Quest Journals
Journal of Research in Humanities and Social Science
Volume 3 ~ Issue 1 (2015) pp:32-41
ISSN(Online) : 2321-9467
www.questjournals.org

Research Paper

Inflation Uncertainity and Output Growth in Nigeria

*Orji Uka Odim[1], Ugbe Solomom N. [2], Ifeanyi Ogbonna Martin[3]
Tansian University Umunya[1], Tansian University Umunya[2] Tansian University Umunya[3], Nigeria S

ABSTRACT:- Inflation uncertainty remains a concern for policy making, this study discovered that there is a negative relationship between inflation and Output growth and a positive relationship between inflation uncertainty and output growth in Nigeria. This suggests that the idea of rational expectation remains a mirage in the Nigeria context as Nigerians tend to be adaptive in expectations. OLS method was employed to check for the relationship between inflation and output growth in Nigeria while granger causality approach was used to check for causality between inflation uncertainty and output growth. The findings shows that Nigeria are backward looking i.e. they follow adaptive expectation and not rational expectation, since they do not apply rationality in their dealings as greater uncertainty should have reduced economic growth. The study recommends that inflation targeting should be adopted as any policy that could best target inflation at a particular rate would reduce the variability or uncertainty in inflation. It also advices that the CBN should maintain some level of flexibility in policy making.

Keywords:- GDP, money supply, budget deficit, real exchange rate and inflation rate.

I. INTRODUCTION

The term inflation was first defined by the neo-classical economist and it is a very controversial term which has undergone modifications since its inception. Inflation is an increase in the overall level of prices (Mankiw, 1997) and constitutes a major macroeconomic problem that destabilizes economies namely LDCs, although the problems of a developing economy are many, inflation would be analyzed based on it being one of the causes of economic retardation in many developing countries, excluding the war period 1966-1970 from our analysis, Nigeria has been characterized on the one hand by a low inflationary rate of about 4% annual average in the 1960's and a sudden leap to about 35% at the peak of inflation in the 1970's, (Iweala & Kwaako 2007).

As a result of the energy crisis of the 1970's high inflation rates became widespread and even industrialized countries like Britain and Italy recorded an annual inflation rate of over 20%. Significantly, Nigeria as an oil exporting country also began to experience high inflationary rates during this same period of their magnitude of about 15%-30% per annum (Iweala & Kwaako 2007: 3). Nwani et al (2004), have shown that inflation retards economic growth and this can be expressed using data showing the relationship between inflation and the growth rate of GDP (which can be seen as a measure of output growth) in Nigeria. Assuming a time lag of one year occurs before an increase in price would also affect production. Inflation rate was 14% in 1970 and growth rate was 18.4% in 1971. The inflation rate rose to 16% in 1971 and growth rate fell to 7.3% in 1972. When inflation rate fell to 2.8% in 1972, growth rate rose to 9.5% etc. Thus, the Nigeria evidence can support the notion that an inverse relationship exists between inflation rate of one year and the growth rate of the next year.

The Inflation uncertainly nexus is that more inflation produces greater uncertainty about the future direction of government policy. In a period of low inflation, policy makers will try to sustain inflation at that level. In contrast, when inflation is high, policy makers face a trade-off between the cost of further inflation and the cost of unemployment associated with disinflation. Higher current inflation rate creates more uncertainly about the level of expected inflation and economic performance. In a high and volatile information setting, the extinction of the information transmitting functions of relative prices would decrease the economic efficiency and thus growth rate.

II. STATEMENT OF THE PROBLEM

Price stability is one of the cardinal objectives of macroeconomic policy and this has occupied the attention of policy makers in Nigeria and elsewhere in the world, prompting the adoption of various monetary–fiscal mixes in vigorous pursuant of this objectives. Nigeria has adopted various monetary policy instructions since independence, ranging from the era of regulation to that of deregulation which started in 1985; in order to fight rising inflation that sprang up in 1970s During the era of regulation (up to 1986) the framework for monetary control was the direct approach. Direct controls operate by placing quantitative ceilings on bank credit, interest rates and also limiting banks freedom to undertake certain activities. The use of direct instruments was however, phased out because of their declining effectiveness overtime, the distortions introduced into the allocation of bank credit and the rising rate of inflation experienced during this period.

In order to achieve relative growth and stability of the economy, the CBN adopted the indirect method of monetary control or market based approach which relies on the power of the monetary authorities to influence the credit operations of banks through changes in bank reserves. The main instruments are open market Operations (OMO) and discount window operations. Since 1993, OMO has been the dominant instrument of liquidity management with discount rate and reserves requirements as the main adjustment instruments (OJO, 1999).

