Academic Journal of Current Research
Vol.6, No.9; October-2019;
ISSN (2343 – 403X);
p –ISSN 3244 - 5621
Impact factor: 5.92

INFLATION RATE AND ECONOMIC GROWTH RATE RELATIONSHIP: A STATISTICAL EVIDENCE FROM NIGERIA

[1]Nwaoha, William Chimee (Ph.D),[2]Atanu, Enebi Yahaya, [3]Ikoro, Uzoma Eunice and [3]Ohajianya, Uzoma Bernard

[1]School of General Studies, Federal Polytechnic of Oil and Gas,Bonny Island, Rivers State, Nigeria.
[2]Department of Statistics, Federal Polytechnic of Oil and Gas,Bonny Island, Rivers State, Nigeria.
[3]Department of Business Admin.& Mgt., Abia State Polytechnic, Aba,Abia State, Nigeria.
Corresponding author: Dr. William Chimee Nwaoha

ABSTRACT: *This study used Ordinary Least Square (OLS) method to examine the inflation rate and economic growth rate (proxy by GDPGR) relationship in Nigeria during the period 1982-2018. The data such as inflation rate (INFR) and gross domestic product growth rate (GDPGR) were obtained from Central Bank of Nigeria (CBN) Statistical Bulletin. The result of the finding revealed that inflation rate has an inverse and significant relationship with GDPGR. This implies that a fall in inflation rate will lead to a rise in economic growth rate. Therefore, the researchers recommend that in order to ensure a sustainable economic growth rate in Nigeria, effective monetary and fiscal policies and other non-monetary measures should be used by the government to combat inflation rate.*

Keywords: *INFR; GDPGR; OLS; CBN.*

INTRODUCTION

The main aim of every manager of the economy is the attainment of sustainable economic growth rate with low inflation rate. Hence, high and sustained output growth in conjunction with low inflation rate is the common objective of macroeconomic policy all over the world. Today, Inflation is no longer a mere war-time phenomenon but a global phenomenon that affect both the developed and developing economies.Anyanwu, (1997) sees inflation as the continual upward movement of the general price level in the economy. To Solow, (1979) inflation is going on when one needs more and more money to buy some representative bundle of goods and services. McMahon (2007) sees it as an increase in the price a person pays for goods, while Amadeo (2012) cited it as when the prices of most goods and services continue to creep upward leading to low standard of living. Ackley (1960) agreed that inflation is a persistent and appreciable rise in the general price level of goods and services. In other words it is a fall in the purchasing power of money within an economy. Jhingan (2002) opined that inflation is the tenacious and the significant rise in the overall level of prices. Ekpenyong, Omekara and Ekerete, (2013) were of the opinion that, not all increase in price of goods and services in an economy can be referred to as inflation but only increase in price level that is enduring, continuous and affect all commodities in the economy.

Dwivedi (2006), economic growth implies that the rate of increase in total output must be greater than the rate of population growth. Economic growth is therefore a quantitative increase in output of an economy and it is measured by the increase in the amount of goods and services produced in a country. Salami and Kelikume (2015) described economic growth as a positive change in the level of production of goods and services by a country over a certain period of time. Bencivenga and Smith (1991) asserted that economic growth will increase if more savings are channelled into the activity with high productivity while reducing the risk associated with liquidity needs. An economy is said to be growing when it increases its

Academic Journal of Current Research
Vol.6, No.9; October-2019;
ISSN (2343 – 403X);
p –ISSN 3244 - 5621
Impact factor: 5.92

productive capacity which later yield more in production of more goods and services (Jhingan 2003).

Every developing economy engages in ensuring sustainable economic growth which is driven by stable macroeconomic variables most especially low levels of inflation. Several studies in the past have established the relationship between inflation and economic growth. Studies like Fischer (1993), Bruno and Easterly (1998), Kremer, Bick and Nautz(2013) are of the opinion that increased continuing levels of inflation affects economic growth negatively. Others, such as De Gregorio (1993), Hedgimichael, Ghura, Mhleisen and Nord (1995), Khan and Senhadju (2000) maintained that low rates of inflation moves in the same direction with high level of economic growth. Hence, it can be concluded with the above assertion that, every developing economy must ensure keeping her inflation at a low rate to sustain economic growth. On the same note, before being affirmative on the above deduction, some of the previous works still revealed that even though inflation is ill-disposed to economic growth (Barro, 1991 and Fischer, 1993), others hold to the fact that significant level of continuous and persistent rise in price is necessary to attain economic growth (Tobin, 1969 and De Gregorio, 1993). It then means that, as the economic managers try to maintain low rate of inflation, and also need to be conscious of that rate of inflation that is necessary to attain certain level of economic growth.

