DYNAMIC LINKAGES BETWEEN GOVERNMENT-INTERVENTIONISTS' POLICIES, GROWTH, INEQUALITY AND POVERTY IN NIGERIA

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Abstract

The inward-looking development strategy adopted by the Nigerian government; coupled with economic mismanagement and massive corruption, led to slow economic growth rate and a high level of poverty in the country. To address these problems, the government implemented a number of interventionist policies (poverty alleviation measures). This article examines the relationship between these interventionist policies, growth, inequality, and poverty. Empirically, the paper examines the impact of these phenomena on poverty using VAR methodology and Granger Causality test. The descriptive analysis shows that the various poverty-alleviation programmes have no significant positive impact on economic growth and poverty. The empirical analysis shows that income inequality tends to amplify the problem of poverty. The results show that income inequality, income growth, and government capital expenditure are major drivers of poverty in Nigeria. Drawing from the above, the study concludes the level of inequality needs to be reduced to achieve increased economic growth rate and a reduction in poverty level. Moreover, government should put in place macroeconomic and social measures that could directly reduce income inequality, encourage more business operations and promote growth.

JEL Classification: H50, I32, O15, O40
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Introduction

One of the major challenges confronting Nigeria is the high and rising level of poverty. As an illustration, in 2018, the country was ranked as 158th out of 189th countries in terms of human development index (UNDP, 2018). The November Report of 2020 World Poverty (World Poverty Clock, 2020) indicated that 105.5 million people representing 51 per cent of the population in Nigeria lives below income poverty line of US$1.9 a day. Indeed, Brookings Institution Annual Report (2018) classified Nigeria as one the poorest countries in the world above India despite her enormous resources.

This development explains why the fight against poverty occupies a critical place in the development agenda of government in Nigeria. Several government interventionists' programmes tagged poverty-reduction measures have been implemented to achieve poverty reduction since 1980s in the country (see Ogwumike 2003, Ijaiya, et al. 2011; Kanayo, 2014). These policies are designed to promote economic growth, which is expected to trickle down to the poor. This idea is based on the argument that economic growth is one the engines intervening in the reduction of poverty (Bouruignon, 2000, Dagdeviren et al. 2004, Lopez & Serven, 2006). However, it has been observed in many countries that the benefits of growth are constrained or destroyed by increase in inequalities (Alesina & Rodrik 1994, Kakwani et al. 2000, Oxfam 2000, Angelson & Wunder, 2006). It is contended that many of the poverty-reduction measures often influence the share of the income of the poor. Thus, poverty-reduction measures rather than reducing poverty through economic growth work to increase inequalities and poverty (Angelson & Wunder, 2006).

In Nigeria, some studies have examined issues on poverty and the impact of the various government interventionists' policies on poverty (Ogwumike, 2003, Kanayo 2014, Ijaiya et al. 2011, Ibrahim & Taiga 2020, Nwosa & Ehinomen 2020, Aderounmu et al. 2021). For example, studies by Ibrahim and

Taiga (2020) examines the relationship between income inequality and poverty, while Ijaya et al. (2011) and Dauda (2017) focus on economic growth and poverty-reduction in Nigeria. Ogwumike (2003) and Kanayo (2014) investigate the effect of anti-poverty measures on poverty reduction. Aderounmu et al. (2021) examine poverty drivers and Nigeria development. Nuruddeen and Ibrahim (2014) and Nwosa and Ehinomen (2020) examine the nexus between inequality, poverty and economic growth. However, one general observation from the existing studies is that none has examined the nexus between government interventionists' policies (poverty-alleviation policies), income inequality, growth and poverty in the country. In particular, the intervening role of income inequality and economic growth on the government interventionists' policies-poverty nexus has not been considered. Hence, this paper attempts to fill this gap in existing studies on the subject matter in Nigeria. Firstly, the study provides a causal review of the impact of the various poverty-reduction measures in Nigeria. Secondly, the dynamic relationship between government interventionists' policies, income inequalities, economic growth and poverty is examined.

The paper is divided into five main subsections. Section 2 provides the theoretical and empirical literature. Section three gives a brief appraisal the various reforms on economic growth, income distribution and poverty in Nigeria. Section four discusses the methodology and data. Section five provides the results. The last section provides the concluding remarks.