These monetary regimes are responses to Friedman and Shwartz (1957) proposition that inflation would be controlled if appropriate monetary management is adopted. Meanwhile, some people especially the politicians and monetary authorities are claiming that recent efforts by central bank of Nigeria have significantly reduced the rate of inflation; others have taken the opposite stance. Those people say that as far as they know, inflation rate has not changed. Put differently that recent monetary policy tools have not done much to combat inflation in Nigeria since the era of deregulation. These opposing views constitute the major problems, which this research work is designed to resolve. This can be achieved by addressing the following fundamental research questions. What are the various monetary policy regime instruments adopted in Nigeria since independence? How responsive has been rate of inflation to the alternative monetary policy regimes? Are there significant differences between the impact of monetary policy on inflation before 1986 and since 1986? Are there other factors that are responsible for high rate of inflation uncertainty in Nigeria?

III. OBJECTIVES OF THE STUDY

(1) To test the direction of causality between inflation uncertainty and output growth.
(2) To determine if the relationship between inflation uncertainty and output growth is sustainable in the long-run.

Research Hypothesis

From the study objectives, the following hypothesis is to be tested
H_0: There is no causality between inflation uncertainty and output growth.
H_0: There is no long-run relationship between inflation uncertainty and output growth.

IV. LITERATURE

The Costs and Consequences of Inflation

Perhaps one of the most enduring costs of inflation is its impact on inflation uncertainty. Briauit (1995) and Moosa (1997) unequivocally suggest that the most damaging effect of inflation is association with unanticipated. Inflation causes confusion between relative and, aggregate price changes, which lead to misallocation of scare resources and slower growth. Pindyck (1991) found that uncertainty about future price levels could force investors to delay investment decisions, since investment is a sunk cost and largely irreversible. Without this uncertainty, consumers and producers could better plan for the future.

Golob (1994) classifies inflation uncertainty into two economic effects. First inflation uncertainty causes economic agents to take decisions that differ from the ones they would make otherwise. These are the ex ante effects, because the decisions anticipate future inflation. These ex ante effects occur in the following ways:

(i) Inflation uncertainty affects financial markets by increasing long-term interest rates. A key determinant of long term interest rates is the return expected by investors. If inflation is expected by investors. If inflation is uncertain, the return on nominal long-term dept will be riskier. As a result, investors will require higher long-term interest rates. Finally, higher rate will imply less investment in plants and equipment by the producers and less investment in housing and other durable goods by the consumers.

(ii) Inflation uncertainty induces the agents to spend resources in order to avoid the risks of future inflation. When uncertainty about inflation is high, business enterprises may spend more resources improving their inflation forecast.

On the other hand, the ex post effect occur when inflation differs from what has been expected. Consequently, unexpected inflation leads to a transfer of resources between economic agents in nominal terms. However, because wealth transfer implies that someone wins while another loose, it is very difficult to measure the aggregate ex post effects. These arguments indicate that uncertainty about future inflation could have adverse economic consequence.

Although inflation uncertainty cannot be completely eliminated, the adoption of certain policy regimes could minimize inflation uncertainly and its costs. In particular, since some theoretical models predict that inflation uncertainty increases with the level of inflation, pursuing a policy of price stability might minimize the cost of high inflation uncertainty. Ball and Cecchetti (1990) distinguished between short run and long run inflation uncertainly. The effect of uncertainly on economic decision making is not the same in the short run as in the long run. Short run uncertainty is most likely to affect temporal decision, while long run uncertainty is due to long run economic decisions.

It is certain that in an economy experiencing volatile inflation rates and high inflation uncertainty, the return on investment cannot be fixed. This uncertainly could make it difficult for individuals and firms to enter into long-term contracts and thus investment expenditures would decline. In a business environment where an investment experience is financed by debt, the risk premium, which is linked with the highly volatile inflation rates, would increase the cost of investment. Pindyck and solimano (1993) conclude that firms, which take investment decisions by considering the Net percent value (NPV), would encounter interest rate volatility and tend to postpone their investment decision.

