

EXAMINING THE EFFECT OF INFLATION ON ECONOMIC GROWTH IN NIGERIA

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Abstract

In Nigeria, past and present governments tried to reduce adverse effect of inflation on the economy but not much has been achieved in this direction. Therefore, this study makes an analysis on the effect inflation on economic growth in Nigeria over period of 1981 to 2018. To achieve the objective of the study, annual time series data on GDP (economic growth) inflation, exchange rate and interest rate were collected from the online database of central bank of Nigeria (CBN) and the world development indicators. The study employs augmented dickey fuller test (ADF), co-integration and vector error correction models. From the result of the ADF test the variables are stationary at first difference. However, the Johansen Co-integration test shows the existence of long run equilibrium relationship among the variables. The result of long run co-integration coefficients shows that inflation has negative and significant effect on GDP. Whereby, exchange rate and interest rate have positive and significant effect on GDP. In addition, the error correction term of the vector error correction model is negative and statistically significant. Based on the findings of the study, the study recommends that monetary authority should embark on inflationary targeting based on single digit inflation rate, government should encourage production of goods and services because increase in the output level can reduce inflation to the required minimum level and government should embark on suitable exchange rate and interest rate policies that will boost the economy.

Keyword: first keyword, Second keyword, Third keyword (Most relevant to your abstract)

1. INTRODUCTION

Price stability and sustainable economic growth are the main macroeconomic objectives in most of the developing countries like Nigeria. In accomplishing these objectives, Central Bank of Nigeria (CBN, 2011) acknowledges the existence of conflict between them necessitating some sort of trade-offs. Failure to give deserved attention to price stability in managing monetary policy in order to maintain sustainable economic growth and development cum strengthening purchasing power of the local currency could lead to economic stagnation (Umaru and Zubairu 2012). The debate whether inflation is desirable remains the topic of discussions among scholars and policy makers. For instance, Structuralists are of the opinion that inflation is vital for the growth of the economy of nations while according to the monetarist, Inflation is harmful to economic growth (.Shehu and Sa'ad ,2019; Doguwa, 2012). Nigeria as a country, has witnessed a number of inflationary adverse effects on the economy. These adverse effects or conditions, as highlighted by Sodipe (2015) have been blamed on poor investment trend; For instance, the proportion of real national output invested in Nigeria was about 23% in 1975. This fell marginally to 21% in 1980. It then collapsed to about 8% in 1985. The investment ratio rose temporarily to 12% in 1990, probably due to the effect of the Gulf War oil bonanza, before dropping sharply to 6% in 1995 and again rise marginally to 6.2 % in 2010 (NBS, 2012). Furthermore, the continued over valuation of the naira in 1980, even after the collapse of the oil boom has been adduced as another factor of inflation engendering significant economic distortions in production and consumption as there was a high rate of dependence on import which led to balance of payment deficits. The Structural Adjustment

Programme (SAP) in 1986, made government to reduce fiscal deficit because there was removal of subsidies and reduction in government's involvement in the economy. However, from the CBN statistical bulletin, the Nigeria's GDP dropped in 1990 from 8.3% to 1.2% in 1994, with inflation rising from 7.5% (1990) to 57.0% (1994). Again, the devaluation of the naira by the Central Bank of Nigeria (CBN) through the Second Tier Foreign Exchange Market (SFEM) led to a fall in agricultural outputs as machines and raw materials (mostly imported) were out of reach. It is against this backdrop that this study aims at investigating the effect of inflation on economic growth in Nigeria from the year 1981 to 2018.

Given the numerous literature reviewed in this study, on the effect of inflation on economic growth in Nigeria, it is clear that there is no consensus among scholars in this direction. This is because there are many conflicting views and empirical findings on the effect of inflation on economic growth. Some researchers find that there is a positive effect between inflation and economic growth. This can be seen in the study conducted by Umaru and Zubairu (2012) Enejoh and Tsauni (2017) Anidiobu, Okolie, and Oleka (2018), etcetera. While the studies that find this effect to be negative include, Kasidi and Mwanemmel (2013) Idris and Bakar (2017), et cetera.

Moreover, there are controversies in findings as early stated and different methods were used to arrive at these different findings. These led to different policy recommendations by different researchers. To contribute on the existing studies in this direction and to improve in the quality of the studies conducted this study focus on an empirical analysis on the effect of inflation on economic growth in Nigeria from 1981 to 2018.

1.1. Research Questions

1.2.

In this study, we want to examine whether there is the short and the long run relationship among the variables of interest namely: inflation, economic growth exchange rate, and interest rate.

1.2. Objective of the study

This study aims to examine the long run and short run relationship between inflation, exchange rate, interest rate and economic growth in Nigeria.