For years, the magnitude of the inflationary rate and economic growth rate in Nigeria continues to vary overtime and all sectors of the economy have been affected by the shocks. In 1983, the inflation rate was 23.2% and the economic growth rate was -7.5% (negative/ recession). This was as a result of the collapse of the world oil market that led to a fall in oil prices in early 1980's. During 1988, the inflation rate stood at 54.5% while the growth rate of the economy was 6.2%. This was because of the introduction of Structural Adjustment Programme (SAP) in the mid 1980's. In 1995, the rate of inflation in Nigeria stood at 72.8% and economic growth rate was at 1.8%. This is the highest ever recorded inflation rate in the Nigeria economic history, probably because of the sanctions against Nigeria government by the international community as well as collapse of some Nigeria banks. The inflation rate and growth rate in year 2002 was 12.8% and 14.6% respectively. This improvement was as a result of the birth of democratic government in Nigeria. In 2007, the inflation rate recorded a single digit of 5.3% while economic growth rate was 7.7%.This was due to the introduction of economic and institutional reforms by the democratic government geared towards sustainable growth and development. The inflation rate and economic growth rate in year 2015 stood at the single digits of 9.8% and 2.7% respectively. The was as a result of the change in democratic government with new policies. In 2016, the rate of inflation in Nigeria stood at 9.8% and economic growth rate was at -1.5% (negative/recession). This was because of the policy failure of the new democratic government that led to economic recession. (see table 2, appendix 1).

The remaining part of this paper include: review of related literature; methodology; result and discussion; andconclusion.

REVIEW OF RELATED LITERATURE

This section discusses some empirical literature on the dependent and independent variables of the study as well as their graph of relationship.

Muhammad, Muhammad, Rashid (2015) examined the impact of major economic variables includes inflation rate, interest rate and exchange rate on economic growth of Pakistan using time series data from 1981 to 2013. The results from multiple linear regression model found that inflation rate and interest rate spread negative impact on Pakistan's economic growth.

Eggoh and Muhammad (2014), based on data from 102 countries using the PSTR and dynamic GMM methods, concluded that the relationship betweeninflation and economic growth is non-linear and proposed several inflation thresholds for different samples.

Barro (2013) found that rising inflation by 10 pp led to a decline in the real GDP percapita growth rate by 0.2-0.3 pp.

Chaudhary, Imran, and Imran (2013) investigated both the short run and long run relation of monetary policy, rate of inflation and growth rate in Pakistan during the period of 1972-2010. The investigation showed that credit disbursement to private sector leads to increase in the level of inflation that is harmful for the economy.

Patrick, Prudence, and Edmond (2013) studied the relationship between GDP (Gross Domestic Product) growth rate and inflationary rate in Ghana from the period 1980 to 2012. The study employs the methods of scatter plot, correlation analysis and simple linear regression estimated using OLS (Ordinary Least Squares). All the three

approaches proved that there is a strong negative linear relationship between GDP growth rate and inflation rate in Ghana.

Umaru and Zubairu (2012) investigated the effects of inflation rate fluctuation on the economic growth and development in Nigeria for period from (1970-2010). Most of the countries of the world used monetary policy as instrument to stable their consumer price index level. The study revealed that inflation possessed a positive impact on productivity and overall output level in the economy.

Chimobi (2010) investigates the existence of a relationship between inflation and economic growth using annual data for the period 1970 – 2005. The study finds no co-integrating relationship between the two variables. Using Granger causality test, however, the study established unidirectional causality running from inflation to economic growth.

Hussain and Malik (2005) concluded that there was no definite level of inflation in the economy of Pakistan because 4 to 6 percent inflation rate is not harmful for the economy but at this level inflation encourages the overall productivity and investment returns. He further stated that a structural break level inflation rate was temporary harmful for economic stability in long run.