While the costs of inflation uncertainty are easy to identify, emplaning why inflation uncertainty might increase with inflation is more difficult. The most appealing explanation involves the response of monetary policy to inflation. When inflation is low, monetary policymakers try to keep it low. To the extent they are successful, inflation remains low and stable. When inflation is high, however, monetary policy makers are more likely to adopt disinflation policies. These policies, by lowering the inflation rate, increase inflation variability. Moreover, the policies create inflation uncertainty because the timing and short term impacts of policy on inflation are uncertain. The timing of disinflationary policy actions is uncertain, in part, because of short-run tradeoffs among the goals of monetary policy although the long-run goal of monetary policy is to make progress toward eliminating inflation, the central Bank also tries in the short run to moderate the depth of economic downturns. When inflation is high at the same time, the economy is in a slump; it is not obvious which goals should take immediate priority. This uncertainty arises about the timing of policy action to reduce inflation; the impact of monetary policy on inflation is also uncertain Holland (1993). In particular, the effects of monetary policy take time to work their way through the banking system, to the real economy, and eventually to inflation. Moreover, the speed with which monetary policy actions are transmitted to inflation varies widely over time. Thus, the complexity of predicting how much and how quickly prices respond to monetary policy creates inflation uncertainty, even if the stance of monetary policy were known with certainty.

In summary, the costs and consequences of inflation uncertainty lies in its potency to blur the investment and consumption decisions of economic agents. Surely, the economy will work best when economic agents can proceed with full confidence that the price level will remain stable in the near future.

V. INFLATION UNCERTAINTY AND OUTPUT GROWTH

Economics have long been interested in the effect inflation on real economic variable; it has expanded greatly, spurred on by the relatively high inflation rates in the development economics beginning in the 1970s and the coincident slowing in the rate of output growth.

On traditional and widely accepted notion is that anticipated inflation has little or no effects arising from institutional features such as incompletely indexed tax zero and zero interest payments on currency and reserves. It is also widely accepted that unanticipated inflation affects real variable, at least in the short run.

Many analyses also hold that uncertainty about future inflation rates affects real variables. Indeed, Marshall (1886) expressed concern about the negative effects of an uncertain future value of the English pound on output over 100 years ago. More recent arguments in this spirit are continued in Okun (1971) and Friedman (1977), who argue that uncertainty about future inflations is detrimental to real economic activity.

Furthermore, they suggest that uncertainty about future inflation in linked to the mean rate of inflation by the policy environment. Friedman, in particular, argues that nations might temporality purse a set of goals, for real variable (for example, output and underpayment) threat leads to a high inflation rate. The high inflation rate induces strong political pressure to reduce it, leading to stop-go policies and attendant uncertainty about future inflation. Thus high inflation coexists with increased inflation uncertainty, as individuals become less certain about the political choice over future inflation paths.

Friedman postulates a negative effect of a highly volatile inflation rate on economic efficiently for two reasons. First, increased volatility in inflation makes long term contracts more costly because the future long term contracts more costly because the future value of dollar payment is more uncertain. Second, increased volatility inflation reduces the ability of markets of convert information to market participants about relative price movement. By reducing economic efficacy, greater inflation uncertainty should at least temporarily increase the rate of unemployment and reduce economic growth.

Through these theoretical concerns about the effect of inflation, uncertainty seem reasonable and persist in economic discussions and existing studies provide only mixed support for them.

VI. EMPIRICAL REVIEW

As already noticed, a growing body of literature exists in the inflation – inflation uncertainty debate. Friedman (1977), Ball (1992) and other hence provided intuitive and formal argument on the positive influence of higher inflation on inflation uncertainty. Cukierman and Meltzer (1986) employed the Baro-Gordon approach to show that increase in uncertainty will increases the optimal average inflation rate because it provides incentives for the policy policymaker to create in inflation surprise in order to stimulate output growth.

Brunner ad Hess (1993) provided evidence in support of the Friedman's hypothesis based on U.S data. The results from Grier and parry (1998) showed that inflation has a significant and positive effect on inflation uncertainty and hence contradict the predictions of Cukierman and Meltzer. Grier and parry (1998) argue that the correlation between inflation and inflation uncertainty may lead to the so called" stabilization motive". This suggests policymakers will have increased incentive to lower the inflation rate and its concomitant real cost.

In his empirical enquiry, Johnson (2002) found that inflation targeting (IT) monetary policy (2002) found that inflation targeting (IT) monetary policy framework reduces expected inflation but brings no additional benefit in the from of lower uncertainty. The empirical evidence of Holland (1992) and O' Reilly (1998) also suggests that the relationship between inflating and inflation uncertainty is positive and that uncertainty about future inflation is the most important cost of inflation.