Literature Review

Inequality-growth nexus

No consensus has emerged on the link between inequality and growth. Some proponents of the Washington consensus[1] view high inequality either as non-issue or an important issue about which nothing much can be done. Others see it as a source of incentives and capital accumulation leading to faster income growth for all, including the poor, or a stimulus to upward mobility for low-income groups.

However, most recent income theories have argued that inequality has a negative impact on growth. There are four general categories of theory that explain how inequality affects growth. The first category known as political economy model provides a political economy explanations of the effect of inequality on growth. It is premised on the logic that political decisions to redistribute income are more likely to be made when inequality is greater and will result in economic policies that tax investment and therefore reduce growth (Alesina & Rodrik, 1994; Persson & Tabellini, 1994). These models assume both implicit, if not actual, democracy and that redistribution is implemented in a way that reduces growth.

The second category of model argues that an unequal distribution of resources is a source of political tension and social conflict. It is contended that poverty would be relatively high in unstable environments or at least would not be falling significantly, thus poverty and inequality will be positively correlated. Essentially, in such a socio-political environment, property rights are insecure and this discourages accumulation. It posits that higher gap between the rich and the poor, encourages rent seeking with adverse effect on investment (Benabou, 1996). Moreover, greater inequality is argued would lead to less political stability and consequently sub-optimal investment levels (Alesina & Perotti, 1996). Rodrick (1998) lends support to this channel in his argument that greater inequality increases the shares of resources dedicated to bargaining over distribution of rent, thereby slowing down the political system's effective response to external shocks.

The third group known as credit market channel was proposed by Chatterjee (1991) and Tsiddon (1992). The argument here is that investments are lumpy and access to credit depends on the existence of collateral. Consequently, there is a credit constraint stemming from unequal initial distribution of assets and this hinders growth. In this context, inequality of land holdings represents a constraint on growth

[1] Washington consensus is a set of ten economic policy prescriptions considered as the 'standard' reform package for addressing economic crisis in developing countries by The World Bank, IMF and US Department of Treasury.

in the agricultural sector, typically the major productive sector in poor developing countries. A closely related argument is that greater income equality encourages human capital accumulation, because there are fewer liquidity constraints and investment in human capital is lumpy (Chiu, 1998).

The last category of theory referred to as X-inefficiency is premised on the argument that high inequality reduces the X-efficiency of workers. X-efficiency simply refers to a measure of worker's productivity, holding constant all other inputs into the production process including workers' skills (Leibenstein, 1966 cited in Birdsall, et al, 1995). Workers' productivity is limited by a "visual" glass ceiling because they do not visualize themselves progressing beyond a certain point, and this discourages effort and perpetuates a vicious cycles of low incomes and therefore high inequality. Hence, inequality has a disincentive effect that retards growth.

Several empirical studies have been conducted on the relationship between inequality and economic growth (Alesina & Rodrik, 1994, Deininger & Squire, 1998, Adams 2004, Ncube et al. 2013, Nwosa 2019, Ibrahim & Taiga 2021). Most of these studies found a negative relationship between income inequality and growth in the long run. The implication of this is that a more equitable distribution of income and wealth would enhance growth. Equity income distribution could create higher demand for basic goods and services within the domestic economy. In South Korea and Taiwan, for example, relative income equality, within the framework of supportive economic policy was a factor in enabling local industries to grow by producing goods for healthy local markets (Benabou, 1996). Moreover, a more equitable distribution of income could lead to increased domestic savings ratios and human capital formation (World Bank, 1993). In MENA countries, Ncube et al. (2013) reported that income inequality had significant negative effect on economic growth. Likewise, Nwosa (2019) found that economic growth had positive but insignificant impact on income inequality in Nigeria for the period 1981-2017.

Growth and poverty reduction

Social scientists have long debated the relationship between growth and poverty. The consensus seems to be that growth leads to a reduction in poverty. This position possibly informs the adoption of strategy that focussed on macro and microeconomic policies to enhance growth in most developing countries since 80s. Economic growth is seen a major driving force to conquering poverty. Specifically, economic growth will help to generate income earning opportunities for the poor, make job creation possible, and thus make use of their most abundant assets – labour; produce additional resources for governments to use for social programmes aimed at overcoming poverty and lastly, increase the incomes poor people receive as remuneration for their labour.

