



A PRELIMINARY INVESTIGATION ON INFLATION AND DETERMINANTS IN NIGERIA: A CAUSAL RELATIONSHIP APPROACH

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Abstract

In recent time, despite the stressed commitment of the Central Bank of Nigeria (CBN) to achieve low and stable price level to enhance sustainable economic growth, the Nigerian economy has continued to witness a persistent upward trend and volatility in her domestic price level while her performance in terms of economic growth has remained sluggish and unimpressive. This paper therefore examines the direction of causal relationships that exist between inflation and its possible determinants in Nigeria, for a period which spans through 1980 to 2012, applying Nigerian time series and econometric analysis based on Granger causality test. The analysis of the findings established that unidirectional relationship runs from inflation to interest rate and from government fiscal deficit (GFDS) to inflation, implying that in Nigeria, inflation predominantly determines interest rates without a feedback, while GFDS determines inflation without a feedback. The result also shows that bilateral causality runs significantly from inflation to output income (GDP), money supply and exchange rate, implying that they determine inflation with feedback. Based on these findings, the study recommends the sustenance of increase in production capacity through economic efficiency which will dampen the inflationary pressures. The optimal interest (lending) rate should reflect the overall internal rate of return in the productive sector with due attention to market fundamentals. There is need for fiscal policy initiatives that will channel funds to the productive sector and thus, excess liquidity could be minimized in the system. Monetary authority should ensure effective coordination of monetary and fiscal policies to avoid counter-cyclical effect. Overall, since bilateral causality runs from inflation to GDP, the monetary authority should not lay much emphasis on price stability at the negligence of economic growth as it does not maximize social welfare.

Keywords: *Inflation, Determinants, Unit Root and Causality Test*

Background to the Study

In most developing economies, the maintenance of price stability has continued to be an overriding objective of monetary policy, based on the implicit belief that no sustainable growth can be achieved in the midst of persistent rise and volatility in price level. Since 1980s, this objective has become very difficult to achieve in Nigeria and her performance in terms of her economic growth has been very sluggish. In pursuit of this objective, the Nigerian Monetary authorities have adopted (and are still pursuing) several reforms/policies, in line with neo-liberal thinking. It seems however, that these goals are unattainable. Inflationary pressures has really remained a central issue to both policy makers and other stakeholders based on the

distortions it can exert on macroeconomic conditions and its potentials to derail the economy from the path of sustainable economic growth. Many scholars have long held the view that the sources and behaviour of inflation in Nigeria have not been properly understood and thus, inappropriately managed. Several attempts by different studies have been made to explain why inflationary pressures seem to be defying all these attempts to abate its rapid progression. Motley, (1998), Fakayesi, (1996), Moser (1994), Mordi, et al (2007), Asogu, (1991), Cozier and Solody, (1992) and Odusola, (2006), Fuller et al (1997) are among the related studies made on inflationary tendencies.

Inflation rate in Nigeria was relatively stable between 1960s and 1970s. But between 1987 and 2012, the incidence of high rate of inflation became more frequent. (CBN, 2012). This was attributed among other factors, to the introduction of Structural Adjustment Programme (SAP) in 1986, (Asogu, 1991). Between 1987 and 1995, inflation rate rose from 5.4 per cent to 72.8 per cent. As at 2012, the inflation rate stood at 12.7 per cent which is still more than the single digit policy target. It was quite obvious that the rising prices and the interest rate in the industrialized economy of the trading partners were imported into Nigeria through the country's high marginal propensity to import. (Masha, 2000 and Asogu, 1991).

Against this background of high and volatile price level, which is accompanied with declining productivity signals and Nigeria being a developing economy characterized by significant debt burden, structural imbalance and uncertainties, an insight into the determinants of inflationary pressure is pertinent.

Potentially, unfavorable implications of inflationary pressure are reflected on its adverse effect on macroeconomic activities. However, in an inflationary environment, rising productivity could cushion the effect of price increase. (Nnanna, 2002).