A number of studies have attempted to measure inflation uncertainty using different approaches. Carlos (2000) examined the real effect of inflation uncertainty in Paraguay using the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) class of model. This allows the conditional; variance can be used as a prosy for inflation uncertainty. Thus, a positive relationship between the conditional variance and inflation is interpreted as evidence that inflation uncertainty increase with the level of inflation. Grier and Parry (1998) analyzed the relationship between inflation and inflation uncertainty in the G7 countries from 1918 to 1993. Different Autoregressive models were used to generate a measure of inflation uncertainty and there after, the Granger method was employed to text causality between inflation and inflation uncertainty. Their result shows that high levels of inflation have been followed by more inflation uncertainty. Grier and Grier (1998) employed a comparable model to study the process of inflation in Mexico between 1960 and 1997. They adjusted the GARCH (1,1) model to the Mexican inflation process addition lagged inflation in the conditional variance equation similarity, Magendzo (1998) used a combination of autoregressive integrated moving average (ARIMA) and GARCH methodologies to evaluate Friedman's hypothesis for Chile and Uruguay over different time periods. In this study, lagged values of standard deviation of inflation were included in the mean equation to obtain the measure inflation uncertainty. The Granger causality method is then used to test whether increase inflation varies inflation uncertainty. The empirical evidence presented in these literatures indicates that, in all these countries, high level of inflation has been followed by more inflation uncertainty.

Derat and Lopez (1989) examined the impact for the period 1953 and 1984 and they measured inflation uncertainty using a three year moving average standard deviation if the inflation forecasts. This measure is related to a conditional (rational) process since it conditions the inflation forecasts upon the information embodied in several potential predictors in addition to the inflation's own history. The study found that higher level of inflation is followed by more inflation uncertainty.

Using the ARCH technique to construct a time series for the variance of unanticipated shocks of inflation, Engle (1983) finds that the conditional variance is uncorrelated with the current level of inflation. i.e. higher inflation in one quarter does not lead to greater uncertainty about both ARIMA and ARCH mythologies to determine inflation uncertainty in the UK for the period, 1972 to 2002. His findings reveal that higher inflation rate causes higher inflation uncertainty.

In the Nigerian context, research work was carried out by Nwani et al, (2004) on "Inflation and inflation uncertainty in Nigeria: Evidence from GARCH modeling". Their work concluded that there exists a positive relationship between the trend inflation and the measure of uncertainty.

From the above literatures, it becomes difficult to state a priori, what the casual relationship between inflation and inflation uncertainty will be in Nigeria, hence the need for this study.

V. METHODOLOGY

Model 1: LOG (REDP) = F (RER, LOG (M2), BD, INF, INFLU)………(1)

Where

LOG (RGDP) = log of Real Gross Domestic Product.

RER = Real Exchange Rate

LOG (M2) = log of money supply.

BD = Budget Deficit

INF = Inflation

INFLU = Infaltion uncertainty

Thus transformating equation 1, we can econometrically state as:

LOG RGDP = $\beta_o + \beta_1$ RER $+\beta_2$ LOG $(M_2) + \beta_3$ (BD) $+ \beta_4$ (INF) $= \beta_5$ (INFLU) + U_t…………………..(2)
As stated in the objective of study, we would determine the direction of causality between inflation and output growth. We state the equations respectively as;

Model 2

$$INF_t = \sum_{t=1}^{n} \propto iINFU_{t-1} + \sum_{t=1}^{n} \beta iINF_{t-j} + U1t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

$$INFLU_t = \sum_{t=1}^{n} \lambda iINF_{t-j} + \sum_{j=1}^{n} \delta iINFFLU_{t-j} + U2t \ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Model 3

$$LOG\ (RGDP)_t = \sum_{t=1}^{n} \propto iINFU_{t-j} + \sum_{t=1}^{n} \beta j\log(RGDP)_{t-j} + U1t \ldots\ldots (5)$$

$$INF_t = \sum_{t=1}^{n} \lambda iLog\ (RGDP)_{t-j} + \sum_{j=1}^{n} \delta iINF_{t-j} + U2t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

DATA

Table 1.1 model 1 Regression Results

variable	Co-efficient	Standard error	t-value	t-prob
CONSTANT	4.253915	0.810590	52.13780	0.0000
RER	0.001650	0.001404	1.175753	0.2489
LOG(M2)	0.254346	0.016853	15.09162	0.0000
BD-	0.027768	0.06671	-4.162776	0.0002
INF	-o.002121	0.002594	-0.817707	0.4200
INFLU	0.001318	0.000514	2.263094	0,0156

