Analysis of the Effect of Macroeconomic Variables on Poverty Incidence in Nigeria (1980-2018)

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Abstract. This study explores the relationship between poverty and selected macroeconomic variables, as well as the implication of these macroeconomics variables on poverty level in Nigeria within the period 1988-2018.A total of six variables were employed in this study.They include poverty, inflation, unemployment, exchange rate, government spending, and interest rate.All the six variables were subjected to unit root test, and were found to be stationary at the first difference I (1).Using the Johansen's co-integration technique, the levels of co-integration of the variables were determined.The variables were found to be co-integrated at 5% level of significance.The short run error correction model was used to determine the short run relationship between poverty and the macroeconomic variables in consideration.The result obtained showed that unemployment,inflation, interest rate, and exchange rate share a positive relationship with poverty, while government spending share a negative relationship with poverty.The study further concludes that all five macroeconomic variables (dependent variables) considered in this study significantly affect the level of poverty in the country,and recommends that government should endeavour to embark on enabling monetary and fiscal policies that would attract foreign investment,and that the government should effect policies that will ensure price stability, and makeincentives available to local producers so as to reduce the incidence of inflation in the country.

Key words: Poverty, macroeconomic unit root test, co-integration, inflation

Introduction

Poverty is a "dreaded global phenomenon" that affects diverse people in diverse ways and at differing locations, be it continents or nations.Although no country or region is unaffected by poverty, its impact varies from one region to another (Binuyo, 2014). It is general knowledge that poverty though a global problem,has been an endemic issue in Nigeria from independence till date with differing rates in each of the states in the country. Though there has been slight reduction in poverty rate in Nigeria in some years as reported by the NBS (2010), poverty rate still edged back up in others. For example, the NBS (2010) conducted five surveys, which revealed that the national poverty rate was 28.1 percent in 1980, 46.3 percent in 1985, 42.76 percent in 1992, 65.6 percent in 1996 and 54.4 percent in 2004. According to records, poverty incidence in the country increased between the period 1980 and 1985 and between 1992 and 1996. The results further revealed a notable decrease in poverty rates between 1985 and 1992 and between 1996 and 2004.Although poverty rates dropped, still the proportion of the poor in the population has been on the increase from 17.7 million in 1980 to 68.7 million in 2004. During the period (1980-2004) the percentage of the extremely poor in the population increased from 6.2 percent to 29.3 percent between 1980 and 1996 and then reduced to 21.8 percent in 2004. The proportion of the moderately poor people took a different toll as it increased from 21.0 percent to 34.2 percent between 1980 and 1985 but decreased during the periods 1985 and 1992 from 34.2 percent to 28.9 percent. Also, between 1992 and 1996 it increased from 28.9 percent to 36.5 percent, but between

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1996 and 2004 it reduced from 36.3 percent to 32.4 percent).Between 2003 and 2004, poverty rate using the headcount approach at national estimate, was 64.2%. The report released in 2010 showed that, though between 2009 and 2010 poverty rate reduced to 62.6 percent, it edged back up to 69 percent in 2010 (NBS, 2010). Below is a table which explains the head count per capita poverty measurement in all thirty seven (with inclusion of FCT Abuja) Nigerian states during the periods; 2003 to 2004 and 2009 to 2010. When considering the concept of poverty in Nigeria, one basic question of how the poor are distinguished from the non-poor has to be answered, as Akindola (2010) rightly puts it: poverty is multidimensional and an understanding of these dimensions is the only way to poverty reduction and making a clear cut between the poor and the non-poor. That is to say poverty can be viewed in various forms ranging from the Absolute to the Relative and Subjective forms of poverty.

It is widely acknowledged that poverty incidence is owing to a number of macroeconomic forces whose relationship with poverty has persistently generated series of debates among scholars. A number of scholars have attempted to examine the influence of macroeconomic variables on poverty. Some of these scholars concluded that certain macroeconomic variables have significant effect on poverty, while some came up with contrary opinions saying the incidence of some macroeconomic variables do not significantly affect poverty.For instance, to mention a few concluded in their study Effects of macroeconomic variables on poverty in Iran (Application of Bootstrap technique)" that macroeconomic variables such as economic growth, inflation, and unemployment has significant effect on poverty (in Iran). In contrast however, in the study Poverty, inequality and macroeconomic instability vividly stated that inflation seemed to have little association with poverty and inequality among the populace (in Brazil), as well as unemployment which reveals a relatively weak relationship with poverty and inequality. Also, Blank and Blinder (1985) in their study, Macroeconomics, Income distribution and Poverty revealed that though Unemployment has a very large and negative impact on the poor, Inflation appeared to have a milder effect on the poor. Inflation as a macroeconomic variable is the persistent increase in the general price of goods and services in an economy over a period of time (Chen, 2019). It provides information on the state of the country's economy and on the effective macroeconomic policies that can be adopted to control it (Sabir & Tahir, 2012).