There is also less than full agreement on the sources of the transmission of inflationary negative influence on the growth of the economy (Trueman, 2003). It is therefore pertinent to empirically confirm the major determinants of inflationary pressure which is a first step to controlling inflation in Nigeria.

It is difficult to forecast under high inflationary pressure. This may make it more difficult to deduce the real return on investment from available market information and thus, may cause investors/savers to be less willing to take long run nominal contracts and projects. The resultant reduced stock of productive capital may in turn imply a dearth of long-term project investments and thus, lower level of future GDP. (Motley, 1998 and Shiratsuka, 1997)

Furthermore, there is a general believe that most central banks places much weight on price stability with minimal weight being placed on economic growth which is the ultimate objective of the monetary policy. This is not likely to maximize social welfare. It apparently implies that the weight of contraction or expansion of the economy does not really matter to the monetary policy makers, as long as price stability is achieved. (Piu, 2003; Woodford, 2003 and Mordi, 2009). Since these goals complement one another, a coherent and effective monetary policy

framework can resolve this problem by recognizing the relative weight to be placed on these apparently conflicting and competing objectives and prioritizing them accordingly.

Consequently, establishing empirically the direction of causal relationship that exists between inflation and its selected determinants especially output income (GDP) will enable monetary policy makers recognize the relative weights that would be placed on them. This will enhance formulation of appropriate policy strategies for redressing the imbalances.

However, none of the related reviewed studies mentioned above explicitly modeled their studies using modern analytical econometric models like unit root and Granger causal tests. For instance, studies like Moser (1994), Odusola (2006), Fakayesi (1996), Busari (2007), Fuller et al (1997, Asogu (1991), Motley (1998) did not apply unit root test. Mordi, et al (2007) applied unit root test but did not use Granger causal test. .None application of the unit root test can lead to biased results due to spurious regression. (Eagle and Granger, 1987 and Gujarati and Porters, 2009).

In addition, most of them used panel and cross-sectional approach without taking into consideration the country's policy differences. Motley (1998) and Cozier and Solody (1992) used cross-sectional approach. The applications of cross-sectional studies implicitly assume common structure of the economy across the countries. Shan and Sun (1998) argued that parameter variations between various countries can lead to misleading results. Recognizing these gaps and challenges, this study seeks to examine this problem holistically and therefore extends prior research by applying unit root and Granger causal tests, using Nigerian time series data to see if a more authentic result could be achieved for effective policy planning and implementations. This paper is structured into five sections. Section one introduces the study. Section two covers the related reviewed literature. In section three, the empirical methodology of the study is introduced. Section four presents the data and analysis of the major findings, while section five concludes the study with some recommendations.

Objective of the Study

The main objective of this study is to examine empirically the major determinants of inflation in Nigeria by establishing the direction of causality that exist between inflation and the generally accepted inflation determinants, through identification of the nature of their causal relationships. Adequate knowledge of the causal relationships can lead to efficient management of inflation and this will enhance economic stability and sustainable economic growth within a developing economy like Nigeria.

Hypothesis

In order to achieve this objective the following hypothesis is formulated:

There is no Granger causal relationship between inflation and some selected and generally regarded major inflation determinants which include money supply, exchange rate, interest rate, government fiscal deficit, and income output (GDP) in Nigeria.

Literature Review

The concept of inflation and economic growth has been defined in various ways by different scholars of economics. Although the definitions are varied, it is pertinent to note that no definition is quite explicit in explaining the concepts of the two economic variables. However from the various definitions we may attempt to assert what determines the cause of inflation and how it influences economic growth.

Inflation is described as a situation of rapid, persistent and unacceptably high rise on the general price level, in an economy, resulting to general loss of purchasing power of the domestic value of currency. It is a persisting decline in the value of money as a medium of exchange. Depending on the pace of decline, inflation may be described as creeping, marching or galloping. Simply put, inflation is defined as a sustained rise in general price level. Included in this definitions are the prices of those currently produced goods and services and do not include those of assets. Ajai and Ojo (1981) see inflation simply as a “sustained” rise in price. In this sense inflation is not clearly defined with reference to price. Lavy and Sarvet, (1987) and Coates, et al (1978) defined inflation as” substantial sustained increase in the general price level.”

