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Study Examine The Effect of Monetary Policy on Income Generation in Nigeria

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Abstract

The study examined the effect of monetary policy on income generation for the period of 11 years from 2007 to 2017. The adopted ex-post facto research design and used data from Central bank of Nigeria statistical bulletin. The study adopted regression with the aid of E-view statistical software package to analysed data. The found that monetary policy contributes significantly to income generation in Nigeria. This implies that there is a significant relationship between monetary policy (interest rate, inflation rate and exchange rate) and income generation (per capita income) in Nigeria. The study recommended that monetary policy in Nigeria should be regulated with strict consideration of how to control or reduce high interest rate, inflation rate and also improve exchange rate in Nigeria since it can generate or increase per capita income of the people of Nigeria.

Keywords: Monetary Policy, Interest rate, exchange rate, inflation rate and income generation

Introduction

Since 1959, the Central Bank of Nigeria (CBN) has continued to play the traditional role which is the regulation of the stock of money in such a way as to promote the social welfare in order to

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enhance the generation of income in the country. This role is anchored on the use of monetary policy that is usually targeted towards the achievement of income generation by full-employment equilibrium, rapid economic growth, price stability, and external balance. Over the years, the major goals of monetary policy have often been the two later objectives. Thus, inflation targeting and exchange rate policy have dominated CBN's monetary policy focus based on assumption that these are essential tools of achieving macroeconomic stability in order to generate income to the poor(Ajayi, 1999).

Over the years, Central Bank of Nigeria regulates interest rate, exchange rate and also issue out economic policy in order to control inflation rate in Nigeria. The monetary policy of the central bank of Nigeria is dynamic and multifaceted. Inspite of the dynamic and multifaceted monetary policy as formulated and monitored by the CBN, the cost of living is very high which an average Nigeria lives on income of N500(less than \$2) daily.

The objective of this study is to establish the effect of monetary policy performance on income generation in Nigeria. Other specific objectives includes: evaluate the effect of interest rate on income generation in Nigeria, examine the extent to which exchange rate influence income generation in Nigeria and assess the effect of inflation rate on income generation in Nigeria.

The scope of this study is restricted to examining the effect of monetary policy on income generation in Nigeria, covering the period of 2007-2017 (11 years). This period is chosen because as it witnessed turbulent changes in monetary policy predicted on fluctuations in economic indicators particularly income level. Also, the period is chosen because CBN have made strong effort to ensure that they minimize the high exchange, inflation rate and also control money supply in the economy. The study also covered interest rate, exchange rate, money supply, domestic credit and inflation rate as well as income generation.

The following null hypotheses are formulated:

- H₀₁: Interest rate has no significant impact on income generation in Nigeria.
- H₀₂: Exchange rate has no significant impact on income generation in Nigeria.
- H₀₃: Inflation rate has no significant impact on income generation in Nigeria.

Concept of Monetary Policy

According to CBN (2006), monetary policy concept was defined as "Any policy measure designed by the federal government through the CBN to control cost availability and supply of credit. Jhingan (2002), refers monetary policy as the credit measures adopted by the central bank of a country.

Exchange rate is the rate at which the naira is converted to another currency (Becks, 2011). It is measured as domestic price x nominal exchange rate x divided by foreign price. James (2010) averred that price increase on raw-materials transient to increase per unit cost on their production. It is therefore expedient to note that since exchange rate has propulsive influence on the performance of small scale enterprises, they should take abreast of the economic environment for effective decision making, since it is external to them (James, 2010; Beckin, 2011). There are two common concepts of exchange rate namely nominal exchange rate and real exchange rate. The nominal exchange rate is a monetary concept which measures the relative price of two countries' moneys or currencies, e.g., naira in relation to the U.S. dollar (e.g., N400 to \$1) and vice versa. But the real exchange rate, as the name implies, is a real concept that measures the relative price of two goods i.e., tradable goods (exports and imports) in relation to non-tradable goods (goods and services produced and consumed locally).

Inflation is referred to as a persistent increase in the general price level of goods and services over a period of time. Ahlgrim and D'Arcy (2012) defined inflation as changes in the overall level of prices within an economy, which consequently leads to fall in value of the domestic currency.

Adebiyi (2002) defines interest rate as the return or yield on equity or opportunity cost of deferring current consumption into the future. Bernhardsen (2008) defined the interest rate as the real interest rate, at which inflation is stable and the production gap equals zero. That interest rate very often appears in monetary policy deliberations. Also, Opusunju, Akyüz and Santeli (2019) believe that the price a borrower needs to pay to the lender for transferring purchasing power to the future.