Statement of the Problem

Ideally, goal of government in every economy is to ensure stability. Economic stability is aimed at by government and monetary officials through effective implementation of macroeconomic policies (fiscal and monetary policies inclusive). However, creating a balance in the activity of macroeconomic variables contribute in a large extent to the stability of any economy.

Poverty in any economy poses a major threat for policy makers and societal scientist (Chani et al., 2011). Nowadays, It is discovered to be one of the most critical problems confronting developing economies (Boateng et al., 2000), Nigeria inclusive. Nigeria remains a country with high poverty level (World Bank, 2019) as it ranks the 158th of 177 countries that are known to be the poorest in the world with an HDI of 0.470.

Inflation, (a macroeconomic variable) has been a major setback in the Nigerian economy despite the persistent efforts of the government to fight against this global "pandemic:" phenomenon. It has resulted to uneven distribution of wealth and income, led to income inequality and poverty in the society, as money gradually loses its value and the prices of goods and services is unsteady. Nigeria experienced a period of high inflationary growth on average in the 1980s and 1990s. In the 20th and 21stcentury however, the inflation rate reduced remarkably to a single digit though still not satisfactorily stable. Despite the reduction, poverty still remains deadly in the country.

A continuous decline in GDP growth rate is an indication that an economy is tending towards recession. Recession occurs when an economy has two or more consecutive quarters of negative GDP growth, causing a decline in consumer spending. Thus forcing producers to reduce production output and some factors of production (labour inclusive). This in turn led to an increase in the rate of Unemployment in the economy. Hence, poverty set in as a result of decline in economic growth. This has been a usual trend in the Nigerian economy, hence is posed as a major concern for policy makers and societal scientists in the country. It is on this background that, this study examined effect of the selected macroeconomic variables on poverty in Nigeria.

Research Questions

This study provides answers to the following questions:

1. Is there a relationship between the selected macroeconomic variables and poverty incidence within the specified period of time?
2. What effect do the selected macroeconomic variables have on poverty in Nigeria within the specified period?

Objective of the Study

The main objective of the study is to examine the effect of macroeconomic variables on poverty incidence in Nigeria.

The specific objectives are:

1. To identify the relationship between the selected macroeconomic variables and poverty incidence within the specified time.
2. To determine the effect of the selected macroeconomic variables on poverty in Nigeria within the specified period.

Study Area

The scope of this study is Nigeria, officially called the Federal republic of Nigeria. Nigeria is a federal republic in West Africa, bordering Niger in the north, Chad in the north-east, Cameroun in the east and Benin Republic in the west, and with an area of 923,768 square kilometres, and a population density of 215/square km. It became a protectorate in 1914.

Nigeria is an African country located on the Gulf of Guinea, and richly blessed with natural landmarks and wildlife reserves such as Yankari National Park, and Cross River National Park. Nigeria is made up of thirty-six states and One Federal Capital Territory where the Country's Capital (Abuja) is located. As at year 2016, the population of Nigeria was 189 million. By 2017, it increased to 190.9 million (World Bank, 2017). This increase in population made Nigeria become the most populous country in Africa, and the seventh most populous in the World, ranking the third country with the highest youth population in the world after India and China. The Country is often called "The Giant of Africa" owing to its high population and economy.

It is a country characterised by a mixed economy and emerging market, with expanding production, education, financial, service, defence, oil, and communications sectors among others. It has the 27th-largest economy in the world and the largest in Africa with respect to the nominal GDP, and ranks the 22nd largest with respect to the purchasing power parity (PPP). Its re-emergent manufacturing sector became the largest on the continent in 2013, and it produces a large proportion of goods and services for the West African subcontinent.