Comparatively, the definitions by Lavy and Coates, et al have the merit of having eliminated transitory price fluctuation. Their definition implies that a once and for all rise in price level may not depict an inflationary phenomenon but if the situation is sustained, inflation is implied with serious consequences for macroeconomic stability. These definitions, however fail to explain what constitutes a substantial price increase and it is therefore ambiguous. However, this depends on the institutional structure of the economy, the extent to which inflation has been anticipated, and how it is controlled within the economy.

Others have defined it as a condition of generalized excess demand for stocks of goods and flows of real money income, a fall in purchasing power of money and an excess of wages claim over productivity growth Orubu (2009) and Fakiyesi (1996).

In the economic literature, the concept of inflation has been, intrinsically linked to money, as captured by the often heard maxim “inflation is always and everywhere a monetary phenomenon” as by Hamilton (2001) citing the quantity theorists represented by Milton Friedman,(1968). Thus in the long-run, as money supply increases the price level also rises. By implication since monetary aggregates are normally the assets/ liabilities of central banks, it is believed that central banks can reasonably control the quantity of money supplied at a level consistent with the absorptive capacity of the economy. At that level, macro economic conditions are expected to be stable. When the price stability objective is achieved, it ushers in higher levels of economic wellbeing among the citizenry.

Generally, three major aspects for explanation of inflation include fiscal, monetary and Balance of Payment (BOP). While in the monetary aspect, inflation is considered to be due to an increase in money supply in the fiscal aspect, the budget deficits are assumed to be the fundamental cause of inflation especially in countries with prolonged high inflationary pressure. In the Balance of payment aspect, emphasis is given on the exchange rate depreciation which brings

about inflation, either through high import prices and increase in inflation expectation which are accommodated, or through an accelerated wage indexation mechanism. (Akinlo, 2007).

The nature and causes of inflation in developing economies have been examined by various studies like Fakiyesi (1996), Aghevli and Khan (1978), Busari (2007), Kim (2001), Onwioduokit (1999), Odusola and Akinlo (2001) and they conclude that Inflationary pressures have been attributed collectively by demand pressures, wage pressures, government monetary factors, exchange rate depreciation, high rate of lending rate, and decline in output.

Proponents of the fiscal have focused their attention on the sources of monetary growth. Working primarily in a closed context, authors such as Sargent and Wallace (1981) has argued that autonomous expansion of base money essentially arises from a fiscal disequilibrium. Those who advocate the “balance of payment” view, tend to emphasize on the role of exchange rate. A strong form of this view has been taken by Liviatan (1986), who sees inflation as highly linked to exchange rate depreciation, which increases the underlying rate of inflation either through increases in inflation expectations, which are then accommodated by monetary authorities or through the wage indexation mechanism. In Liviatan's view, this is primarily because by depleting the Central Bank's foreign assets, it will prompt a balance of payment crises, which will then generate inflation through one of the mechanism mentioned above.

Along this line of reasoning, the current high inflation in Nigeria has been attributed to the huge government fiscal deficits, financed largely by the CBN which resulted in excess liquidity in the banking system and a subsequent increase in domestic aggregate demand, increased cost of production due to continued depreciation of the Naira, high interest rate (prime lending rate) coupled with depressed investment output (CBN 1994).

Methodology

Estimation Technique and Procedure:

The study applied modern econometric analytical techniques which include unit root test and Granger causality test using time series data from CBN Statistical Bulletin 2012 and Annual Reports and Statement of Accounts, 2009.

Unit Root Test:

From the empirical studies reviewed, there was no application of unit root test. In line with recent development in time series modeling, unit root test is basically required to establish whether the time series have a stationary trend, and if non-stationary, the number of times the variable has to be differenced (screened) to arrive at a stationary. This could form the strategy and reduce (if not eliminate) the risk of spurious regression. (Engel and Granger, 1987).