1.3. Hypotheses of the study

In this study, we want to test the hypothesis that inflation, exchange rate, interest rate has no significant effect on economic growth in the short run and the long run.

2. REVIEW OF RELATED LITERATURE

2.1. Concept of Inflation

In attempt to explain the concept of inflation, Fatukasi (2012) describes it as the persistent increase in the general price level within the economy which affects the value of the domestic currency. It is not once and for all upward price movement but has to be sustained over time and affect all goods and services within the economy. According to Jhingan (2008), the inflation which results from excess aggregate demand is called the demand pull inflation. The cost push inflation results from wage increases enforced by unions and profit increases by employers while the structure inflation arises from some constraints such as inefficient production, marketing and distribution systems in the productive sectors of the economy. Inflation is an economic situation in which the increase in money supply in an economy is faster than the increase in the new production of goods and services in the same economy. Inflation may be imported, open or seasonal. It is intrinsically linked to money, as captured by the often heard maxim "inflation is too much money chasing too few goods" (Friedman, 1960).

2.2. Economic Growth

According to Dwivedi (2004), economic growth on is a sustained increase in per Capita national output or net national product over a long period of time. It implies that the rate of increase in total output must be greater than the rate of population growth. According to Jhingan (2008), Economic growth is related to quantitative sustained increase in the country's per capita output or income accompanied by expansion in its labor force, consumption, capital and volume of

trade. However, Jumare, Yusuf and Mohammed (2016), opines economic growth as the product of the quality of output and output is determined by the quality of input. In traditional production theory resources used for the production of a product are known as factors of production, factors of production are now termed as inputs which means the use of the services of land, labor, capital and organization in the process of production. Economic growth is measured as a percentage change in the Gross Domestic Product or Gross National Product.

2.3. Exchange rate

Exchange is the rate at which one currency is exchanged for another. It is the price of one country's currency in relation to another country. According to Aliyu (2009) an exchange rate is a relative price of one currency in term of other that connects domestic and world markets for goods and assets. Black (2002) defined exchange rate as the price of one currency in terms of another. For example, the price of dollar to naira.

2.4. Interest Rate

According to Keynes, interest rate is the reward for not hoarding but for parting with liquidity for a specific period of time. It is however, the amount a lender charges for the use of assets expressed as percentage of the principal. The asset could be cash or goods.

2.5. Relationship between Inflation and Economic Growth

2.5.1. Keynesian School of thought

The traditional Keynesian model illustrates growth and inflationary relationship through the aggregate demand and the aggregate supply curves. The model is such that if the aggregate supply curve is vertical, changes on the demand side of the economy affect prices only if the aggregate supply curve is upwardly sloped changes in aggregate demand will affect both prices and output. In Gokal and Hamif (2004), moving from short run to hypothetical long run factors that drive inflation rate and output in the short run such as expectation, labor force, price of other factors of

production, fiscal or monetary policy are assumed to balance out in the steady state. This is because the dynamic adjustment of short run aggregate demand and aggregate supply curves yields an adjustment path which exhibits an initial positive relationship between inflation and growth which turns negative towards the higher part of the adjustment.

2.5.2. Monetarists' school of thought:

The monetarism emphasized several long run properties of the economy such as the quantity theory of money and the availability of money. The proponent is Milton Friedman. According to Gokal and Hamif (2004), the quantity theory of money linked inflation to economic growth by equating the total amount of spending in the economy to the total amount of money in circulation. Friedman looked at inflation being a product of an increase in the money supply and velocity of money at a rate greater than the rate of growth in the economy. Monetarism suggests that in the long run, prices are mainly affected by the growth rate in money while having no real effect in money but if the growth in the money supply is higher than the economic growth or output rate, it will manifest in inflation.

2.5.3. Neo Keynesian Model

As outlined by Enejoh and Tsauni (2017) one of the major developments under Neo-Keynesians was the concept of 'potential output', which is also called natural output. This is a level of output where the economy is at its optimal level of production, given the institutional and natural constraints. This level of output also corresponds to the natural rate of unemployment or what is called non-accelerating inflation rate of unemployment (NAIRU). NAIRU is the unemployment rate at which the inflation rate is neither raising nor falling. According to this theory, inflation depends on the level of actual output (GDP) and natural rate of unemployment. Firstly, if GDP exceed it potential and unemployment is below the natural rate of unemployment, other things being equal, inflation will accelerate as Suppliers increase their prices as built-in inflation worsen. Secondly, if the GDP falls below its potential level and unemployment is above the natural rate of unemployment, other

things being equal, the inflation rate will decelerate as Suppliers attempt to fill excess capacity, reducing prices and undermining built-in inflation. Finally, if GDP is equal to its potential and the unemployment rate is equal to NAIRU, the inflation rate will not change, as long as there are no supply shocks. However, after critically reviewing the theories, this study adopts the monetarist theory on inflation which posits that inflation retards economic growth.