Type and Source of Data

This study examined the relationship between macroeconomic variables and poverty incidence using annual time series data covering the period of 1988 to 2018, sourced from the World Bank Development Indicators. This is because it was the only source that provided explicitly adequate information on the variables considered in this study and within the time space specified.

Method of Data Analysis

Stationary Test

Data with a time series component normally has non-stationary problem. Hence, there is a need to ascertain the stationary status of the data before estimating the model. The model used Augmented Dickey Fuller (ADF) test, which is the standard unit root test: is used to test for the integration properties of time series. It tests for the stationary status of all variables, in order to determine their order of integration so as to ensure that the variables are not stationary, and to avoid spurious results.

The following equations are used for the ADF;

$$\Delta_{t-1}^{y} = (y_{t-1} - y_{t-2}) \quad (1)$$

$$\Delta_{t-2}^{y} = (y_{t-2} - y_{t-3}) \quad (2)$$

The above equations determine whether the estimates of δ are equal to zero or not. If the calculated ratio (value) of the coefficient δ is less than r which is the critical value from the Fuller table, then Y is said to be stationary.

Co-Integration Estimation (Long Run)

The co-integration estimate is used to establish the number of co-integration vectors using Johansen's methodology which comprises of two test statistics namely; Trace test statistics and the maximum Eigen–value test statistic. The trace statistic tests, the null hypothesis that the number of deviating co-integrating relationships is less than or equal to 'r' alongside the alternative hypothesis of more than 'r' co-integration relationships, and is defined as the maximum likelihood ratio or the maximum Eigen-value statistic for testing the null hypothesis of at most 'r' co-integration vectors alongside the alternative hypothesis of 'r+1' co-integrating vectors.

Short Run Error Correction Test (Short Run Relationship)

The Error Correction Mechanism (ECM) regression gives the answer to the question of spurious correlation in the short run dynamic relationship between macroeconomic variables and poverty estimated from the ECM formulation. ECM is said to be the returning force of the integrated variables to their initial long run relation when they deviate from the relationship (Banerjee et al., 1994)

Model Specification

The econometric model for the study is adapted from Adesiyan (2014).

A total of six variables were considered in this study. Poverty was used as the dependent variable, while the macroeconomic variables(GDP,Inflation rate, rate of intrest,exchange rate, Unemployment and Population growth rate) were the independent variables.

$$POV_t = \alpha + \beta_1 U_t + \beta_2 IF_t + \beta_3 IR_t + \beta_4 GS_t + \beta_5 ER_t$$

Where;

POV_t= Poverty incidence of the people living below the set poverty line at t period

U_t= Number of people that are unemployed in the country at t period

IF_t= Rate of inflation in the country at t period

IR_t= Prevailing rate of interest in the country at period, t

GS_t= Proportion of government spending to GDP at period, t

ER_t= Current ratio of exchange rate with reference to USD ($) at period, t

Definitions of the Variables

(i) Dependent Variable

(a) Poverty (POV_t): Poverty is defined as the percentage of the overall population whose income falls below the poverty line. This study employed a headcount poverty index that measures absolute not relative poverty.

(ii) Independent Variables

(b) Inflation (IF_t): This variable is used to capture macroeconomic instability that is measured as the rate of inflation (i.e. annualized percentage change in the general price index)

(c) Government Spending (GS_t): This is measured as the ratio of government expenditure to GDP.

(d) Interest Rate (IR_t): An interest rate is regarded as that percentage of principal charged by the lender for the use of its money. The principal is the amount of money lent.

(e) Exchange Rate (ER_t): Measures the rate at which one currency is exchanged for another. It is also regarded as the value of one country's currency in relation to another currency.

(f) Unemployment (U_t): Captures the percentage of the population willing and eligible for employment, but are not employed.

Result and Discussions

Stationary Result

The six variables (Poverty, Inflation, Unemployment, Interest rate, Government spending, and Exchange rate) were tested for stationarity using the Augmented Dickey-Fuller (ADF) unit root test. The result showed that all the six variables were non-stationary at levels, but were stationary at first differencing of the variables, implying that the variables do not have unit root. The order of co-integration was 1. The result of this test is in correlation with the work of Adesiyan et al. (2014).