R^2 = 0.919567 f (5,37) = 68.59609 R^2 = 0.906161 dw =1.45

Table 1.2: model 2

Variable	obs	f-statistic	probability
Influ does not Granger cause inf	34	4.06201	0.02782
INF does not Granger cause INFLU		3.91825	0.03117

Table 1.3: model 3

Variable	Obs	f-statistic	probability
INF does not Granger cause log (RGDP)	35	0.06238	0.93965
INF does not Granger cause log INF		1.12047	0.33939

Interpretation of Results

From the results in table 1.1a above, it is observed that while the constant term, RER, BD, LOG (m2) and INF conformed to their a priori expectations, INFLU did not. The implication is that a unit increase (or positive change) in INFLU will lead to a 0.13% increase in the LOG (RGDP).

Statistical (First Order) Criteria

(a) R^2: coefficient of determination for model 1 was 0.919567. This implies that the explanatory variable explain about 91% of change in the LOG (RGDP).

(b) t-statistic

The decision rule employed in the t-test is to reject the null hypothesis i.e Ho if the computed t* exceeds the tabulated t, using the 5% level of significance ad for (n-k) degrees of freedom (i.e-t* <- $t_{o.o25}$ or t*< $t_{o\cdot 025}$) for two tailed. This holds where.
N = the number of observation (37)

K = the number of parameter estimates (5 for the model in use) from the students t – distribution table, for a two tailed test and at 5% level of significance and with 32. Degree of freedom, the tabulated t-value is 2.021. Looking at the table 1.1 (model) me se that the constant term, LOG (M2) , BD and INFLU are all Statistical significant at 5% level (i.e. 52.13780>2.021, 15.09162>2.01 and 2.563094>2.021). However, we also observed that RER and INF are not statistically significant at 5% level of significance (since 1.175753<2.021 and 0.817707<2.021).

(c) F-Test

In F-test, the decision rule employed is to reject the null hypothesis (i.e. accepting the claim that there exist an overall significance of the regression model or accepting the claim of goodness of fit) if the computed F* exceeds the tabulated f value at the 5% level of Significance, with (k-1) (n-k) (v_2) degrees of freedom. At 5% level of significance, with the model having (4,37) as their degrees of freedom, the corresponding tabulated F value is 2.69. From table 1.1, we discover that the computer F* value (i.e. 68 .59609>2.69). it thus implies that the model has good fit and is statically significance. Hence, we reject the null hypothesis and conclude that the parameters are statistically significant and there exist a goodness fit.

Econometric (second order) criteria

(a) In carrying out the test for stationary, we employ that Augmented Dickey Fuller (ADF) test; we can state our hypothesis as

H_0: 8 H_0: 8 = 0 (unit root problem) Vs H_1: 8 H_0: 8 < 0 (unit root problem)

In the test for stationary, the decision rule is to reject the null hypothesis (H_0), if the calculated ADF statistic (in absolute terms) is greater than the tabulated ADF statistic (in absolute terms), using the 5% and 1% level of significance, and accept the null hypothesis if otherwise. For our model, the ADF test was conducted on the variables in their level forms with constant, using their second lags as required by the Augmented Dickey fuller (ADF) test, and below are the results in a tabular form.

Table 1.4

Variable	T-ADF	1% Critical Values	5% Critical
D (LOG(GRDP(-1,(2)	-4.843520	-4.2505	-3.5468
D(RER(-1))	12.63820	-.2.6300	-1.9507
D(LOG(M2)-1), (2)	-3.563791	-4.2505	-3.5468
D(BD(-1), 2)	-6.061112	-3.6353	-2.9499
D(NIF(-1))	-3.419545	-3.6228	-2.9472
D(INFLU(1-))	-3.789566	-3.6353	-2-9499

From the table 1.4 above, we can see that LOG (RGDP) (Real Gross Domestic Product) is stationary at first difference both at 1% and 5% critical levels (i.e. – 4.843520/>/-4.2505/ and /-4.843520/>/-3.5468/). RER (Real exchange Rate is stationary at level form at both 1% and 5% critical levels (i.e. / 12.63820/>/-2.6300/ and /12.63820/>/-1.9507/). LOG (M2) is stationary at first difference in only 5% critical value (where /-3.563791/>/-3.5488/). BD (budget deficit) is stationary at fist difference in both 1% and 5% critical values (i.e./-6.061112/>/-3.6353/ and /- 6.06112/>/-2.9499/) INF (Inflation) in stationary at level form at 5% critical value (i.e. /-3.419545/>/-2.94721). Finally INFLU (Inflation uncertainty) is stationary at level form at both 1% and 5% (i.e./-3789566/>-3.6353/ and /-3.789566/>/-2.9499/)

