables not captured by the model. The result also revealed that the independent variables are mutually significant to explain the impact of inflation on economic growth (dependent variable) as showed by the significant probability value of the F statistic which is 0.00004.

Additionally, the findings revealed that inflation rate has significant negative relationship with economic growth. Precisely, a unit increase in inflation rate will bring about-0.006688 percent significant decrease in GDP at 5 percent level of significance. Also, the finding revealed that money supply has significant negative relationship with GDP. Specifically, a unit increase in the value of money supply will bring about-0.947662 percent decrease in GDP for the period under study. Moreover, the findings indicated that interest rate (INTR) has significant negative relationship with GDP. Precisely, a unit increase in (INTR) will bring about -0.065686 percent decrease in GDP. However, government consumption expenditure (GCE) has significant positive relationship with GDP. Precisely, a unit increase in log (GCE) will bring about 0.207569 increases in GDP for the period under study.

6. Conclusion and Recommendations

6.1 Conclusion

The study investigates the impact of inflation on the economic growth in Nigeria from the period 1990 to 2020. The study shows that inflation rate, money supply and interest rate have a significant negative impact on economic growth which implies that when the rate of inflation, interest rate and money supply increase, there will be decrease in GDP. However, government consumption expenditure shows significant positive impact on the economic growth.

Given that inflation rate has significant negative relationship with economic growth; it means that changes in inflation rate, money supply and interest rate in Nigeria will negatively affect economic growth. However, an increase in government consumption expenditure will trigger economic growth.

6.2 Recommendations

The results from this study recommends for possible consideration by government: that the Central Bank of Nigeria should use the instrument of monetary policy to tackle inflation, control money supply and interest rate.

Furthermore, policy measures should focus on encouraging government consumption expenditure because of its positive impact on economic growth. Efforts should be made to reinforce productivity by stimulating investment in the economy.

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