

Impact of Inflation Rate on the Economic Growth in Nigeria

Abstract

The study examined the impact of inflation rate on the economic growth in Nigeria. The study explored secondary data for the period of 1960 to 2012 and used E-view 7.2 statistical window in processing and analyzing the data. Real gross domestic product (RGDP) was used as a proxy for economic growth; Inflation economic growth. The empirical result of the test showed that for the periods, 1960-2012, there was no co-integrating relationship between Inflation and economic growth for Nigeria data. Further effort was made to check the causality relationship that exists between the two variables by employing the Pairwise-Granger causality at two lag periods. The paper however recommended that the government should ensure that policy measure (or monetary or fiscal) to control inflation rate has to be put place-through the efforts of Central Bank of Nigeria, maintain inflation rate at single-digit level. Government to place a high premium of control on money supply since it has a significant link with inflation in the economy-such as Nigeria. Government should in sincerity control inflation rate since it inversely affects interest rate in Nigeria. Government should formulate and implement policy on inflation rate since it negatively affects market capitalization in Nigeria. And government should create atmosphere that encourages the general public to save that part of cash that is not consumed immediately or idle cash, saving leads to capital accumulation or rather capital formation will be low. This will discourage potential investors to invest since no source of investible funds.

Keywords: Inflation, Economic growth, Cointegration, Granger causality

1.0 Introduction

Inflation is one the basic macroeconomics objectives which has been a cankerworm eaten deeply in the growth fabric of most economy of the world, most especially the developing countries—such as Nigeria. On the one hand, however, there is a consensus among many economists, Central bankers, financial analysts, policy makers and practitioners that one of the fundamental objectives of macroeconomic policies in both the developed and developing economies is to sustain high economic growth together with low or single-digit inflation. On the other, inflation has render economists, financial analysts, etc impotent in the sense that the effort to combating it has proven fruitless (Shuaib, 2010). At the individual level, inflation exerts a heavy toll on those with fixed income; inflation relatively favours debtors at the expense of creditors, at the firm level;

the effect of inflation is called the ‘menu cost’ (Yap, 1996), and Johansen, (1967) because it affects output when firms have to incur costs as they adjust to the new price level (e.g. changing their price lists for customer). However, much less agreement exists about the precise relationship between inflation and economic performance, and the mechanism by which inflation affects economic activity at the macroeconomic level. This has generated a significant debate both theoretically and empirically. A series of studies found no conclusive empirical evidence for either a positive or a negative association between inflation and economic growth, notably among these studies are (Johansen, 1967). The second strand of the literature found a negative correlation between inflation and economic growth. Among these studies are Fisher, (1993); De Gregorio, (1993); Barro, (1995,1996); Brunno and Easterly, (1995); Malla, (1997); Faria and Carneiro, (2001), Dewan & Hussein, (2001). While the third strand of the literature found a positive relationship between inflation and economic growth. Despite these plethora of studies both for developing and developed countries, the literature on inflation and economic growth in Nigeria is scanty. This is resulting from the unavailability of statistical data to enable the researcher to have a sense of direction towards inflationary rate in Nigeria (Omoke, 2010; Shuaib, 2010).

2.0 Review of Related Literature

The investigations into the existence and nature of the link between inflation and economic growth have experienced a long history. Although economists now widely accept that inflation has a negative effect on economic growth, researchers did not detect this effect in data from the 1950s and the 1960s. This view prevailed until the 1970s, when many countries, mainly in Latin America, experienced hyperinflation or chronic inflation. Numerous empirical studies were devoted to finding the effects of inflation in high-inflation countries. These studies repeatedly confirmed that inflation had a significant negative effect on economic growth, at least at sufficiently high levels of inflation. Therefore, today, the dominant view regarding the effects of inflation has changed dramatically.

Fischer (1993) found negative associations between inflation and growth in pooled cross-section, time series regressions for a large set of countries. He argued that inflation impedes the efficient allocation of resources by obscuring the signaling role of relative price changes, the most important guide to efficient economic decision-making. Later, a famous paper by Barro, (1995) more precisely examined the five-year average data of 100 countries over the period of 1960-90 by using the Instrumental Variable (IV) estimation method. Using different instrumental variables, he obtained a robust estimation result showing that an increase in average inflation by 10 percentage points per year would slow the growth rate of the real per capita GDP by 0.2-0.3 percentage points per year. He argued that although the adverse influence of inflation on growth appeared small, the long-term effects on standards of living were actually substantial. Nevertheless, some other empirical and theoretical studies argued that the inflation-growth relationship is fragile. Bruno and Easterly, (1998) found support for the notion that this negative relationship emerges only

when rates of inflation exceed some threshold. Tan, (2008) ascertained whether there is any trade-off between inflation and economic growth in the founding members of ASEAN namely Malaysia, Singapore, Thailand, the Philippines and Indonesia and Japan and South Korea. The purpose of the paper was met by integrating the Phillips curve framework with Okun's theory.