(b) Co-integration test result

Usually, the co-integration test is employed to check whether there exist a long run relationship among the variable in each model and this is to ensure that we do not loose any valuable long term information by running the models at their level forms which may result if we were to use their first difference instead. A co – integration test was conducted for the model at their level forms with the co-integration equation as LOG (RGDP) = Bo + B_1 LOG $(M_2)_t$ + B_3 $(BD)_t$ + B_4 $(INF)_t$ + B_5 $(INFLU)_t$ + $U_{t.}$ - - - - - - (1)

The residual for equation (1) was obtained and the ADF test employed to test for co integration among the variables in the model. The co-integration results are as follows:

Table 1.5

Variable	<-ADF	1% critical	5% critical Values
U_t	-2.460396	-2.6321	-1.9510

From table 1.5 above, we can observe that the error term (U_t) is co-integrrated at 5% level of significance i.e. (1/-2.460365/>/-19.510? and this implies that the growth rate of Nigeria real GDP (LOG) (RGDP), RER, LOG (M2). BD, INF and INFLU are all co-integrated of the same order at 5% level of significance.

(c) The error correction model

The error correction mechanism is a short-run model, which explains the extent to which the long run error of a model is corrected in the short run. The error correction model (ECM) thus implies running of the first differences of their level forms against the first lag of the co-integrating residuals obtained. Thus, we have:

$LOG\ (RGDP)_t = \beta_0 + \beta_1 LOG\ (RGDP)_{t-1}\ \beta 2\ (RER)_t + \beta_3 (RER)_{t-1} + \beta_4 LOG\ (M2)_t + \beta_5 LOG\ (M2)_{t-1} + \beta_6 (BD)_t + B_7\ (BD)_{t-1} + \beta_8\ (INF)_t + \beta_9\ (1NF)_{t-1} + \beta_{10}\ (INFLU)_t + B_{11}\ (INFLU)_{t-1} + \beta_{12}\ (ECM)_{t-1} + U_t$……………………………..(ii)

Where B_{12} = the speed of adjustment

Running the model at lag zero only, we obtain the following results.

Table 1.6

Variable	Coefficient	t-statistic
ECM_{t-1}	-0.355668	-2.639936

From the table 1.6, the speed of adjustment is about 3556%, i.e. 35.56% of the error in the long run is corrected in the short run yearly.

(d) Test for Multicollinearity

In testing for multicollinarity, the correlation matrix was employed and below is the table that shows the collinearity between the variables in the model.

Decision rule: Case1: If the r^2 from the correlation matrix is in excess of 0.8%, we conclude there is presence of multicollineaarity. Case 2: if the r^2 from the correlation matrix is less than 0.8, we conclude that there is no multicollinearity.

Table 1.7

Variable	Correlation Coefficient	Conclusion
RER & LOG (M2)	0.381523	NM
RER & BD	0.282693	NM
RER & INF	-0.0134858	NM
RER & INFLU	-0.139829	NM
LOG (M2) & BD	-O,112655	NM
LOG (M2) & INF	-0.043232	NM
LON (M2) & INFLU	-0.043232	NM
ED & INF	-0.22420	NM
BD & INFLU	-0.089346	NM
INF & INFLU	0.534222	NM

Where NM stands for No Multicollinearity among the variables.

(e) Normality Test

This test is carried out to check if the error follows the normal distribution. The Jarque Bera (JB) statistic which follows. Chi – square distribution is used for carryout this normality test.

Decision rule: Reject H_o if $JB_{cal} > JB_{0.05}$ (df) ($JB_{tab)}$. If otherwise, accept H_o. From the results, the normality test JB_{cal} = 1.26045 while the chi – square table is given as: JB = 5.99147. Therefore, since $JB^* < JB_{tab}$ at 5% level of significance; we accept the null hypothesis (i.e. H0) and conclude that the error term follows a normal distribution.

(f) Test for Autocorrelation

This was carried out in this work using the Durbin Watson t–statistic.