Concept of Income Generation

Income generation simply means gaining or increasing income or money that an individual or business receives in exchange for providing a good or service after investing capital. It can also be defined as small scale projects that create an income source to individual beneficiaries or beneficiary group whilst promoting; the principal right of self-determination and the objectives of integration, reputation and re –integration (FAO, 2011). Income generation refers to the amount of money that a person has by involving in any business activities in the society.

Empirical Studies

Nora (2017) established the mechanisms through which monetary policy affects the concentration of income and wealth; transmission channels are established and highlights existing errors in understanding inflation and income distribution. It also states that the effects of monetary policy are not homogeneous, since they depend on the type of policy that applies: conventional or unconventional, and shows that the same policy can have different effects, depending on the composition of the balance of economic agents, their access to financial services, the type of assets held and the particularities of its function of wealth. Finally it states that the effects vary between developed and developing economies, and even within the same country

Morander and Schmidt (2002) examined the role of the inflation targeting in achieving price stability in Chile using vector autoregressive models. The VARs models used six endogenous variables (interest rates, wages, GDP, consumer price index, money supply and nominal exchange rate) and two endogenous variables (the terms of trade and the US consumer price index). The empirical evidence reveals that announcement of an explicit inflation target and adoption of a supportive monetary policy and a floating exchange rate regime that lend credibility to that target were instrumental to achieving price stability.

Coenan, Orphanides, and Wieland (2003) carried out a study on price stability and monetary policy effectiveness when nominal interest rates are bounded at zero for the European Central Bank. The paper employed stochastic simulations of a small structural rational expectations

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model to investigate the consequences of the zero bound on nominal interest rates. We find that if the economy is subject to stochastic shocks similar in magnitude to those experienced in the U.S over the 1980s and 1990s, the consequences of the zero bound are negligible for target inflation rates as low as 2 percent. However, the effects of the constraint are non-linear with respect to the inflation target and produce a quantitatively significant deterioration of the performance of the economy with targets between 0 and 1 percent. The variability of output increases significantly and that of inflation also rises somewhat. Also, the paper showed that the asymmetry of the policy ineffectiveness induced by the zero bound generates a non-vertical long-run Philips curve. Output fall increasingly short of potential with lower inflation targets.

Orji (2006) examined the efficacy of monetary policy in ensuring price stability using consumer price index and inflation rate as price measure in Nigeria. The analysis used data from 1980 – 2004 and applied the Ordinary Least Squares (OLS) techniques. The study results research reveal that only money supply and domestic credit has significant effects on consumer price index hence for monetary authority to achieve its objective of price stability, its policies should be geared towards targeting the consumer price index, which remains a viable measure for price stability in Nigeria.

Classical Theory of Interest Rates

The classical theory of interest rates applies the classical theory of economics to determining interest rates. It defines the interest rate as the element that equates savings to investment. The theory compares the supply of savings with the demand for borrowing. Using supply and demand curves the equilibrium rate is calculated by determining the curves intersection point. Thus if savings are greater than investments the interest rate drops until they reach equilibrium and vice versa, if savings are less than investment the interest rate increases until the reward for savings encourages increased savings rates causing the market to again reach equilibrium (Gorder 2009).

Other proponents of the classical theory of interest rates look at it differently. Marshal argues that interest rate is the price paid for the use of capital and that it is determined by the intersection of aggregate demand and supply of capital. According Keynes, interest rates definitely influences the marginal propensity to save. He concludes that the rate of interest

should be at a point where the demand curve for capital at different rates intersects the savings curve at a fixed income level. However the classical theory of interest rates fails to account for factors besides supply and demand that may affect interest rates such as the creation of funds, the importance of income and wealth and changes in the primary borrowers in an economy.

Methodology

This study employed ex-post facto research design using secondary data. This research used expost facto research design because it employ the used of time series data using secondary sources of data from Central Bank of Nigeria (CBN), Nigeria Bureau of statistic (NBS) and Annual Abstract of statistic (AAS) and Nigerian Bureau of Statistics (NBS). This study adopted both descriptive and inferential statistical analysis. The statistical tool adopted is regression. The study used E-view statistical software package to analysis data. The study adopted the following regression models to study the variables and the Functional Relationship model is stated below

PCI= f (INT, INF, EXC,) Function 1

Model One

 $PCI = \alpha + \beta_1 INT + \beta_2 INF + \beta_3 EXC + \epsilon$ equation 2

Where PCI is the per capita, INT is the interest rate EXC is the exchange rate INF is the inflation rate **Correlation Models**

r = correlation coefficient

- \sum = Summation
- x = dependent variable
- y = independent variables

Data Analysis and Discussion

Trend Analysis of the Variables

The trend analysis shows data on gross interest rate (INT), Exchange rate (EXC), Inflation Rate (INF) and Per capita Income (PCI). The study conducted a comprehensive and close analysis of the trend of the variables within the period of study in Nigeria is computed and presented in Figure 4.1 below:





This trend shows that the per capita income of workers in Nigeria from 2007 to 2015 was increasing steadily, and had a sudden top from 2015 but reduced from 2016 and to increase again in 20017. The variable trend of Interest rate (INT) has a down ward trend over the period of 2007 to 2008. However, in 2008 to 2009, there was an increase in interest rate but in 2011 to 2016 there was a slowly drop from the rise of interest rate and eventual increase in 2017. The trend of Inflation rate (INF) is characterised by rise the period of 2007 to 2010 and decrease from 2011 but eventually increase from 2012 but in 2013, 2014, it rise at very slow rate. However, in 2015, 2016 and 2017, it started to rise again at very low rate in Nigeria. The trend of exchange rate (EXC) is characterised by rise in 2007 to 2009. At 2010, 2011, 2012, 2013 and 2015 it rise at a very slow rate. But it eventfully rise in 2015 and rise again from 2015 to 2017.

Table 1: Descriptive Statistics

	PCI	INF	INT	EXC
Mean	59685.31	12.09273	16.97636	184.6145
Median	59929.89	11.80000	16.85000	157.3300
Maximum	78367.47	19.28000	18.99000	335.4500
Minimum	42922.41	6.600000	15.14000	117.9700
Std. Dev.	10805.34	4.237934	1.035783	70.24150
Skewness	-5.47E-05	0.476115	0.324661	1.391114
Kurtosis	2.108016	2.059626	3.031293	3.430784
Jarque-Bera	0.364666	0.820896	0.193690	3.632918
Probability	0.833324	0.663353	0.907696	0.162601
Sum	656538.4	133.0200	186.7400	2030.760
Sum Sq. Dev.	1.17E+09	179.6008	10.72845	49338.69
Observations	11	11	11	11

Source: Researcher's Computation Using E-Views 9.0, 2019

The table shows that per capita income (PCI) has a mean value (average) of 59685.31 over the period of review, median value of 59929.89 which shows that the absence of outliers in the

values. It has a maximum value of 78367.47 and also has a minimum value of 42922.41. The variable has a standard deviation of 10805.34 which suggests that the value of the observation is spread across its mean value of 59685.31. The skewness statistics of the variable is -5.47, suggesting that it is negative, while the kurtosis statistics of 2.10 suggests that the observation is leptokurtic in distribution. The Jaque-Bera statistics 0.36 with a probability value of 0.83 suggests that the PCI is normally distributed at 5% level of significance.

The table shows that Inflation rate (INF) has a mean value (average) of 12.09 over the period of review, median value of 11.80 which shows that the absence of outliers in the values. It has a maximum value of 19.28 and also has a minimum value of 6.60. The variable has a standard deviation of 4.23 which suggests that the value of the observation is spread across its mean value of 12.09. The skewness statistics of the variable is 0.47, suggesting that it is positive, while the kurtosis statistics of 2.05 suggests that the observation is leptokurtic in distribution. The Jaque-Bera statistics 0.82 with a probability value of 0.66 suggests that the INF is normally distributed at 5% level of significance.

The table shows that Interest rate (INT) has a mean value (average) of 16.87 over the period of review, median value of 16.85 which shows that the absence of outliers in the values. It has a maximum value of 18.99 and also has a minimum value of 15.14. The variable has a standard deviation of 1.03 which suggests that the value of the observation is spread across its mean value of 16.87. The skewness statistics of the variable is 0.32, suggesting that it is positive, while the kurtosis statistics of 3.03 suggests that the observation is leptokurtic in distribution. The Jaque-Bera statistics 0.19 with a probability value of 0.90 suggests that the INT is normally distributed at 5% level of significance.

The table shows that exchange rate (EXC) has a mean value (average) of 184.61 over the period of review, median value of 154.33 which shows that the absence of outliers in the values. It has a maximum value of 335.45 and also has a minimum value of 117.97. The variable has a standard deviation of 70.24 which suggests that the value of the observation is spread across its mean value of 184.61. The skewness statistics of the variable is 1.39, suggesting that it is positive, while the kurtosis statistics of 3.43 suggests that the observation is leptokurtic in distribution. The Jaque-Bera statistics 3.63 with a probability value of 0.16 suggests that the EXC is normally distributed at 5% level of significance.