The empirical results suggested that a trade-off albeit small exists between economic growth and inflation in Singapore, South Korea and Thailand after the 1997/98 Asian financial crisis years while none in the other countries. In the wake of these findings, one might somehow infer that monetary cooperation is sustainable amongst these sample countries.

Erbaykal and Okuyan, (2008) examined the relationship between the inflation and the economic growth in Turkey has been in the framework of data covering 1987:1-2006:2 periods.

Saaed, (2007) explored the relationship between inflation and economic growth in the context of Kuwait, using annual data set on real GDP and CPI for the period of 1985 to 2005. The estimated result of the relationship shows a long-run and strong inverse relationship between CPI and real GDP in Kuwait.

Mubarik, (2005) estimated the threshold level of inflation for Pakistan using an annual data set from the period between 1973 and 2000. He employed the *Granger Causality* test as an application of the threshold model and finally, the relevant sensitivity analysis of the model. His estimation of the threshold model suggests that an inflation rate beyond 9-percent is detrimental for the economic growth of Pakistan. This in turn, suggested that inflation rate below the estimated level of 9-percent is favorable for the economic growth. Moreover, the sensitivity analysis performed for the robustness of the threshold model also confirms the same level of threshold inflation rate.

Ahmed and Mortaza, (2005) empirically explored the relationship between inflation and economic growth in Bangladesh, using annual data set on real GDP and CPI for the period of 1980 to 2005, and the co-integration and error correction models. The empirical evidence demonstrates that there exists a statistically significant long-run *negative* relationship between inflation and economic growth for the country as indicated by a statistically significant long-run *negative* relationship between CPI and real GDP. Sweidan, (2004) examined whether the relationship between inflation and economic growth has a structural breakpoint effect or not for the Jordanian economy from the period between 1970 and 2003. He finds that this relation tends to be positive and significant below an inflation rate of 2-percent and the structural breakpoint effect occurs at an inflation rate equal to 2-percent. Beyond this threshold level inflation affects economic growth negatively. Mallik and Chowdhury, (2001) examined the short-run and long-run dynamics of the relationship between inflation and economic growth for four South Asian economies: Bangladesh, India, Pakistan, and Sri Lanka.

Applying co-integration and error correction models to the annual data retrieved from the International Monetary Fund (IMF) *International Financial Statistics* (IFS), they found two motivating results. First, the relationship between inflation and economic growth is positive and statistically significant

for all four countries. Second, the sensitivity of growth to changes in inflation rates is smaller than that of inflation to changes in growth rates.

These results have important policy implications, that is, although moderate inflation promotes economic growth, faster economic growth absorbs into inflation by overheating the economy. Therefore, these four countries are on the turning point of inflation-economic growth relationship.

Faria and Carneiro, (2001) investigated the relationship between inflation and economic growth in the context of Brazil which has been experiencing persistent high inflation until recently. Analyzing a bivariate time series model (i.e., vector autoregression) with annual data for the period between 1980 and 1995, they found that although there exist a negative relationship between inflation and economic growth in the short-run, inflation does not affect economic growth in the long-run. Their empirical results also support the *superneutrality* concept of money in the long run. This in turn provides empirical evidence against the view that inflation affects economic growth in the long run.

Shitundu and Luvanda, (2000) used the Least Trimmed Squares (LTS) method, as introduced by Rousseeuw and Leroy, (1987) which detects regression outliers and produces robust regression, to examine the impact of inflation on economic growth in Tanzania. The empirical results obtained suggest that inflation has been harmful to economic growth in Tanzania. Malla (1997) conducted an empirical analysis using a small sample of Asian countries and countries belonging to the Organization for Economic Cooperation and Development (OECD) separately. After controlling for labor and capital inputs, the estimated results suggest that for the OECD countries there exists a statistically significant negative relationship between economic growth and inflation including its first difference. However, the relationship is not statistically significant for the developing countries of Asia. The crucial finding of this empirical analysis suggests that the cross-country relationship between inflation and long-term economic growth experiences some fundamental problems like adjustment in country sample and the time period. Therefore, inconclusive relationship between inflation and economic growth can be drawn from comparing cross country time-series regressions with different regions and time periods.

The robustness of the empirical results is examined by controlling for other factors such as shocks (e.g., terms of trade shocks, political crises, and wars). Finally, they found that countries recover their pre-crisis economic growth rates following successful reduction of high inflation and there is no permanent damage to economic growth due to discrete high inflation crises.