Sachsida, Carneiro, and Loureiro (2003), in countries with open economies, the negative impact of inflation on economic growth is significantly enhanced afterreaching the threshold.

Mallik and Chaodhry (2001) examined a long-run positive relation with economy of the four Asian countries (Bangladesh, India, Pakistan and Sri Lanka). They found that a long run significant relationship exists between GDP growth rate and inflation rate for all above four countries. By using co-integration and error correction model they concluded that a moderate inflation rate put positive impact on the economy.

Faria and Carneiro (2001) analyzed a negative impact of the inflation on Brazilian economy under both short run and long run scenario. The study found permanent inflationary shocks on the economy while such shocks of inflation didn't threatened the economy in extreme. However permanent increase in inflation rate would be trouble for the health of Brazilian.

Bruno and Easterly (1998) found that there was a temporary negative relationship found between inflation rate and economic growth. The sign of relation depends on the level of inflation rate. If level of inflation is high than it would be harmful to economy growth while if the level of inflation is low it could encourage high productivity as well as increase in output level.

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.

Levin and Zervos(1998) showed that the cross-section correlation between inflation and growth depends on extreme inflation observations with high-frequency data.

Johanson (1967) posits that there is no convincing evidence of any clear association, positive or negative, between the rate of inflation and the rate of economic growth. He argues that it is not inflation that determines economic growth but the application of knowledge, through technical and managerial change and the improvement of human capacities.

Wai (1959) argues that there is no relationship between inflation and economic growth noting that growth has been possible without inflation in some countries while in others, there have been inflation without growth.

Academic Journal of Current Research
Vol.6, No.9; October-2019;
ISSN (2343 – 403X);
p –ISSN 3244 - 5621
Impact factor: 5.92

Relationship Between GDPGR And INFR

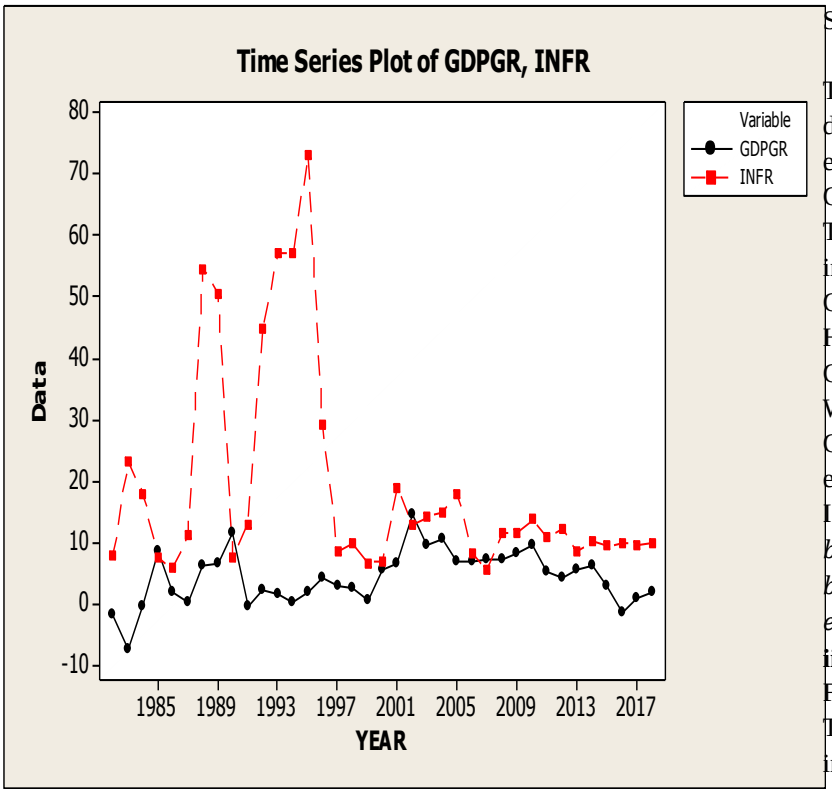

Fig.1. Source: Researcher's Survey, 2019.