	PCI	INT	INF	EXC
PCI	1.000000			
INT	0.205987	1.000000		
INF	0.342880	0.266215	1.000000	
EXC	0.804480	0.319644	0.742523	1.000000

 Table 2: Correlation Matrix

Source: Researcher's computation using, E-views 9.0, 2019

Based on the results of the correlation matrix, per capita income (PCI), has a weak positive correlation (0.20) with interest rate (INT). Per capita income (PCI) has a weak positive correlation (0.34) with inflation rate in Nigeria (INF). Per capita income (PCI) has a strong positive correlation (0.80) with exchange rate in Nigeria (EXC). However, interest rate has a weak positive correlation (0.26) with inflation rate in Nigeria (INF). Interest rate has a weak positive correlation (0.31) with exchange rate in Nigeria (EXC). Also, inflation rate has a strong positive correlation (0.74) with exchange rate in Nigeria (EXC). These correlation shows that the variables are appropriately selected and thus, there is no problem of multicollinearity.

Table 3: Summa	ry of Unit	Root test Results
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Variable	Level of	ADF-	Significant values	Order of	Prob.(5%)
	stationarity	statistic	1%, 5%, 10%	Integration	
PCI	Trend and	7.54	-6.29, -4.45, -3.70	0(1)	0.0044*
	Constant				
INT	constant	3.05	-4.58, -3.32,-2.80	1(2)	0.0008*
	(exogenous)				
INF	constant	5.34	-4.29, -3.21, -2.75	1(1)	0.0024*
	(exogenous)				
EXC	constant	4.84	-4.58, -3.32, -2.80	1(2)	0.0073*
	(exogenous)				

Source: Author's Computation using E-view 9.00

Probability values are indicated by *

The results of the Unit Root Test as summarized in table 3, reveals that per capita income is not stationary at first different and second difference. However, it is stationary at level. This is because the value of its ADF test statistics at level (7.540487) is greater than their corresponding critical values at 5% level of significance. Thus, PCI is stationary at first difference and it is integrated of order one 1(0).

The results of the Unit Root Test as summarized in table 3, reveals that interest rate is not stationary at level and first difference. However, it is stationary at second difference. This is because the value of its ADF test statistics at level (3.05) is greater than their corresponding critical values at 5% level of significance. Thus, INT is stationary at second difference and it is integrated of order one 1(2).

The results of the Unit Root Test as summarized in table 3, reveals that inflation rate(INF) is not stationary at level and second difference. However, it is stationary at first difference. This is because the value of its ADF test statistics at level (5.34) is greater than their corresponding critical values at 5% level of significance. Thus, INF is stationary at first difference and it is integrated of order one 1(1).

The results of the Unit Root Test as summarized in tab le 3, reveals that exchange rare is not stationary at level and first difference. However, it is stationary at second difference. This is because the value of its ADF test statistics at level (4.84) is greater than their corresponding critical values at 5% level of significance. Thus, EXC is stationary at first difference and it is integrated of order one 1(2).

GDPG	Co-efficient	Standard error	T-Test	Probability
С	48.91	30758.75	1.59	0.15
INT	-40.49	1883.34	-0.21	0.83
INF	-14.30	651.15	-2.21	0.06
EXC	19.55	39.96	4.76	0.002
\mathbb{R}^2	0.79			
R2 Adjusted	0.70			
F-Statistics	9.08138			
Prob(F)	0.008			

Table 4: Regression Result

Source: Researcher's computation using E-views 8.0, 2019.

The Fisher-statistics (F) is 9.08138 with an associated P value of 0.006 which suggested that the model is a good fit and is used to test the contribution of monetary policy on income generation in Nigeria. The coefficient of Interest rate (INT) is negative and significant in increasing per capita income in Nigeria. The PCI= 48.91-40.48INT which indicates that income generation in terms of per capita income will decrease by 48% for every 1% increase in interest rate in Nigeria. The p-value of 0.83 is more than the t-statistic value of -0.21 and the standard error value of 1883.24 is more than the t-statistic value which implies that there is insignificant relationship between interest rate and per capita income in Nigeria.

The coefficient of Inflation rate (INF) is negative and significant in increasing per capita income in Nigeria. The PCI= 48.91-14.30INF which indicates that income generation in terms of per capita income will decrease by 14% for every 1% increase in inflation rate in Nigeria. The p-value of 0.06 is less than the t-statistic value of -2.21 and the standard error value of 651.15 is more than the t-statistic value which implies that there is insignificant relationship between inflation rate and per capita income in Nigeria.