Sarel, (1995) mentioned that inflation rates were somewhat modest in most countries before the 1970s and after then rates started to be high. Therefore, most empirical studies conducted before the 1970s show the evidence of a positive relationship between inflation and economic growth and a negative relationship between the two beyond that time period due to the severe inflation hike. Omoke, (2010) examined the relationship between Inflation and economic growth in Nigeria from 1970 to 2005. His study

employed cointegration and Granger causality test. He concluded from the empirical results of the findings that causality that runs from inflation to economic growth is an indication of relationship showing that inflation indeed has an impact on economic growth.

Inflation cut across every sector of the economy. Boyd et al., (2001) examined five-year average data on bank credit extension to the private sector, the volume of bank liabilities outstanding, stock market capitalization and trading volume (all as ratios to GDP), and inflation for a cross-sectional sample over 1960-1995. Boyd et al., (2001) found that, at low-to-moderate rates of inflation, increases in the rate of inflation lead to markedly lower volumes of bank lending to the private sector, lower levels of bank liabilities outstanding, and significantly reduced levels of stock market capitalization and trading volume. In addition, Boyd et al., (2001) found that the relationship between inflation and financial development is nonlinear. Inflation emanated from excess money in circulation or increase in prices of goods and services or available money chases few goods and services (Anyanwu, 1997; Shuaib, 2010).

3.0 Theoretical Framework

A powerful criticism of the adaptive expectations hypothesis is that it assumes people keep basing their expectations on the values of lagged variables and fail to learn from the past their past errors. When inflation is rising the error between actual and predicted inflation is positive over successive periods, and so is serially correlated. This error is repeated and so is called systematic, yet no attention is paid to it if expectations are adaptive.

If economic agents are rational, they will make full use of all the available information when forming expectations and not just rely on past values of the relevant variable. Expectations which conditioned on all available information are called *rational* expectations. When expectations are formed rationally the errors between actual inflation and expected rate are random and are serially uncorrelated or independent over time. There is no systematic error by definition because any systematic error would reveal that information had not been fully used when the expectations were formed. So the expected or mean error is zero. If expectations are rational, then

$$\left(\frac{\bar{P}}{P}\right)_t = E\left(\frac{\bar{P}}{P}\right)_t + \varepsilon_t \quad (1)$$

Where ε_t is a serially uncorrelated error term with a zero mean.

When expectations are formed rationally then people use information derived from the model which they think explains how the economy behaves. This means that if inflation is due to monetary expansion, then information about the current movements in the money supply will be important in conditioning expectations. For instance, if the rate of inflation is determined by

$$\left(\frac{\bar{P}}{P}\right)_t = \rho \left(\frac{\bar{M}}{M}\right)_t + \varepsilon_t \quad (2)$$

Where $\left(\frac{\bar{M}}{M}\right)$ is the rate of growth of the money stock, then

$$E\left(\frac{\bar{P}}{P}\right)_t = \rho \left(\frac{\bar{M}}{M}\right)_t \quad (3)$$

Substituting both equation 2 and 3 to give thus:

$$f(U_t) \cong \rho \left[\left(\frac{\bar{M}}{M}\right)_t \right] + \varepsilon_t \quad (4)$$

The application of rational expectations therefore leads to the conclusion that there is not even a short run trade-off between inflation and unemployment. The short-run Phillips curve shifts up to PC_1 instantly. Equation 4 shows that unemployment is affected only by random errors, .i.e., by unpredictable events. The government can only secure a short-run decrease in employment if it makes surprise increases in the money supply.

Although the instantaneous rate of rational expectations adjustment derived from the full information application of rational expectations may seem unrealistic, its basis, that people will make use of all the available information when forming expectations and not make correctable errors, is quite sound (Levačić & Rebman, 1982, 352-353).

4.0 Model Specification

The model of this paper is hinged on the model of Omoke, (2010), which enables us to examine the impact of inflation on the growth of the Nigerian Economy.

$$RGDP = f(INFL, MS, INTR, MCAP, TS) \dots\dots\dots (6)$$

Where:

RGDP = Real Gross Domestic Product is proxied for economic growth

INFL= Inflation Rate

MS = Money Supply.

MCAPs = Market Capitalizations

TS = Total Saving

The model is transformed into log-linear form. Which is expressed as:

$$\text{LogRGDP} = \beta_0 + \beta_1 \log INFL + \beta_2 \log MS + \beta_3 \log INTR + \beta_4 \log MCAPs + \beta_5 \log TS + \mu \dots\dots (7)$$

The a priori expectations are as follows:

$$\beta_0 > 0, \beta_1 > 0, \beta_2 < 1, \beta_3 > 0, \beta_4 > 0, \beta_5 > 0.$$

Where:

β_0 = Intercept, β_1 = Coefficient of Inflation, β_2 = Coefficient of money supply, β_3 = Coefficient of interest rate, β_4 = Coefficient of market Capitalization, β_5 = Coefficient of total saving, and μ = white noise error term.