2.6 Empirical Review

Several studies conducted research on the effect of inflation on economic growth. In the effort to examine the effect of inflation on economic growth in Nigeria, Anidiobu, Okolie, and Oleka (2018) utilized annualized data covering the period 1986 to 2015. Using Ordinary Least Square technique, the regression results indicated that Inflation Rate had a positive and non-significant effect on economic growth (measured by RGDP) in Nigeria for the period studied. Shame (2018), studied the impact of inflation on economic growth in Zambia for the periods of 1990 to 2017. The study found that there is no relationship between inflation and economic growth.

In a different manner, Enejoh and Tsauni (2017) analyzed the effect of inflation on economic growth in Nigeria for the period 1970 to 2016. The study employed ARDL approach to co-integration and error correction mechanism (ECM) to test both the short and long run impact of inflation on economic growth. The result showed that inflation and foreign exchange have positive impact on economic growth both in the short and long run.

On the contrary, Idris and Bakar (2017) explored the inflationary trend in Nigeria with the view to determining its impact on economic growth. The study adopted a descriptive method and further utilized charts to show the inflationary trend and GDP growth in order to provide better understanding on how inflation rates in Nigeria affects the desired level of economic growth. The study therefore concludes that the current inflationary trend in Nigeria is negatively affecting the realization of sustainable growth and development. This implies that one of the necessary requirements for attaining the desired growth level in Nigeria is to control the excessive increase in inflation rate.

However, Umaru and Zubairu (2012) investigated the effect of inflation on economic growth and development in Nigeria between 1970 -2010. Through the application of Granger causality test, the results of Causality suggest that GDP causes inflation and not inflation causing GDP. The results also revealed that inflation possessed a positive impact on economic growth through encouraging productivity and output level and on evolution of total factor productivity.

On the contrary, Hasanov (2011) examined the possibility of threshold effect of inflation on economic growth over the period of 2000-2009. Estimated threshold model indicate that there is a non-linear relationship between economic growth and inflation in the Azerbaijani economy and threshold level of inflation for GDP growth is 13 percent. Below threshold level inflation has statistically significant positive effect on GDP growth, but this positive relationship becomes negative one when inflation exceeds 13 percent.

However, Bawa and Abdullahi (2012) estimated a threshold inflation level of 13 per cent for Nigeria. Below the threshold level, inflation has a mild effect on economic activities, while above it, the magnitude of the negative effect of inflation on growth was high. The negative and significant relationship between inflation and economic growth for inflation rates both below and above the threshold level is robust with respect to changes in econometric methodology, additional explanatory variables and changes in data frequency.

On the opposite, Kasidi and Mwanemmel (2013) examined the impact of inflation on economic growth and established the existence of inflation growth relationship. Time-series data for the period 1990 to 2011 were used to examine the impact of inflation on economic growth. Correlation coefficient and co-integration technique established the relationship between inflation and GDP and Coefficient of elasticity were applied to measure the degree of responsiveness of change in GDP to changes in general price levels. Results suggest that inflation has a negative impact on economic growth. The study also revealed that there was no co-integration between inflation and economic growth during the period of study. No long-run relationship between inflation and economic growth in Tanzania.

Oladipo et al (2015), examined the inflation, interest rate and economic growth in Nigeria using annual time series data from 1981 to 2014. The study adopts the

Ordinary Least Square (OLS) method. The long run relationship among the variables was tested using Johansen co integration test and causality test was also carried out. The OLS result shows that both inflation and interest rate have negative impact on the economic growth. Johansen co integration shows that there is long run relationship among the variables under consideration. The Granger causality test shows that both inflation and interest rate do not Granger cause the economic growth in Nigeria.

Olu and Idih (2015) investigated the nature of relationship between inflation rate and economic growth rate in Nigeria. Ordinary Least Square (OLS) multiple regression was employed with Gross Domestic Product (GDP) as the dependent variable and Inflation Rate (INFR), Exchange Rate (EXCHR), Input of Labour and Input of Capital served as the explanatory variables. Results show that inflation rate had a positive relationship but non-significant with the economic growth rate. While interest rates and exchange rate are negatively related to GDP.