The coefficient of exchange rate (EXC) is positive and significant in increasing per capita income in Nigeria. The PCI= 48.91+19.55EXC which indicates that income generation in terms of per capita income will increase by 19% for every 1% increase in exchange rate in Nigeria. The p-value of 0.002 is less than the t-statistic value of 4.76 and the standard error value of 39.96 is more than the t-statistic value which implies that there is significant relationship between exchange rate and per capita income in Nigeria.

The coefficient of determination (r^2) of 0.79 indicates that about 79% variation in income generation (per capita income) can be explained by monetary policy (interest rate, exchange rate and inflation rate) in Nigeria. The remaining 21% can be explained by other related factors not noted in the regression model. The Fisher-statistics (F) of 9.08138 is with an associated P value of 0.008 which suggested that there a significant effect of monetary policy on income generation in Nigeria.

Discussion of Findings

The analysis revealed that monetary policy contributes significantly to income generation in Nigeria. This implies that there is a significant relationship between monetary policy (interest rate, inflation rate and exchange rate) and income generation (per capita income) in Nigeria. Therefore the study is in tandem with the previous classical theory which Keynes argued capitalism was a good economic system. In a capitalist system, people earn money from their work. Businesses employ and pay people to work. Then people can spend their money on things they want. Other people work and make things to buy. Sometimes the capitalist system has problems; people lose their work, businesses close, people cannot work and cannot spend money. Keynes recommended that the government should step in and help people who do not have work. The study is also inline with the findings of Nora (2017) and Ufoeze et al (2018) who found a statistical significant relationship with the variables.

The analysis in hypothesis 1 reveals that there is insignificant relationship between interest rate and per capita income in Nigeria. The study realized that interest rate in Nigeria as regulated by the Central Bank of Nigeria does not contribute to increase in per capita income of the people of Nigeria. The reason may be due high interest rate or may be some Nigerian do not have assess to acquire interest in banks.

The analysis in hypothesis 2, reveals that there is insignificant relationship between inflation rate and per capita income in Nigeria. The study realized that inflation rate in Nigeria as regulated by the Central Bank of Nigeria does not contribute to increase in per capita income of the people of Nigeria. The reason may be that there is a continue increase in inflation rate in Nigeria and this rendered the income of the consumers meaningless since the money the generate becomes ineffective and cannot purchase what they want to buy. The continue rise in the general price of goods and services in Nigerian market make consumers not to have effective income.

In the analysis in hypothesis 3, reveals that there is significant relationship between exchange and per capita income in Nigeria. The study realized that exchange rate in Nigeria as regulated by the Central Bank of Nigeria contribute to increase in per capita income of the people of Nigeria. This implies that exchange rate in Nigeria contribute significantly to income generation in Nigeria.

Conclusion and Recommendations

The following conclusions were drawn from the result analyzed

There is insignificant relationship between interest rate and per capita income in Nigeria. The study realized that interest rate in Nigeria as regulated by the Central Bank of Nigeria does not contribute to increase in per capita income of the people of Nigeria. The reason may be due high interest rate or may be some Nigerian do not have assess to acquire interest in banks.

There is insignificant relationship between inflation rate and per capita income in Nigeria. The study realized that inflation rate in Nigeria as regulated by the Central Bank of Nigeria does not contribute to increase in per capita income of the people of Nigeria. The reason may be that there is a continue increase in inflation rate in Nigeria and this rendered the income of the consumers meaningless since the money the generate becomes ineffective and cannot purchase what they want to buy. The continue rise in the general price of goods and services in Nigerian market make consumers not to have effective income.

There is significant relationship between exchange and per capita income in Nigeria. The study realized that exchange rate in Nigeria as regulated by the Central Bank of Nigeria contribute to increase in per capita income of the people of Nigeria. This implies that exchange rate in Nigeria contribute significantly to income generation in Nigeria.

From our empirical results, the study suggests that:

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Monetary policy in Nigeria should be regulated with strict consideration of how to control or reduce high interest rate, inflation rate and also improve exchange rate in Nigeria since it can generate or increase per capita income of the people of Nigeria.

- Government of Nigeria should try to checkmate the institutions on issues relating interest rate changes to ensure that the interest rate regulated by the Central Bank of Nigeria is maintained and sustain to ascertain if in the future the interest may increase per capita income of the people.
- 2. Central bank of Nigeria should try to regulated adequately inflation rate in Nigeria by making economic policy to checkmate it, stabilizing it with price of goods and services so that in the future, the income of the people will be stable. The income of the workers should be maintained since the problem is due to high inflation rate that rendered the value of the money received by workers.
- 3. Central bank of Nigeria should continue to implement the policy of reducing exchange rate in Nigeria and can even adopt a policy that was adopted in 2007 to ensure that exchange is effectively reduced to faviour the people of Nigeria.

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