The contribution of this study to knowledge is in terms of the estimation techniques employed and the data used which is extended to 2012. An attempt will be made to empirically investigate the relationship between the impact of inflation on the growth of the Nigerian Economy for the period 1960 – 2012 regression analysis. The equation was estimated using a variety of analytical tools, including group unit root tests, co-integration tests, Granger Causality Analysis and Error Correction Model (ECM). The results are discussed below. The data used for the study covers the period 1960 and 2012. The study employed secondary data which are derived from various issues of CBN *Annual Report and Statement of Accounts (2011)*, and CBN *Statistical Bulletin (2012)*.

4.1 Model Summary

Table 1: Group Unit Root Test

Group unit root test on D(Inflation)

Group unit root test: Summary

Series: LOG_RGDP_, LOG_INFL_, LOG_INTR_, LOG_MCAP_, LOG_MS_,
LOG_TS_

Date: 01/11/14 Time: 21:56

Sample: 1960 2012

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 3

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross- sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t^*	-1.90279	0.0285	6	280
Breitung t-stat	0.18477	0.5733	6	274
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.08133	0.0187	6	280
ADF - Fisher Chi-square	27.5184	0.0065	6	280
PP - Fisher Chi-square	23.6189	0.0229	6	285

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Table1 shows the summary of the Group unit root test using summary test (.i.e. Levin, Lin & Chu t^* ; Im, Breitung t-stat, Pesaran and Shin W-stat; ADF-Fisher Chi-square; PP-Fisher Chi-square) with the lag length selection based on SIC: 0 to 1 of the variables used for the empirical study. The group unit root test shows that; Real Gross Domestic Product (RGDP); Inflation rate (INFL); Interest rate (INTR);

Market Capitalization (MCAP); Money Supply (MS) and Total Saving (TS) were stationary at level at 5 percent level of significance respectively.

The top of the output indicates the type of test, exogenous variables and test equation options. If we were instead estimating a Group unit test, a list of the series used in the test would also be depicted. The lower part of the summary output gives the main test results, organized both by null hypothesis as well as the maintained hypothesis concerning the type of the unit root process.

All of the results indicate the presence of a unit root, as the LLC, IPS, and both Fisher tests fail to reject the null of a unit root at level. While all of the results indicate the absence of a unit root, as LLC, IPS and both Fisher test accept the null of a unit root.

4.2. Cointegration test results

Co-integration test is carried out in order to determine the long-run relationship between the dependent and independent variables when one or all of the variables is/are non-stationary at level which means they have number of stochastic trends in asymptotic distribution. Co-integration tests are conducted by using the reduced procedure developed by Engle and Granger, (1987). They noted that a linear combination of two or more $I(1)$ series may be stationary, or $I(0)$, on which case we say the series are cointegrated. Such linear combination defines a cointegrating equation with cointegrating vector of weights characterizing the long-run relationship between the variables. The Engle and Granger, (1987) test results are divided into three distinct sections. *First* portion display the test specification and settings, along with the test values and corresponding p -values. *Second* (or the middle) section of the output displays the estimated coefficients, standard error, t -statistics, and p -value for the constant, even though they are not strictly speaking valid or intermediate results used in constructing the test statistic that may be of interest. The summary statistics portion is relatively familiar but does require a bit comment (Mackinnon, 1996). Most entries are self-explanatory, though a few deserve a bit of discussion-such as RHO S.E. and Residual Variance are the (possibly) d.f. corrected coefficient standard error of the regression. The long-run residual variance is the estimate of the long-run variance is the estimate of the long-run of the residual based on the estimated parametric model. The number of stochastic trends entry reports the value used to obtain the p -value.

Engle and Granger procedure is used to determine the linear combination of two or more series and/or to identify a long-run relationship. The cointegration tests include Real Gross Domestic Product (RGDP); Inflation (INFL), interest rate (INTR), Market Capitalization (MCAP), Money Supply (MS), and Total Saving (TS). Which includes Automatic lag specification (lag = 0 based on Schwarz Info Criterion, maxlag = 6).