The fig.1 above depicts the graphical relationship between inflation rate (INFR) and economic growth rate (GDPGR). There have been fluctuations between the two variables during the study period. In 1983, the peak of inflation rate was 23.2% and economicgrowth rate at the same period was -7.5%. Also in 1988, inflation rate and economic growth rate stood at 54.5% and 6.2% respectively. Though in 1995, inflation rate was 72.8% which was ever recorded in the economic history of Nigeria while economic growth rate was at 1.8%. In 2002, inflation rate was 12.8% and economic growth rate was 14.6%. During 2007, inflation rate and economic growth rate stood at single digits of 5.3% and 7.7% respectively. In 2015 and 2016, inflation rates and economic growth rates were 2.7% and 9.4% as well as 9.8% and -1.5%.

METHODOLOGY

In this study, Ordinary Least Square (OLS) method was used to determine the relationship between the inflation rate and economic growth rate in Nigeria during the study period (1982-2018). Secondary data was used in the analysis. Data like inflation rate and economic growth rate (GDP growth rate) were obtained from Central Bank Nigeria (CBN) Statistical Bulletin for analysis.

i. Model Formulation

The independent variable is inflation rate while the dependent variable is the GDP growth rate (proxy of economic growth rate). The model is stated as follows:

GDPGR = F(INFR) ……(1)

Thus, the functional relationship between dependent and the independent variables in the study are stated as follows:

GDPGR = F(INFR) + e_t ……(2)

Hence, the mathematical form of the model is thus:

GDPGR = b_0 + b_1INFR + e_t ……(3)

Where:

GDPGR = Gross Domestic Product Growth Rate (proxy of economic growth rate)

INFR = Inflation rate

b_0= Intercept estimator

b_1= Slope estimator

e_t= Error term

ii. A Priori Expectation

From the equation above, GDPGR is a function of INFR. That is, GDPGR is expected to be negatively related to inflation rate. This implies that a decrease in inflation rate will, all things being equal, lead to an increase in GDPGR. Hence, $b_1 < 0$.

RESULT AND DISCUSSION

For the purpose of finding the quantitative prediction regarding dependent and independent variables, regression analysis method has been adopted to show the individual significance of independent variable and overall significance of the model. Below is the result of regression analysis:

Table 1. OLS Result

Dependent Variable: D(GDPGR,1)
Method: Least Squares
Date: 08/16/19 Time: 11:08
Sample (adjusted): 1983 2018
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INFR,1)	-0.328850	0.047169	-3.611638	0.0048
C	0.104838	0.715990	0.146423	0.8845
R-squared	0.610883	Mean dependent var		0.103183

Academic Journal of Current Research
Vol.6, No.9; October-2019;
ISSN (2343 – 403X);
p –ISSN 3244 - 5621
Impact factor: 5.92

Adjusted R-squared	0.408208	S.D. dependent var	4.257323
S.E. of regression	4.295908	Akaike info criterion	5.807156
Sum squared resid	627.4641	Schwarz criterion	5.895129
Log likelihood	-102.5288	Hannan-Quinn criter.	5.837861
F-statistic	7.374101	Durbin-Watson stat	1.748444
Prob(F-statistic)	0.000846		

Source: Researchers' Survey, 2019.

The result in table 1 above shows that R^2 represents the coefficient of determination (explanatory variable)that determines the degree and direction of the variable which is associated with each other from the sample data. There is a range of coefficient of determination (correlation) which expresses the strength and direction of the correlation between the variables. This range includes '+1' and '-1'. If there is a strong positive linear relationship found between variables, the value of the 'R^2' will be close to the '+1'. While the value of the 'R^2' will be closed to '-1' if a negative linear relationship is found between variables. But if the value of 'R^2' will be zero, it then means a weak relationship exists between the variables.Therefore, the value of $R^2$is 0.61 that means 61% of economic growth rate of Nigeria is explained by inflation rate.There is also an absence of autocorrelation as shown by Durbin Watson result.

The t-value of inflation rate is -3.61 which means that inflation rate has significant relationship with economic growth rate of Nigeria and the overall regression is also significant.