Table 1. Result of the augmented Dickey Fuller unit root test

Variable	Constant and Trend	Constant
Poverty (Head Count, Pov_t)	-0.07	-1.15^{***}
Inflation (If_t)	-0.65	-1.79^{***}
Unemployment (U_t)	-0.21	-1.19^{***}
Interest Rate (Ir_t)	-0.47	-1.96^{***}
Government Spending (Gs_t)	-0.08	-1.14^{***}
Exchange Rate (Er_t)	-0.42	-1.15^{***}

Source: Author's computation

Note: *** denotes significance at 1%.

Co-Integration Test (Long Run)

Johansen's maximum likelihood approach is employed due to the non-stationary behaviour of time series data. This is a vital approach in preventing spurious regression result. Starting with the null hypothesis of no co-integration (R=0) among the variables, the trace-test statistics gives 142.637 which is greater than 5% critical value of 127.634 as seen in Table 2 below. Hence, the invalidation of the null hypothesis of no co-integration and the validation of the alternative hypothesis of co-integration.

The study concluded that there is only one co-integration relationship among poverty, inflation, unemployment, interest rate, government spending, and exchange rate. Maximum Eigen value tests the null hypothesis of no co-integration (R=0) which is rejected at the 5% level of significance, in favour of the alternative hypothesis that is one-integrating vector (R=1). Johansen co-integration test provides one co-integration equation at 5% level of significance.

Table 2. Result of the Johansen-Juselius maximum likelihood test of co-integration

Null Hypothesis	Trace Test Values	5% Critical Value	Null Hypothesis	Maximum Eigen Values	5% Critical Value
R=0	142.637**	127.6341	R=0	43.8867**	42.131
$R \leq 1$	81.4413	92.71362	R=1	29.00142	37.06652
$R \leq 2$	52.4132	60.72818	R=2	20.4556	32.78442
R ≤ 3	30.4421	53.4826	R=3	13.32271	21.4831
R ≤ 4	4.7210	13.3489	R=4	3.8942	12.6321
R ≤ 5	2.1832	11.24861	R=5	4.3244	10.5532

Source: Author's computation

Note: ** represents significance at 5%.

Short Run Error Correction Test

From the result below, we can deduce that Inflation and Exchange rate are significant at 5%, Unemployment is significant at 10% level of significance, and both interest rate and Government spending are not significant.

The coefficient of determinant R^2, indicates that the explanatory variables account for about 63% of the variation in the level of poverty incidence.

Table 3. Short run error correction test result

Variables	Coefficient	P-Value
Constant $\Delta L\ POV(-1)$	2.3149	0.0221**
ΔL POV (-1)	-0.0247	0.0115**
ΔL IF	3.4321	0.0125**
ΔL U	0.3427	0.0782*
ΔL IR	0.00134	0.1986
ΔGS	-0.0321	0.3182
ΔER	0.1045	0.01243**

Source: Author's computation

R-squared=0.627813,

Adj R-squared=0.51247,

F=1.67.

Note: *(**) signifies that the coefficients are statistically significant at 10% and 5% levels of significance.

The first research question of analysing the relationship between the selected macroeconomic variables and poverty can further be derived from the analysis result above. It was discovered that Inflation, Unemployment, Exchange rate, and Interest rate share a positive relationship with poverty implying that an increase in Unemployment will result in an increase in poverty by 0.343, an increase in Inflation will increase poverty by 3.432, an increase in exchange rate results in an increase in poverty incidence by 0.105, and an increase in interest rate will correspondingly increase poverty by 0.001. On the other hand,

Government spending share a negative relationship with poverty implying that an increase in Government spending will reduce poverty by 0.032.

Effects of Macroeconomic Variables on Poverty

Here, this study addresses its second research question; what is the effect of macroeconomic variables on poverty incidence in Nigeria.

Table 3 above shows that poverty (POV_t), Inflation (IF_t), Unemployment (U_t), and Exchange rate (ER_t) has significant effect on poverty incidence within the examined period.

1. Inflation Rate and Poverty

Inflation rate has a negative effect on poverty incidence i.e. high inflation increases the rate of poverty incidence. This means that there will be general rise in the price of commodities or services, hence reducing the purchasing power of currency without increase in income, which results in increased poverty incidence. Gohun (2009) and Adesiyan (2014) also support this result.

2. Unemployment and Poverty

The relationship between Unemployment and poverty shows that a negative effect occurs between the two variables. The implication is that there is little or no opportunity to be gainfully employed as to generate money to earn a deserved living as a return to individual time and effort. This study is in agreement with Egunjobi (2014).