Table 2: ENGLE-GRANGER COINTEGRATION TEST

Date: 01/11/14 Time: 22:01

Series: LOG_RGDP_ LOG_INFL_ LOG_INTR_ LOG_MCAP_ LOG_MS_ LOG_TS_

Sample (adjusted): 1981 2012

Included observations: 32 after adjustments

Null hypothesis: Series are not cointegrated

Cointegrating equation deterministics: C @TREND

Automatic lags specification based on Schwarz criterion (maxlag=6)

Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
LOG_RGDP_	-3.912810	0.5080	-33.29081	0.0253
LOG_INFL_	-5.001712	0.1437	-50.24806	0.0000
LOG_INTR_	-3.681401	0.6079	-19.71765	0.5777
LOG_MCAP_	-2.972120	0.8722	-14.17036	0.8771
LOG_MS_	-3.032077	0.8555	-13.30602	0.9072
LOG_TS_	-3.283860	0.7720	-15.57267	0.8166

*MacKinnon (1996) p-values.

Warning: p-values may not be accurate for fewer than 35 observations.

Intermediate Results:

	LOG_RGDP_	LOG_INFL_	LOG_INTR_	LOG_MCAP_	LOG_MS_	LOG_TS_
Rho – 1	-0.574710	-1.052021	-0.636053	-0.457108	-0.429227	-0.502344
Rho S.E.	0.146879	0.210332	0.172775	0.153799	0.141562	0.152974
Residual variance	0.000308	0.063639	0.011643	0.011049	0.001200	0.002054
Long-run residual variance	0.001147	0.161314	0.011643	0.011049	0.001200	0.002054
Number of lags	1	1	0	0	0	0
Number of observations	30	30	31	31	31	31
Number of stochastic trends**	6	6	6	6	6	6

**Number of stochastic trends in asymptotic distribution

4.3 Pairwise Granger Causality Test

Pairwise Granger Causality test between real gross domestic product proxied as economic growth, inflation rate, interest rate, Market Capitalization, Money Supply, and Total Saving are examined in Table 3. The Pairwise Granger causality tests were inconclusive at 5% level of significance. The results alternated between bi-directional, no causality and uni-directional, depending on the lag length allowed. The outcome in respect one two-lag length is presented in table 3. The Table reveals that we cannot reject the hypothesis that TS Granger causes MCAP, but we do reject the hypothesis that MCAP does not Granger cause TS. We can reject the hypothesis that MS does not Granger cause MCAP, but we do not reject the hypothesis that MCAP does not Granger cause MS. We can reject the hypothesis that TS does not Granger cause MS, but we do not reject the hypothesis that MS does not Granger cause TS. Therefore it appears that Granger causality runs one-way from MS to MCAP, TS to MCAP, TS to MS and not the other way.

Table 3: Pairwise Granger Causality Tests

Pairwise Granger Causality Tests

Date: 01/11/14 Time: 22:07

Sample: 1960 2012

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LOG_INFL_ does not Granger Cause LOG_RGDP_ LOG_RGDP_ does not Granger Cause LOG_INFL_	44	0.19604 0.98392	0.8228 0.3829
LOG_INTR_ does not Granger Cause LOG_RGDP_ LOG_RGDP_ does not Granger Cause LOG_INTR_	50	0.03644 1.23708	0.9642 0.2999
LOG_MCAP_ does not Granger Cause LOG_RGDP_ LOG_RGDP_ does not Granger Cause LOG_MCAP_	30	0.46179 0.79781	0.6354 0.4614
LOG_MS_ does not Granger Cause LOG_RGDP_ LOG_RGDP_ does not Granger Cause LOG_MS_	51	0.51881 0.11542	0.5987 0.8913
LOG_TS_ does not Granger Cause LOG_RGDP_ LOG_RGDP_ does not Granger Cause LOG_TS_	51	0.92438 0.13551	0.4040 0.8736
LOG_INTR_ does not Granger Cause LOG_INFL_ LOG_INFL_ does not Granger Cause LOG_INTR_	44	2.26964 2.35276	0.1168 0.1085
LOG_MCAP_ does not Granger Cause LOG_INFL_ LOG_INFL_ does not Granger Cause LOG_MCAP_	30	2.84971 0.90728	0.0768 0.4165
LOG_MS_ does not Granger Cause LOG_INFL_ LOG_INFL_ does not Granger Cause LOG_MS_	44	0.98564 1.78475	0.3823 0.1813
LOG_TS_ does not Granger Cause LOG_INFL_ LOG_INFL_ does not Granger Cause LOG_TS_	44	1.93425 1.96637	0.1581 0.1536
LOG_MCAP_ does not Granger Cause LOG_INTR_ LOG_INTR_ does not Granger Cause LOG_MCAP_	30	2.19431 2.01791	0.1324 0.1540
LOG_MS_ does not Granger Cause LOG_INTR_ LOG_INTR_ does not Granger Cause LOG_MS_	50	0.17976 0.70496	0.8361 0.4995
LOG_TS_ does not Granger Cause LOG_INTR_ LOG_INTR_ does not Granger Cause LOG_TS_	50	1.35405 1.07548	0.2685 0.3497
LOG_MS_ does not Granger Cause LOG_MCAP_ LOG_MCAP_ does not Granger Cause LOG_MS_	30	5.48634 1.12957	0.0106 0.3391
LOG_TS_ does not Granger Cause LOG_MCAP_ LOG_MCAP_ does not Granger Cause LOG_TS_	30	2.61464 4.16184	0.0931 0.0275
LOG_TS_ does not Granger Cause LOG_MS_ LOG_MS_ does not Granger Cause LOG_TS_	51	8.66085 2.36828	0.0006 0.1050