The value of coefficient of inflation rate shows the existence of negative relationship between inflation rate and economic growth rate in Nigeria. This meets the a priori expectation which implies that the higher the inflation rate, the lower the economic growth rate. Therefore, 1% increase in inflation rate will lead to 32.8% decrease in economic growth rate. This contradicts the findings of some researchers such as Umaru and Zubairu (2012), Mallik and Chaodhry (2001) who found that inflation rate and economic growth rate have positive and significant relationship. The result from the analysis however, corroborates with the findings of Patrick, Prudence, and Edmond (2013), Sachsida, Carneiro, and Loureiro (2003), Bruno and Easterly (1998) on the effect that inflation rate and economic growth rate are negatively and significantly related.

CONCLUSION

The aim of this study is to examine the relationship between inflation rate and economic growth rate in Nigeria during the period 1982-2018 using Ordinary Least Square (OLS) method. Analysis from the estimation suggests that inflation rate has negative and significant relationship with economic growth rate in Nigeria. This implies that, as inflation rate increases, economic growth rate decreases and vice versa. Therefore, the researchers recommend that effective monetary and fiscal policies and other non-monetary measures should be used to combat inflation rate so as to ensure a sustainable economic growth rate in Nigeria.

REFERENCES

Ackley, G. (1960). *Macroeconomic Theory.*New York, NY: Macmillan.

Amadeo, K. (2012). Obamacarebill:A summary of the Bill's 10 titles. Retrieved from: http://useconomy.about.com/od/healthcarereform/a/Obamacare-Bill.htm.

Anyanwu, J. C. (1997). *Nigerian Public Finance.* Joanne Educational, Onitsha, Anambra State.

Barro, R. J. (2013). Inflation and Economic Growth. *Annals of Economics and Finance*, 14(1), 85-109.

Barrow, R, J. (1991). Economic Growth in a Cross Section of Countries. *National Bureau of Economic Research (NBER) Working Papers* ,3120.

Bencivenga, V. R., & Smith, B. D. (1991). Financial intermediation and endogenous growth. *Review of Economic Studies*, 58(2), 195-209.

Bruno, M., & Easterly, W. (1998). Inflation Crisis and Long-Run Growth.*Journal of Monetary Economics*,4(1)

Central Bank of Nigeria (CBN) (2018*). Statistical Bulletin*.December.

Chaudhary, S., Imran, A. M., & Imran, F. (2013). Does Inflation Matter For Sectoral Growth in Pakistan? An Empirical Analysis. *Pakistan Economic And Social Review*, 51(1), 71-92.

Chimobi, O. P. (2010). Inflation and Economic Growth in Nigeria. *Journal of Sustainable Development*,3(2).

De Gragorio, J. (1993). Inflation, Taxation and Long-run Growth. *Journal of Monetary Economics*, 31(3), 271-298.

Dwivedi, D. N. (2006). Principles of economics. Vikas Publishing House PVT Ltd, New Delhi.

Eggoh, J. C., & Muhammad, K. (2014). On the nonlinear relationship between inflation and economic growth. *Research in Economics, Elsevier*, 68(2), 133-143.

Ekpenyong, E. J., Omekara, C. O., &Ekerete, M. P. (2013). Modeling Inflation rates using Periodogram and Fourier Series Analysis Methods: The Nigerian Case. *International Journal of African and Asian Studies*, vol.4.

Faria, R. J., &Carneiro, G. F. (2001). Does High Inflation Affect Growth in the Long-run and Short-run? *Journal of Applied Economics*, 4(1), 89-105.

Fischer, S. (1993). The role of macroeconomic factors in growth. *Journal of Monetary Economics, 32*(3), 485 – 511.

Hedjimicheal, M., Ghura, D., Mhleisen, M. & Nord, R. (1995). Sub-Saharan Africa: Growth, Savings and Investment, 1986-1993. International Monetary Fund (IMF) Occasional Paper, No. 118.

Hussain, S.,& Malik, S. (2005). Inflation and Economic Growth: Evidence from Pakistan. *International Journal of Economics and Finance*, 3(5), 263-276.

Jhinghan, M. L. (2003). *Macro-Economic Theory.* 11th Revised Edition, Vrinda Publication Ltd. New Delhi.

Jhingan, M. L. (2002). Macroeconomic Theory: 10th Edition, Vrinda Publication Ltd. New Delhi.

Johanson, H. G. (1967).*Is Inflation a Retarding Factor in Economic Growth?* in Fiscal and Monetary Problems in Developing States, Proceedings of the Third Rehoroth Conference, ed. By David Krivine, 121-130.