Table 1.8

Null hypothesis	Decision	If
No positive autocorrelation	Reject	0<d<dL
No positive autocorrelation	No decision	dL≤d≤du
No negative autocorrelation	Reject	4-dL<d<4
No negative autocorrelation	No decision	4-du≤d≤4-Dl
No autocorrelation	No not reject	du<d<4-du

Form the regression result, we observed that the durbin – Watson statistic, d=1.978. Also, the significant point of dL and du from Durbin Watson table at 0.05 level significance are:
dL = 1.190 Vs du = 1.795
using the fifth decision role, we have; du<d<4-du, hence, we did not reject the null hypotheses of no autocorrelation positive or negative and conclude that thee is no evidence to positive or negative fist order serial correlation.

(g) Heteroscedasticity Test

This test was employed to find out if the error term exhibit constant variance using white general heteroscedasticity (with no cross terms. The test asymptotically follows the chi – square distribution with degrees of freedom equal to the number of repressors (excluding the constant term). We tested the flowing hypothesis:
Ho: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 \ldots \beta_{10} = 0$ Vs H_1: $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \ldots \neq \beta_{10} \neq 0$ (heteroscedasticity)
Decision rule: Reject H0 if the computed X^2 value exceeds the critical X^2 value at 5% level of significance, otherwise accept Ho.
The computed X^2 at 10 d.f = n.R^2 = observed R^2
Where n = 37, Observed R- squared = 7.253908, X^2 cal = 7.253908
X^2 tab = X^2.05 (10) = 18.3070
Since at $\propto$ = 5%, X^2cal (7.253908) < $X^2$0.05 (10) (18.3070). We accept the null hypothesis of homoscedasticity and conclude that the errors in the regression model have a constant variance.

(h) Test for Causality

For model 2:

Ho: INFLU does not granger cause INF
Ho: INF does not granger cause INFLU
Decision rule: If Fcal >F_{tab}, reject $H_{0,}$ accept otherwise

Direction of causality	F_{cal}	F_{tab}	Decision
INFLU INF	4.06201	2.53	Reject H_0
INF INFLU	3.91825	2.53	Reject H_0

The above result suggest a bidirectional causality between INF and INFLU i.e. inflation granger causes inflation uncertainly on one hand and inflation uncertainty granger causes inflation on the other hand.

For model 3:

H_0: INF does not granger cause LOG (RGDP)
H_0: LOG (RGDP) does not granger cause IMF decision rule:
If $F_{cal} > F_{tab}$ reject $H_{0,}$ accept otherwise.

Direction of causality	F_{cal}	F_{tab}	Decision
INF LOG (RGDP)	0.06238	2.53	Don not Reject
LOG (RGDP) INF	1.12047	2.53	Do not Reject

The above result suggests that there is no causality of any form between inflation and the LOG (RGDP).

VI. SUMMARY OF FINDINGS

Evidence from existing literature shows that inflation retards economic growth, but there exist mixed conclusion as to the direction of causality between inflation and inflation uncertainty and the effect on output growth. OLS method was employed to check for the relationship between inflation and output growth in Nigeria. We adopted the granger causality approach to check for causality between inflation uncertainty and output growth.

Result obtained in the work shows that inflation conforms to a priori expectation, though not statistically significant. It shows that a 1% increase in inflation will lead to 0.2121% fall in output growth. Inflation uncertainty did not conform to a priori expectation as it shows that a 1% increase in inflation uncertainty will increase output growth by 0.1318%, but this is statically significant. The above shows that Nigeria are backward looking i.e. they follow adaptive expectation and not rational expectation, since they don't apply rationality in their dealings as greater uncertainty should have reduced economic growth.

The granger causality text carried out revealed that there is a bi-directional causality between inflation and inflation uncertainly and no direction of causality between inflation and output growth. It should also be noted that all other variables included in the model (real exchange rate. Money supply, Budget deficit) all conformed to a priori expectation and were statistically significant.

VII. CONCLUSION

This work justifies Friedman's argument in the Nigeria context and we discover a negative relationship between inflation and output growth and a positive relationship between inflation uncertainty and output growth. It is suggested inflation targeting as a way to reduce the variability in inflation since there exists a bi-directional causality between them. This policy remains within the ambit of the monetary authority, as Friedman stated, "inflation is at all time and everywhere a monetary phenomenon".