Sometimes, time series data is subject to accidental or auto/serial correlation. This is informed by the basic concepts in time series econometrics which states that empirical work on OLS multiple regression analysis for time series data, implicitly assumes that the underlying time series is stationary. But sometimes auto or serial correlation may result, due to the fact that underlying time series is non-stationary. This may give rise to spurious regression and it misleads the analyst (Granger and Newbold, 1974 and (Gujarati and Porters, 2009).

Consequently, prior to testing for the direction of causality, the first step is to check the stationary property of the variables used in the model. This is to establish whether the time series have stationary trend and if non-stationary, to show the order of integration through 'differencing'. A time series is stationary if the mean, variance and auto-variance are not time-dependent. The Augmented Dickey Fuller (ADF) (1981) unit root test was applied. The assumption is that the time series used for this research have unit root stochastic process which can be represented as follows:

m

$$Y_t = \alpha + \beta_1 Y_{t-1} + \dots + \beta_m Y_{t-m} + \epsilon_t \quad (1)$$

where Y is the single time series for (INF, MS, INT, FXR and GDP) under investigation and the parameter coefficient, ϵ_t is a pure white noise error term, β_i and α are coefficients of the lag terms and m is the length of the lag terms which is automatically selected using Akaike information criteria. If ' α ' is 0, then there is unit root which implies non-stationary, but if it is less than zero (negative), the null hypothesis is rejected and the alternative that the series is stationary is accepted (Kwiatkowski et al 1992). Where:

- INF_t = Inflation
- FXR_t = Exchange rate (nominal)
- M^s_t = The stock of money supply – M₂
- GDP_t = Aggregate income or output
- Int_t = Interest rate – Maximum Lending Rate
- GFDS = Government Fiscal Deficit/Borrowing
- μ = Error Term

Granger Causality Test

This test is important in determining if it is inflation or determinants variables are significant in either enhancing or deteriorating the rate of each other in Nigeria. Although correlation analysis deals with dependence of one variable on the other, it does not imply causation in the real sense. (Zellner, 1979). A statistical relationship in itself cannot logically imply causation. (Kendal and Stuart, 1961). Consequently, the Granger Causality test (1969) which measures both causation and direction was performed on the variables. The test enables us to determine whether lagged information on inflation as well as that of the selected determinant, has any statistical significant role in explaining the effect of inflationary tendencies in Nigeria. The test was run with an optimal lag of two.

Thus, according to Granger, (1969) variable X Granger causes variable Y if the past values of X can be used to predict Y more accurately than simply using the past values of Y. The test involves estimating the pair of regression as expressed below using Foreign exchange rate and inflation as example:

$$\text{INF}_t = a_0 + \sum_{i=1}^n \beta_i \text{FXR}_{t-i} + \sum_{j=1}^n \gamma_j \text{INF}_{t-j} + \mu_1 \dots\dots\dots (2)$$

$$\text{FXR}_t = b_0 + \sum_{i=1}^n \alpha_i \text{INF}_{t-i} + \sum_{j=1}^n \delta_j \text{FXR}_{t-j} + \mu_2 \dots\dots\dots (3)$$

Equation 16 postulates that current inflation INF_t is related to a number of foreign exchange lags (FXR_{t-i}) or past values of FXR as well as its own past values (INF_{t-j}) where β_i and γ_j are their coefficients, i and j indicate length of time lags while μ_1 is the error term and n is the number of lag terms included. INF_t is the current value of inflation (INF). It is assumed that the error terms μ_1 and μ_2 are uncorrelated. The F-statistic is used for the joint test of hypothesis that:

$$\beta_1 = \beta_2 = \dots = \beta_n = 0 \text{ in equation (2) and } \gamma_1 = \gamma_2 = \dots = \gamma_n = 0 \text{ in equation (3)}$$

In like manner, equation (3) postulates that current foreign exchange rate (FXR_t) is related to a number of inflation lags (INF_{t-i}) or past values of INF as well as its own past values, where n is the number of lag terms. This process applies to each parameter used in the study. Bilateral, unilateral and dependent relationship can be established.