4.4: Orthonormal Loadings Biplot

The component scores are displayed as circles and the variables loadings are displayed from the origin with variable labels. The Biplot clearly shows us that the first component has positive loadings for all the six variables (i.e., general inflation interpretations). Second, component has positive loadings for interest rate and negative loadings for MCAP, MS and TS. If MS does well relative to MCAP and TS, the second specific component will be positive, and vice versa.

Diagram 1: Orthonormal Loadings Biplot

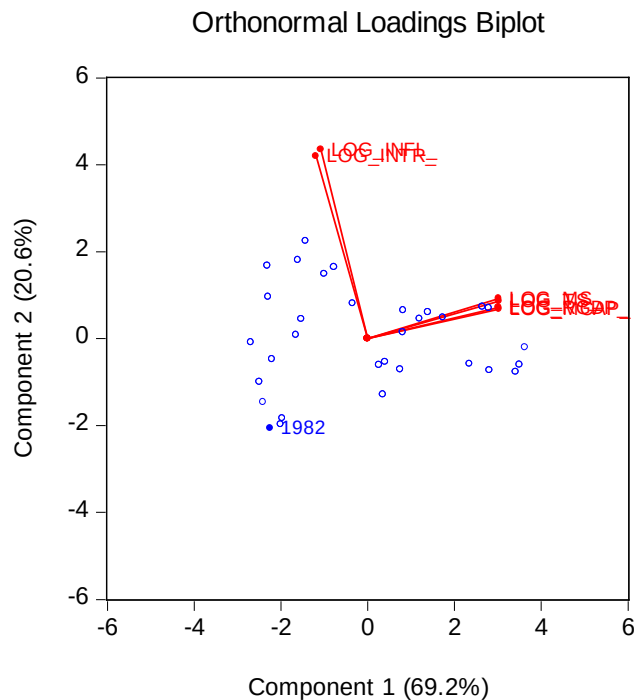


Diagram 2: Boxplot Graph

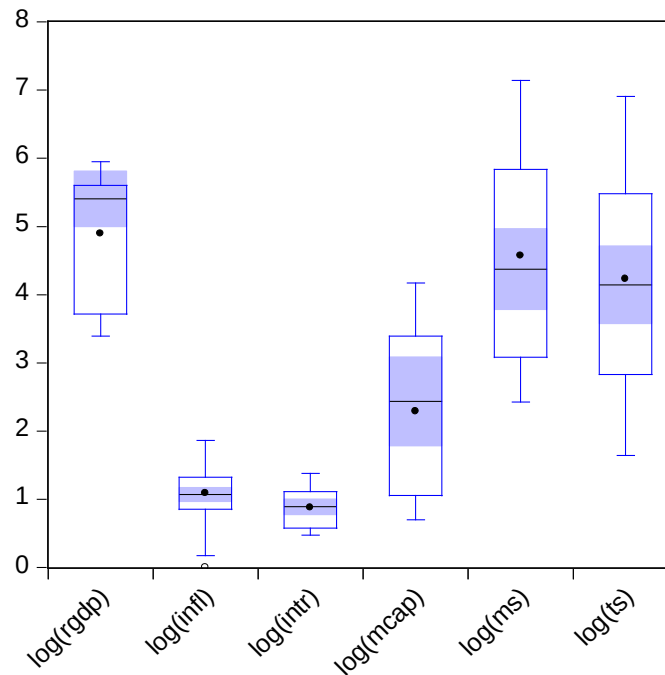
A boxplot, also known as a box and whisker diagram, summarizes the distribution of set of data by displaying the centering and spread of the data using few primary elements (McGill, Tukey, and Larsen, 1978).

Boxplots are often drawn so that the widths of the boxes are uniform. Alternatively, the box widths can be varied as a measure of the sample size for each box, with widths drawn proportional to N , or proportional to the square root of N .