Moreover, based on the premise that policies for fostering economic growth need not be inconsistent with reducing poverty, there is some agreement that policies, which contribute to growth by improving the allocative efficiency of resource use, may help the poor. This is particularly so if the traded goods sector is more labour–intensive than non-traded goods sector and if exports are more labour intensive than import substitutes based on the assumption that the workers have some basic education and skills (Bardham, 1995). In addition, where the terms of trade move in favour of agriculture (where we have high concentration of poor) poverty will no doubt be reduced.

In Sub-Saharan countries, the World Bank has argued that achieving high rates of sustained growth is undoubtedly the most important strategy for reducing poverty in the continent. Growth that generates employment opportunities for the poor will lead to poverty reduction. According to the Bank, growth rates of at least 6.5 percent per year are necessary if poverty is to be reduced in typical Sub-Saharan African countries at an acceptable rate (World Bank, 1996; Obadan, 1997). The view on growth in poverty nexus is premised on the notion that growth in average incomes automatically sinks down to benefit the poor. However, this trickle down effect has been challenged by those who argue that reductions in inequality are required to combat poverty. This includes adherents of the notion of "immiserizing growth", that is, the ideas that growth in average incomes may well occur at the same time as large groups of people are being impoverished. Among the main problems associated with trickle down hypothesis are (i) that some policies that foster growth do not help the poor, (ii) some developing regions with high growth rates still continue to experience high poverty level (e.g. China),

and (iii) that the benefits of growth have often been concentrated in some societies, contrary to the need for them to be widely shared for growth to have the greatest impact on poverty.

Several studies have derived poverty elasticity's of growth through econometric analysis. Ravallion and Chen (1997) use a first difference specification to regress log poverty headcount ratios on log average consumption levels. For the $1 a day poverty line they estimate a poverty growth elasticity of 3.1. Hanmer et al. (1999) using bivariate econometric model that contains separate equations for low, medium and high inequality countries, estimate poverty elasticities that vary between 0.5 for countries with Gini coefficients lower than 0.4, and 1.5 for countries with Ginis greater than 0.5. Hanmer and Naschold (2000) adopted an expanded multivariate regression model, which includes qualitative and structural variables to capture the characteristics of the growth path. The total poverty elasticities, that is, the total effect of growth and other variables on poverty, remains around 1.5, the income poverty elasticity itself reduces to a maximum of 0.9. De Janvry and Sadoulet (2000) adopting similar approach as Hanmer and Naschold (2000) find poverty elasticity's of similar magnitude for a set of twelve Latin American countries.

Some other studies have attempted to estimate poverty elasticities of growth, Demery et al (1995) result for thirty-nine developing countries showed wide variations around the mean poverty elasticity of 1.89. The values range from close to 0 (for Zambia) to over 4 (for Singapore), with higher values in Asia than in Africa, with Latin America in between. Collier and Dollar (2001) adopting the Bourguignon's (2000) theoretical, identity- based method find mean and median poverty elasticities of around 2, which they used to project future poverty trends. As pointed out in the literature, for the analysis to be extended below the aggregate global level, it is necessary to verify whether we can use a single elasticity. It is impossible to ascertain in the abstract how inequality in consumption will affect the consumption poverty elasticity, since this is a function of changes in income distribution overtime, and the properties of the poverty measure used Ravallion (1997). However, empirical results, by Ravallion and Sen (1996); Ravallion, (1997) and Hanmer et al. (1999), all indicate that the size of the consumption poverty elasticity varies systematically with income or consumption inequality. Hanmer and Naschold (2001) divide their simple of 121 observations into two groups: namely those with Ginis above 0.43, and those with Ginis below 0.43. They find that the high inequality countries need growth rates around three times as high as low inequality countries to achieve the same rate of poverty reduction.