Bilateral causal relation exists when both null hypotheses are rejected indicating that both coefficients are statistically and significantly different from zero in both regression. This implies a feed-back.

Unilateral causal relation exists when we accept one of the null hypotheses and reject the other. Lastly, independent causal relation exist when we accept both null hypotheses (Gujarati,2009).

Data Presentation and Analysis of Empirical Results

Table 4.1
 Summary of Unit Root Test Result Data Presentation

VARIABLE	AT LEVEL		FIRST ORDER DIFFERENCE		Remarks
	ADF Test Stat	Order of Integration	ADF Test Stat	Order of Integration	
ln(INF)	-2.187927	-	-3.226143	/ (1)	**
ln(GDP)	-1.777078	-	-3.999801	/ (1)	***
ln(MSP)	-2.551252	-	-3.378241	/ (1)	**
ln(FXR)	-1.336185	-	-3.614041	/ (1)	**
ln (GFDS)	-2.223511	-	-6.966956	/ (1)	***
ln(MLR)	-2.259895	-	-5.900253	/ (1)	***
Note:	Critical Value:		Critical Value:		
	1%	= -3.6852	1%	= -3.6959	
	5%	= -2.9705	5%	= -2.9750	
	10%	= -2.6242	10%	= -2.6265	

Source: E- View Econometric computer software application, Version 6

* = 10% level of Significance

** = 5 % level of significance

*** = 1 % level of significance

Analysis of Unit Root Test Result

In view of the suspected time-dependent feature of the time series variables used for the study, the Augmented Dickey Fuller (1981) unit root test method was applied separately on all the variables at ordinary level and first order series to determine if they are non-stationary or not. The result as presented in table 4.1 shows that the null hypothesis of non-stationarity can only be rejected after the first order differencing / (1) for all the variables at one and 5 per cent levels of significance. This is evidenced by ADF test result at the ordinary level, which shows that the computed negative ADF test statistics for each variable are less than the Mackinnon critical values (Mackinnon, (1991), in absolute term. Thus, the null hypothesis is accepted at level series indicating that the variables are non-stationary.

Table 4. 2: Pairwise Granger Causality Test Result

Sample: 1982 – 2012

Date: 10/02/2013 TIME: 12.19

Lags = 2

Observation = 31 (After Adjusting Endpoints)

Null hypothesis	F-statistics	Probability
Ln(INF.) does not Granger cause Ln(MLRI)	3.66705	0.03567*
Ln(MLR) does not Granger cause Ln(INF.)	0.27782	0.74994
Ln(GFDS) does not Granger cause Ln(INF)	9.21139	0.00115*
Ln(INF) does not Granger cause Ln(GFDS.)	0.34915	0.70896
Ln(INF) does not Granger cause Ln(FXR)	7.02984	0.00416*
Ln(FXR) does not granger cause Ln(INF.)	3.01346	0.04571*
Ln(INF) does not Granger cause Ln(MS)	8.05879	0.00223*
Ln(MS) does not Granger cause Ln(INF)	4.83583	0.02457*
Ln(INF.) does not Granger cause Ln(GDP)	5.26011	0.01022*
Ln(GDP) does not Granger cause Ln(INF.)	8.15650	0.00128*

5 per cent significant level

Source: E-View Econometric Computer software application, version 6.

Summary of Analysis of Pair-wise Granger Causality Test Result

Although regression analysis deals with dependence of one variable on the other, it does not imply causation in the real sense. (Zellner, 1979). A statistical relationship in itself cannot logically imply causation. (Kendal and Stuart, 1961). Consequently, the Granger Causality test (1969) which measures both causation and direction was performed on the variables.