Agwu (2015) explored the factors that contribute to economic growth in Nigeria. For the purpose of realizing the research objectives, Vector Error Correction Mechanism (VECM) was applied in order to ascertain the short-run and long-run dynamics of economic growth. The long-run estimate indicated that government expenditure and oil revenue boosted economic growth, while interest rate and inflation rate had significant negative effects on economic growth.

3. MATERIALS AND METHOD

To analyze the effect of inflation on economic growth in Nigeria from 1981 to 2018, the study subjected the variables to unit root test for stationarity, co-integration and vector error correction model. The study employs secondary data which were collected from the publications of various Government agencies

3.1. Model Specification

3.1.1. Johansen Co-integration

Co-integration Test and the Vector Error Correction Model (VECM)

This study adopts the Johansen co-integration test to investigate the long relationship between the variables

under study. That is, inflation (INF), interest rate (INTR), exchange rate (EXCR) and economic growth (GDP) as a system of interdependent equations.

$$Y_t = A_t Y_{t-1} + \dots + A_p Y_{t-1} + B\gamma + e_t$$

..... (1)

Where;

Y_t = dimensional vector of non-stationary I (1) variable

γ = γ – dimensional vector of deterministic variable

e_t = stochastic error residual

3.1.2. Vector Error Correction Model (VECM)

If long run relationship exists, the short run behavior of the variables can be investigated using error correction method (VECM). The reason behind using Error Correction Model as estimation model is because the time series are not stationary at their levels but stationary at their first differences, the variables are co-integrated of the same order, there exist long-run relationship among the variables and lastly it is capable of providing answer to the research question. The model is given as:

$$\Delta \ln GDP_t = \alpha_0 + \sum_{k_i=1} \alpha_1 \Delta \ln GDP_{t-k_i} + \sum_{k_i=1} \alpha_2 \Delta \ln E$$

$$XCR_{t-k_i} + \sum_{k_i=1} \alpha_3 \Delta \ln INTR + \sum_{k_i=1} \alpha_4 \Delta \ln INFL +$$

$$\sum_{k_i=1} \Delta \ln Ecm_{t-k_i} + e$$

..... (2)

4. PRESENTATION OF RESULTS

4.1. Unit Root Test

It is very vital to test whether the time series data are stationary to avoid spurious regression. Augmented Dickey-Fuller (ADF) test was used to find the order of integration. These tests showed how many times a variable needs to be differenced to become stationary.

Table 1: Unit root test results from Augmented Dickey Fuller Test at first difference

Variables	ADF at 1 st Difference	Critical value at 5%	Order of integration
Ln gdp	-3.180464	-2.945842	I(1)
Ln infl	-3.505344	-2.948404	I(1)
Ln intr	-7.482215	-2.945842	I(1)
Ln reer	-4.578174	-2.945842	I(1)

Source: Authors' computation using E-views 9

Table 1 presents the ADF unit root test for the variables used in the study. It shows that all our variables are non stationary at level but became stationary after taking the first differences.

4.2. Test Result for Co-integration ranks

After finding out that all the variables are stationary and integrated of the same order, co-integration became necessary. Unrestricted Co-integrated Rank Test (Trace) shows that there are two co-integrated equations. This means that economic growth (GDP), inflation, exchange rate, and interest rate, have long-run equilibrium relationship.

Table 2: Unrestricted Co-integration Rank Test (Trace Statistics)

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.
None*	0.467024	50.81638	47.85613	0.0257
At most 1	0.310313	28.16236	29.79707	0.0763
At most 2	0.253721	14.78776	15.49471	0.0637
At most 3*	0.111407	4.252176	3.841466	0.0392

Source: Authors' Computation using E-views 9

4.3. Vector Error Correction Model

Having established the long run relationship between GDP (Economic Growth), inflation, exchange rate, and interest rate, the next step is to establish the short-run and long-run relationship dynamics using the Vector

Error Correction Model. The estimated long run co-integration vector with GDP as dependent variable is presented in table 3 and the Short –run coefficient of vector error correction model is presented in table 4.

Table 3: The estimated long run co-integration vector with GDP as dependent variable

Variable	Coefficients	T- statistics
Lninfl	-1.054461	-19.7733
Lnreer	1.087283	5.24816
Lnintr	0.703569	2.14563

Source: Authors' Computation using E-views 9

The estimated long run co-integration vector is reported in Table 3. The result reveals that among all the variables, only inflation is negative and statistically significant. While exchange rate and interest rate are positive and statistically significant. The result suggests that a percentage increase in inflation decreases economic growth by 1.05% in the long run. This is similar to the findings of Idris and Bakar (2017), and Umaru and Zubairu (2012). However, the outcome of the estimated long run co-integration vector shows that a percentage increase in exchange rate increases GDP by 1.08% in the long run. So also, a percentage increase in interest rate increases GDP by 0.70% in the long run. However, this contradicts the work of Oladapo, etal (2015) and Olu and Idih (2015).