3. Government Spending and Poverty

Government spending has a positive effect on poverty incidence, but the effect is not significantly felt at least in the short run on poverty incidence. This could be attributed to non-execution of the public projects. As often, the earmarked fund is divided by the political clan elites. The result is in accordance with Oriavwote and Ukawe (2018).

4. Exchange Rate and Poverty

Exchange rate significantly affects poverty incidence. This could be as a result of exchange rate variations which in turn affects investment and changes in the remittances receipts (in flows), thus affecting the level of poverty. Exchange rate policy which raises the domestic cost of production in an import dependent production system will affect the poor negatively. However, an exchange rate policy which boosts exports particularly those in which the poor are predominantly engaged (for example agriculture) will help reduce poverty.

5. Interest Rate and Poverty

High Interest rate also affects poverty incidence in Nigeria, though the effect is also not significantly felt in the short run as in Government spending.

Summary, Conclusion and Policy Recommendation

Summary and Conclusion

This research study examined the effect of some macroeconomic variables on poverty incidence both in the long run and short run between (1988 and 2018). The study showed that there exists significant relationship between inflation rates, unemployment, exchange rate, and poverty in the short run. Surprisingly, the relationship between poverty and Government spending was not significant. In the study, poverty incidence was measured by headcount ratio; unemployment was captured by the number of persons eligible for employment, but could not be employed. Inflation was captured as the rate of inflation (annualized percentage change in general price index). Government spending was measured as the ratio of government consumption to GDP.

From the given results, the current situation demands a deserved policy as to put effort to reduced poverty through employment generation, a bearable investment, and tackling of corruption.

Policy Recommendation

It has been proved that there is a strong link between poverty, unemployment, government spending, inflation rate, and exchange rate. Hence, government should endeavour to embark on enabling monetary and fiscal policies that would encourage foreign investors in investing in the country. This will help to create Job opportunities for the populace. Also, government should affect policies that control prices of commodities, and provide incentives to producers to enable them increase production so as to reduce the incidence of inflation in the country.

References

Adesiyan, O. I. (2014). Analysis of the relationship between foreign Direct Investment and Poverty reduction in Nigeria (1980-2009). Unpublished MEC thesis, Universiti Utara, Malaysia.

Akindola, R. B. (2010). Causes of poverty: Voices of the rural poor from Oyo State, Nigeria. *Journal of Social Development in Africa, 25*(1), 105-128.

Binuyo, B. O. (2014). Impact of poverty reduction programme on economic development: Evidence from Nigeria. *Arabian Journal of Business and Management Review, 4*(1).

Blank, R. M., & Blinder, A. S. (1985). *Macroeconomics, Income Distribution, and Poverty*. NBER Working Paper No.1567. Cambridge, MA.

Boateng, K., A.D. Oduro., & L. Boakye-Yiadom (2000). *Poverty in Ghana*. Final Research Report presented to the African economic Research Consortium, Nairobi.

Chani, M. I., Pervaiz, Z., Jan, S. A., Ali, A., & Chaudhary, A. R. (2011). Poverty, Inflation and Economic Growth: Empirical Evidence from Pakistan. *World Applied Sciences Journal, 14*(7), 1058-1063.

Chen, J. (2019). Definition of Inflation. In Investopedia.

Egunjobi, T.A (2014). Poverty and unemployment: Paradox in Nigeria. *IOSR Journal of Humanities and Social Sciences (IOSR-JHSS), 19*(5), 106-116.

Gohun, G. (2009). Impact of FDI on Poverty reduction in Africa, Are there regional differences? Department of Finance and Business Administration, Lavel University, Canada.

NBS (2010). National poverty rates for Nigeria: 2003-04 (Revised) and 2009-10 (Abridged Report).

Oriavwote, V. E., & Ukawe, A. (2018). Government expenditure and poverty reduction in Nigeria. *Journal of Economics and Public Finance, 4*(2), 156-163.

Sabir, H. M., & Tahir, S. H. (2012). The impact of different macroeconomic variables on poverty in Pakistan. *Interdisciplinary Journal of Contemporary Research in Business, 3*(10), 788-799.

United Nations Development Programme (UNDP). (2007). Human Development Report.

World Bank. (2019). World Bank Group Database. https://www.worldbank.org