Policy Recommendations

Based on the findings of this work the following recommendations were made for policy making;

1. The government through her agencies should keep the people informed of all policy actions taken so as to cushion the effect of non-rational adaptive behaviour and not rational expectation.
2. Since polices that can curtail inflation will do same to inflation uncertainty, inflation targeting should than be adopted. Inflation targeting is an economic policy in which a central bank estimates and makes public a projected, or target inflation rate and then attempts to steer actual inflation towards that target through the use of interest rate changes and other monetary tools.
3. Based on the recommendation in (2) above, policy makers should note that inflation targeting has been successful in other countries because of its transparency and predictability to the markets. The Central Bank of Nigeria should maintain some level of flexibility (because inflation targeting gives the central bank too little flexibility) to stabilize growth and/or employment in the event of an external economic shock.

REFERENCES

[1]. Asogu J.O. (1991) "An econometric analysis of the nature and causes of inflation in Nigeria: Central Bank of Nigeria Economic and Financial Review, Vol. 29 No.
[2]. Balol, L, Cecchetti S, (1992) "Why does high inflation raise inflation uncertainty?" journal of monetary Economics 29, 371, -388
[3]. Ball, L, Cecchetti S, (1990). "Inflation and Uncertainty at Short and long Horizons". Brookings paper on Economics Activity, 215-254
[4]. Benigno P., Lopez-Salido, J.D. (2002) "inflation Persistence and Optimal Monetary Policy in the Euro Area". Working paper, European Central Bank, 1978
[5]. Berument, H. et al (2001), Modeling Inflation Uncertainty using EGARCH:
[6]. Brunner, Allan D, Gregory D, Hess (1993) "Are higher levels of inflation less predictable? A
[7]. State-dependent conditional heteroscedascity approach" journal of Business and Economic statistics 11, 189-197.
[8]. Bruno, Michael and William Easterly (1998) "inflation crises and long- run growth, journal of Monetary Economics, 3-26.
[9]. Dew-Becker, Lan and Robert J. Gordan "where did the productivity growth go? Inflation Dynamics and the Distribution o income," Brookings papers on economics activity, 2005, v 2002), 67-127
[10]. Dung Huanxin, Clive W.J Granger and Robert Engle (1993). "A long memory property of stock market returns and a new model", Journal of Empirical Finance 1, 83-106
[11]. Engle (1982), "Autogressive Conditional Heteroscedasticity with Estimates. Of United Kingdom Inflation" Econometrical" 987-1001
[12]. Engle R.F. and V.Ng. (1992) "Measuring and Testing the Impact of news on Volatility, Forth coming journal of Finance.
[13]. Fountas, S., Karanasos, M., 2002," Inflation, output growth and Nominal and real uncertainty and their relationship with inflation and output growth". Economics letter 75, 293-301
[14]. Friedman D (1976), Monetary Policy, Macmilian London.
[15]. Friedman, M. 1977. Nobel lecture. "Inflation and Unemployment journal of political economy" 85, 451-475.
[16]. Gregory Mankiw "Macro economics" Fourth edition-Worth publishers Grier, K. B., Perry, M.J, (1988). "On inflation and inflation uncertainty in the G7countries"
[17]. Journal international Money and Finance 17, 671-689 Harberger A.C.A. premier in inflation, journal of money, credit and Banking. Vol. x N0.4 November.
[18]. Holland, S, (1995). "Inflation and Uncertainly. Test for Temporary Ordering". Journal of money, Credit and Banking 27, 827-837
[19]. Jordi Gali, Mark Gertler. (2003) "Inflation Dynamics: A structural economic Analysis; journal of monetary economics", vol No.2: 195-222
[20]. Kamas, Linda (1995). "Monetary Policy and Inflation under the crawling peg: Some evidence from VARS for Colombia." Journal of development economics 46, No. 1:45-61.
[21]. Kenneth Okanwu (2001) "Inflation and economic growth in Nigeria (an Empirical Analysis) Lucas, Robert (1976) "Econometric Policy Evaluation: A critique" in Brunner, K; Meltzer, A, the
[22]. Philips curve and labour markets, Carnegie Rochester conference series on Policy, 1,
[23]. New York: American Elsevier, pp.19-46
[24]. Malik, W. Shahid (2006), Money output and inflation evidence from Pakistan development review 46:4
[25]. Morana, C., (2002) Common Persistent Factors in inflation and Excess Nominal Money

[26]. Growth. Studies in Non- linear Dynamics and Econometrics, 6(3), Article 3.
[27]. Nelson, C.R. and Shwartz (1977). Short Term interest rate as predictors of inflation on testing the hypothesis that real rate of interest is constant" American Economics Review 61, 478-486