Khan, M. S. &Senhadji, A. S. (2000). Threshold Effects in the Relationshipbetween Inflation and Growth. *International Monetary Fund (IMF) Working Paper*, WP/00/110.

Kremer, S., Bick, A. &Nautz, D. (2013). Inflation and Growth: New Evidencefrom a Dynamic Panel Threshold Analysis. *Empirical Economics, Springer*, 44(2), 861-878.

Levine, R., &Zervous, S. (1998). Stock Markets, Banks and Economic Growth. *American Economic Review*, 88(3), 537-558.

Mallik, G. &Chaodhry, A. (2001). Inflation and Economic Growth: Evidence from four South Asian countries. *Asia Pacific Development Journal*, 13.

McMahon, G. (2007). Measuring short-run inflation for Central Bankers. *Federal Reserve Bank of St. Louis Review, 79*, 3-8.

Muhammad, W., Muhammad, W. M., & Rashid, A.(2015). Impact of Major Economic Variables on Economic Growth of Pakistan. *ActaUniversitatisDanubius. Economica*, 11(2).

Umaru, A., &Zubairu, A. A. (2012). Effect of Inflation on the growth and development of thenigerianeconomy(an empiric analysis). *International Journal of Business and Social Sciences*, 3(10), 183-191.

Patrick, E., Prudence, A. O., & Edmond, H. (2013). The Relationship between GDP Growth Rate and Inflation Rate in Ghana: An Elementary Statistical Approach. *Academic Research International*, 4(5).

Sachsida, A., Carneiro, F. G., &Loureiro, P. R. A. (2003). Does Greater Trade Openness Reduce Inflation? Further Evidence using Panel Data Techniques. *Economic Letters*, 81, 315-319.

Salami, D., &Kelikume, I. (2015). An Estimation of Inflation Threshold for Nigeria (1970-2008). *International review of Business Research papers*, 6(5), 375 – 385.

Academic Journal of Current Research
Vol.6, No.9; October-2019;
ISSN (2343 – 403X);
p –ISSN 3244 - 5621
Impact factor: 5.92

Solow, R.M. (1979). Another Possible Source of Wage Stickiness. *Journal of Macroeconomics*, 1, 79-82. https://doi.org/10.1016/0164-0704(79)90022-3.

Tobin, J. (1969). Money and Income: Post Hoc Ergo Propter Hoc?.CowelsFoundation Discussion Papers, pp. 283.

Wai, U. T. (1959). The Relationship between Inflation and Economic Development: A Statistical Inductive Study. *IMF Staff Papers*, 7, 302-317.

APPENDIX 1

Table 2. GDPGR AND INFR DATA

YEAR	GDPGR	INFR
1982	-1.78874	7.697747
1983	-7.57656	23.21233
1984	-0.50882	17.82053
1985	8.524826	7.435345
1986	1.899665	5.717151
1987	0.170244	11.29032
1988	6.233269	54.51122
1989	6.656061	50.46669
1990	11.62761	7.3644
1991	-0.55203	13.00697
1992	2.193493	44.58884
1993	1.568807	57.16525
1994	0.256575	57.03171
1995	1.872348	72.8355
1996	4.052034	29.26829
1997	2.885916	8.529874
1998	2.495602	9.996378
1999	0.521844	6.618373
2000	5.5185	6.933292
2001	6.666848	18.87365
2002	14.60438	12.87658
2003	9.502606	14.03178
2004	10.442	14.99803
2005	7.008457	17.86349
2006	6.725974	8.239527
2007	7.318081	5.382224
2008	7.199287	11.57798
2009	8.353344	11.53767
2010	9.539786	13.7202
2011	5.307924	10.84079

Academic Journal of Current Research
Vol.6, No.9; October-2019;
ISSN (2343 – 403X);
p –ISSN 3244 - 5621
Impact factor: 5.92

2012	4.20589	12.21701
2013	5.487793	8.475827
2014	6.222942	10.34642
2015	2.786398	9.411122
2016	-1.58307	9.87877
2017	0.823987	9.644946
2018	1.925863	9.761858

Source: CBN Statistical Bulletin, 2018.