In diagram 2, the range of value for the the RGDP, MS, TS & MCAPs is almost similar but the latter (i.e. INFL & INTR) has lower values in general.

The lower values are for the economic growth, which also have a narrower range. None of the four values show an extreme value of growth.

Diagram 2: Boxplot Graph



5.0 Summary

The paper empirically examines the impact of the inflation on the growth of Nigerian economy, using annual time series data from 1960 to 2012. The model developed by Omoke (2010) was used for the study. The paper employs stochastic characteristics of each time series data by testing their stationarity using Group unit root tests, including Cointegration tests and Pairwise Granger Causality Test.

The null hypothesis being that there is presence of a Group unit root (.i.e. Levin, Lin & Chu t^* ; Im, Pesaran and Shin W-stat; ADF-Fisher Chi-square; PP-Fisher Chi-square) except Breitung t-stat was accepted at levels implying that the variables were found stationary at 5% level of significance.

We used co-integration technique by Engle and Granger (1987) approach in assessing the co-integrating properties of variables, especially in a multivariate context. The result of the test showed that for the periods, 1960-2012, there was no co-integrating relationship between Inflation and economic growth for Nigeria data. Thus, all the variables have both short and long run relationship with each other as revealed by Cointegration tests. Besides the non-existence of cointegration existing between economic growth and INTR, MCAP, MS and TS, further effort was made to check the causality relationship that exist between the four variables by employing the Pairwise -Granger causality at two lag periods as could be seen in table 3. The results showed the same at different lags.

The first test was conducted using lag two (2) and in the result unidirectional causality was seen running from MS to MCAP, MCAP to TS, TS to MS.

It should be borne in mind that the study did not consider if the relationship between inflation and growth was negative or positive; however, various studies as reviewed in the literature has come out with the result that high inflation is and has never been favourable to economic growth. Hence it will be good to maintain the fact that the causality does not run from INFL to RGDP and RGDP to INFL is an indication of insignificant relationship showing that Inflation indeed has an inverse impact on growth.

5.1 Recommendations

From the econometric study of the impact of inflation on the growth of the Nigerian Economy from 1960-2012, the following recommendations are stated below:

- Government should ensure that policy measure (or monetary or fiscal) to control inflation rate has to be put in place-through the efforts of central Bank of Nigeria.
- Government should ensure that inflation rate is maintained at single-digit level.
- Government should place a high premium of control on money supply since it has a significant link with inflation in the economy-such as Nigeria.
- Government should in sincerity control inflation rate since it inversely affects interest rate in Nigeria. If the amount charge on investible loans is high, it will manifest negatively on the growth.
- Government should formulate and implement policy on inflation rate since it negatively affects market capitalization in Nigeria. However, Capital market is a market whereby surplus unit saves their surplus and/or lends to deficit unit that needs the money for utilization.
- Government should create atmosphere that encourages the general public to save that part of cash that is not consumed immediately or idle cash. Inflation dissuades savings in other words inflation has an inverse relationship with savings, without saving-no capital accumulation or rather capital formation will be low. This will discourage potential investors to invest since no source of investible funds.

References

- Ahmed, S., and Mortaza, G. (2005). Inflation and Economic Growth in Bangladesh: 1981- 2005. *Policy Analysis Unit (PAU) Working Paper* 0604.
- Anyanwu, J.C. (1997). *Nigerian Public Finance*. Onitsha: Joanee Educational Publishers Ltd.
- Barro, R. J. (1995, 1996). Inflation and Economic Growth. *National Bureau of Economic Research (NBER) Working Paper* No. 5326 (October).