The test was run with an optimal lag of two. The results alternate between the cases of bilateral and unilateral depending on the lag length allowed. We reject the null hypothesis if the F-statistics is significant or accept based on the non-statistical significance of the F-statistics and the probability values. The result as presented on table 4.2 shows that unidirectional relationship runs from inflation to interest rate (MLR) (that is, inflation Granger causes MLR) and from government fiscal deficit (GFDS) to inflation, implying that in Nigeria, inflation predominantly determines interest rates without a feedback, while GFDS determines inflation without a feedback. The result also shows that bilateral causality runs significantly from inflation to money supply and exchange rate and output income (GDP) implying that they determine inflation with feedback. There is no independent process.

In summary, the above Granger causality result is inconclusive since there are unidirectional and bilateral relationships among some of the time series variables used in the study. However, it agrees with the findings of Kara and Pentecost (2000) which shows that causality tests are mixed and inconclusive depending on the variables used.

Conclusion and Recommendations

This study attempts to, empirically, examine the direction of causal relationships that exist between inflation and some selected possible determinants in Nigeria by applying econometric analysis based on Unit root test and Granger Causality (1969) approach, between 1980 to 2012. The result established that the time series variables used for the study have unit root or are non-stationary at first level but become stationary after first “differencing” in order to avoid spurious regression

Furthermore, significant feed-back Granger causality relationship exist between inflation and money supply, exchange rate and output income (GDP) attesting that they can cause a change on each other. Unilateral Granger causal relationship exists between inflation and interest rate, implying that inflation predominantly determines the maximum lending interest while government excessive fiscal deficit predominantly determine inflationary tendencies without a feed-back.

Based on the analysis of the findings, the study recommends the sustenance of increase in production capacity through economic efficiency which will dampen the inflationary pressures. The optimal interest (lending) rate should reflect the overall internal rate of return in the productive sector with due attention to market fundamentals. There is need for fiscal policy initiatives that will channel funds to the productive sector and minimize excess liquidity in the system. Monetary authority should ensure effective coordination of monetary and fiscal policies to avoid counter-cyclical effect. Overall, an important policy implication is that since bilateral causality runs from inflation to GDP, the monetary authority should not lay much

emphasis on price stability at the negligence of economic growth as it does not maximize social welfare.

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DEPOSIT MOBILIZATION AND LENDING BEHAVIOUR OF BANKS IN NIGERIA (1996-2014)

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Abstract

The study attempts to evaluate the relationship between deposit mobilization and lending behavior of banks in Nigeria using data spanning (1996-2014). Secondary data was used and collected from CBN statistical bulletin and hypotheses were formulated and tested using ordinary least square (OLS) model. The study reveals that there is a positive significant relationship between deposit mobilization and credit to manufacturing sector. The study also reveals that there is a negative significant relationship between deposit mobilization and credit to agricultural sector in Nigeria. The study therefore, recommends that government intervention and regulation should not distort the workings of the market mechanism in the banking sector. Banks should be provided with greater autonomy so that they might be able to develop a variety of savings instruments and enjoy greater freedom in the determination of interest rates. CBN and government should do more than they are currently doing by broadening the credit guarantee scheme to meet the greater needs of the bank's customers. Stakeholders in the agricultural sector should have a formal arrangement that will enable them to access credit in the banking industry.

Keywords: *Deposit, Mobilization, Lending Behavior, Banks and Nigeria*

Background of the Study

The main economic function of banks has been identified as mobilization of deposits and channeling the same to productive sector of the economy Nzotta (2014). The surplus economic units of banks' constitute their deposit liabilities, while the deficit economic units form credits or loans, termed to be the bank assets. Nzotta and Okereke (2009) stated that, banks should have the ability to contain the sudden and unanticipated withdrawals by depositors and the likelihood of defaults from debtors. The uniqueness of banking operations coupled with their ability to create money make them highly regulated and to ensure stability in the financial sector and conformity to the national objective of economic growth and development. Andabai (2013) noted that, the proliferation of banks in the presence of paucity of investment opportunities in the economy, bankers need to be extra cautious since the risks inherent in banking operations are high particularly those associated with loans and advances. Hence for individual banks to perform efficiently and effectively above the industry performance level as custodians of public funds, they must emphasize on effective risk management functions especially in lending (Onyewe, 2004).