Table 4 Short –run coefficient of vector error correction model

Variable	Coefficient	T-Statistics
Ecm_{t-1}	-0.121242	-4.15693
LnGDPL1	-0.247088	-1.24037
Lninfl	0.366364	2.73910
Lnreer	-0.024320	-0.58481
Lnintr	-0.067620	-1.28344
R² = 0.657050		

Source: Authors' Computation using E-views 9

The result of the Short –run coefficient of vector error correction model presented in table 4 shows that the error correction term of -0.1212 is negative and statistically significant. It means that there is adjustment from short run to long run equilibrium among the variables (inflation, interest rate, exchange rate and GDP). It also reveals that the speed of adjustment is high. From the short run coefficient of vector error correction model, inflation is the only variable having positive effect on GDP, while interest rate and exchange rate have negative effects on GDP. From the result of the short run estimates, inflation is positive and statistically significant. It reveals that a percentage increase in inflation increases GDP by 36.6%. This is contrary with the long run estimates. However, interest rate and exchange rate are negative but not statistically significant. The result shows that a percentage increase in interest rates and exchange rates decreases GDP by 6.8% and 2.4% respectively. This also contradicts long run estimates. The R squared of 0.6570 suggests that about 66 percent of variations in GDP are explained by the explanatory variables. Therefore, a model has a good fit.

4.4. Diagnostic tests

To check if the model used in this study is in agreement with the data, some diagnostic tests were performed and which include serial correlation LM test, Residual hetroskedasticity and normality test. Conducting diagnostic tests is very crucial in the analysis since it reveals whether there exists a problem in the estimation of a model or not. For this study, the diagnostic tests carried out showed the following results as indicated in table 5.

Table 5: Post Estimation / Diagnostic test result

TEST	NULL HYPOTHESES	P value	REMARKS
Serial Correlation LM Test	No Serial Correlation	0.3348	Accept null hypotheses
Residual Heteroskedasticity	No Heteroskedasticity	0.1220	Accept null hypotheses
Normality Test	Residuals are multivariate normal	0.0000	Reject null hypotheses

Source: Authors' Computation using E-views 9

The Table 5 has shown the absence of Serial Correlation and heteroskedasticity, which means the data, is good and the results from the data can be taken seriously for policy recommendation

4.5. Discussion of findings

From the results presented, the study examines the effect of inflation on economic growth in Nigeria from 1981 to 2018. The facts and figures were obtained from the Central Bank of Nigeria and World Development Indicators. The result of the Johansen co-integration reveals that economic growth, inflation, exchange rate and interest rate have long run relationship among them. It shows long run relationship among the variables under study. This is in line with the study conducted by Oladipo et al (2015) and, Enejoh and Tsauni (2017). However, the study conducted by Kasidi and Mwakanemel (2013) contradicts this result.

From the result of the long run co-integration vector, inflation is negative and statistically significant. It denotes that inflation retards economic growth in the long run. This is line with the study conducted by Kasidi and Mwakanemel (2013), and Idris and Bakar (2017). This is also in line with the monetarist explanation of economic growth. The result is as expected because greater proportion of the society will suffer a lot when inflation occurs. These among others include salaries and wage earners, pensioners, land lords, debtors, interest and rent receivers et cetera, suffer a lot from inflation, thus, resulting from negative effect on the economy. However, the long run estimates implies that, exchange rate and interest rate have positive and significant effect on economic growth. This disagrees with the study conducted by Oladipo et al (2015) and, Olu and Idih (2015). Exchange rate can however, be used to bring in foreign direct investment, which when properly managed can bring in more employment opportunities, reduced the number of unemployed, increase the standard of living of many citizens and boost the economy of the nation. The result also suggests that interest rate has significant effect on GDP. Interest rates can be used to boost the economy. However, the interest rate must be low. Low interest rate is vital in encouraging investment in agriculture and industry. It makes public borrowing

cheap and encourages public investments which translates to economic growth.

5. CONCLUSION AND RECOMMENDATIONS

From the ongoing discussion, the study concludes that inflation has negative and significant effect on economic growth while exchange rate and interest rate have positive and significant effect on economic growth. The study also concludes that there exists long run relationship among the variables under study. Based on the findings of the study, the study gave the following recommendations:

Monetary authority should embark on inflationary targeting based on single digit inflation rate.

Government should encourage production of goods and services because increase in the output level can reduce inflation to the required minimum level.

Government should embark on suitable exchange rate and interest rate policies that will boost the economy.

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