- Bruno, M., and Easterly, W. (1995). Inflation Crises and Long-Run Growth, *World Bank Policy Research Working Paper* No.1517
- Boyd, J.H., & Champ, B. (2001). Inflation, Banking, and Economic Growth. *Federal Reserve Bank of Cleveland*.
- Central Bank of Nigeria (2011). *Statistical Bulletin (various issues)*, Abuja.
- Central Bank of Nigeria (2012). *Statistical Bulletin*, Abuja.
- Culver, E. S., & Papell, H.D. (1997). Pitfalls and Opportunities: What Macroeconomics Should Know about Unit Roots, In O. J. Blanchard and S. Fischer, eds., *NBER Macroeconomics Annual 1991*, Cambridge: MIT Press.
- De Gregorio, José. (1993). Effects of Inflation on Economic Growth: Lessons from Latin America. *European Economic Review*, 36,417–25.
- Engle, R. F., & Granger, C.W.J. (1987). Co-integration and Error Correction: Representation, Estimation and Testing. *Econometrica*, 55, 1-87.
- Erbaykal, E., and Okuyan, H.A. (2008). Does Inflation Depress Economic Growth? Evidence from Turkey. *International Research Journal of Finance and Economics*, Issue 17, no. 1450-2887
- Faria, J. R., and Carneiro, F.G. (2001). Does High Inflation Affect Growth in the Long and Short-run? *Journal of Applied Economics*, IV (1), 89-105.
- Fischer, S. (1993). The role of macroeconomic factors in economic growth”, *Journal of Monetary Economics*, 32, 485-512.
- Gokai, V., and Hanif, S. (2004). Relationship Between Inflation and Economic Growth. *Economic Department Reserve Bank of Fiji*
- Guisan, M.C. (2006). Causality Relationships and Economic Growth: Effects of Demand and Supply. *International Journal of Applied Econometrics and Quantitative Studies*, 3(2).
- Harris, R. I. D. (1995). *Using Co-integration Analysis in Econometric Modeling*", London: Prentice Hall, Harvester Wheat sheaf. Independence of Regression Residuals,” *Economics Letters*, 6, 255-259.
- Khan, S.M. (2002). Inflation, Financial Deepening, and Economic Growth’ Inflation, Financial Deepening, and Economic Growth’ Paper prepared for the Banco de Mexico Conference on *Macroeconomic Stability, Financial Markets and Economic Development*, Mexico City, November 12-13,
- Khan, M. S., and Senhadji, A.S. (2001). Threshold Effects in the Relationship between Inflation and Growth, *IMF Staff Papers*, 48, 1. *Journal of Sustainable Development* 3(2), June 2010 165
- Kwiatkowski, D., Phillips, P., Schmidt, P., and Shin, Y. (1992). Testing the Null Hypothesis of Stationary against the Alternative of a Unit Root. *Journal of Econometrics*, 54, 159-178.
- Levačić, R., and Rebman, A. (1982). *Macroeconomics: An Introduction to Keynesian-NeoClassical Controversies*, 2 (ed), 352-353, London, Macmillan Basingstoke press

- MacKinnon, J. (1996). *Critical Values for Co-integration Tests*, In R. F. Engel and C. W. J. Granger, eds., Long Run Economic Relationships: Readings in Co-integration, Oxford: Oxford University Press.
- Malla, S. (1997). Inflation and Economic Growth: Evidence from a Growth Equation. mimeo, Department of Economics, University of Hawai'i at Monoa, Honolulu.
Available at www.hawaii.edu/~malla
- Mallik, G. and Chowdhury, A. (2001). Inflation and Economic Growth: Evidence from South Asian Countries, *Asian Pacific Development Journal*, 8(1), 123-135.
- Mubarik, Y. A. (2005). Inflation and Growth: An Estimate of the Threshold Level of Inflation in Pakistan,” *State Bank of Pakistan – Research Bulletin*, 1, (1-2), 35-44.
- Omoke, P.C. (2010). Inflation and Economic Growth in Nigeria, *Journal of Sustainable Development*, 3(2), 159.
- Paul, S., Kearney, C., & Chowdhury K. (1997). Inflation and economic growth: a multi-country empirical analysis. *Applied Economics*, 29, 1387-1301.
- Ramsey, J.B. (1995). Models, Specification Error and Inference: A Discussion of Some Problems in Econometric Methodology. *Bulletin of the Oxford Institute of Economics and Statistics*, 32, 301-318.
- Saaed, A. (2007). Inflation and Economic Growth in Kuwait: 1985-2005 Evidence from Cointegration and Error Correction Model’ *Applied Econometrics and International Development* Vol. 7-1
- Sarel, M. (1996). Nonlinear Effects of Inflation on Economic Growth,” IMF WP/95/56, Washington
- Shitundu, J. L., and Luvanda, E.G. (2000). The Effect of Inflation on Economic Growth in Tanzania. *African Journal of Finance and Management*, 9(1), 20-40.
- Shuaib, I.M. (2010). *Monetary Policy*, Unpublished Version.
- Sweidan, O. D. (2004). Does Inflation Harm Economic Growth in Jordan? An Econometric Analysis for the Period 1970-2000. *International Journal of Applied Econometrics and Quantitative Studies*, 1 &2, 41-66.
- Tan, Eu Chye (2008). Inflation and Economic Growth in ASEAN-5, Japan and South Korea. In: *11th International Convention of the East Asian Economic Association*, 15-16 November 2008, Manila. (Unpublished)
- Tobin, J. (1965). Money and Economic Growth, *Econometrica*, 33, 671-684.
- Yap, J.T. (1996). Inflation and Economic Growth in the Philippines’ PIDS. Discussion Papers Series. 96-11