Bourguigeon (2000) and Heltberg (2002) demonstrate theoretically why the absolute value of the elasticity should increase with the level of per capita consumption. This is premised on the assumption that past growth will have pulled the poor closer to the poverty line such that any given extra growth will move more people out of poverty. However, this view has been challenged in the literature. Lipton (2001) for example, argue that the assumption ignores the fact that a large proportion of poor become poor in any given year and that those left in poverty during past growth periods are also those who are least likely to escape poverty through future growth. All the same, several empirical findings seem to support positive relationship between average consumption and poverty elasticity of growth. The studies by Adams (2003, 2004) for some developing countries revealed that economic growth contributes to poverty reduction. In Nigeria, the study by Ijaiya, et al. (2011) showed that only a positive change in economic growth had a positive effect on poverty reduction. The study by Dada and Fanowopo (2020) examined the effect of economic growth on poverty reduction in Nigeria for the period 1984-2018. The result showed that economic growth and institutions positively affect poverty reduction both in the short run and the long run.

Inequality and poverty

The relationship between inequality and poverty is not yet settled in the literature. As noted, an increase in inequality can be interpreted as an increase in poverty and vice versa. This simply means that high inequality will lead to high level of poverty. On the contrary, lower inequality will lead to lower poverty level. Low inequality can benefit the poor in two ways; by increasing growth and average income, and by letting them share more in that growth. Conversely, as noted in Ravllion (1997), countries which could be on a high growth path if income distribution was equitable may experience slow growth and

even slower poverty reduction if inequality is high. In another way, an increase in poverty may be accompanied by a decrease in inequality overall. Also, there may be widespread poverty in the society, yet very little economic inequality. In essence inequality and poverty tend to affect each other directly or indirectly through their link with economic growth.

Empirically, several studies have examined the inequality-poverty nexus. De Janvry and Sadoulet (1999) analyzed inequality-poverty data for 12 Latin American countries between 1970 and 1994. The result shows that income growth reduces urban and rural poverty but not inequality. They show further that urban poverty is anti-cyclical, falling with income growth and rising in recession. The result shows that growth is only effective in reducing urban poverty when inequality is moderate. By implication, countries with high level of inequality cannot rely on growth to reduce poverty. Besley and Burgess (2003) find that the relationship between inequality and the level of poverty is positive and significant within a country. The study by Lopez and Serven (2006) based on a large cross-country sample of industrial and developing countries find that inequality dampens poverty reduction for two main reasons. One, inequality has a negative impact on the growth elasticity of poverty. Two, it has negative impact on the inequality elasticity of poverty.

The study by Housseima and ben Rejeb (2012) using a panel of 52 developing countries for the period 1990-2005 show that poverty, inequality and growth are highly interrelated. The result shows that increased levels of inequality increase the proportion of the poor in the population. Specifically, a 1 percent point increase in the inequality Gini-coefficient increases the poverty rate by 3.26 percentage points. In contrast, the result of the work of Alvaredo and Gasparini (2013) reveal that the relationship between poverty and inequality is weak. The result shows that the correlation coefficient between the headcount ($2 line) and the Gini Coefficient is just 0.17.

In Nigeria, a number of studies have examined the nexus between inequality and poverty reduction (Mbanasor, et al. 2013, Ajibola, et al. 2018, Brown & Ogbonna 2018, Ibrahim & Taiga, 2020). For example, Mbanasor et al. (2013) result on the relationship between income inequality and poverty among rural households in Abia state showed that the latter adversely affected the former. High level of income inequality worsened poverty situation in the study area. In the same way, Ibrahim and Taiga (2020) found that income inequality significantly contributed to rising poverty level in Nigeria for the period 1986-2018.

Government interventionists' policies, inequality, growth and poverty

Theoretically, poverty-reduction policies, inequality, growth and poverty level interact with one another through a set of two way links. Poverty-reduction policies can directly influence poverty level and vice versa. Also, poverty reduction policies can indirectly influence poverty through economic growth. In the same way, inequality can indirectly influence poverty as inequality affects growth and growth in turn influence poverty. Essentially, there is a dynamic relationship between the sets of economic growth, economic growth, inequality and poverty level.

Most empirical studies have analysed the relationship between inequality, growth and poverty without considering the role of government interventionists' policies. Some of these existing studies include Hanmer and Naschold (2000), Ravallion and Sen (1996), Ravallion (2001), Adams (2003), Iradian (2005), Fanta and Upadhyay (2009), Moges (2013), Fosu (2015, 2017), Beker (2016), Akanbi (2016), Iniguez-Montiel and Kurosaki (2018), Breunig and Majeed (2020), In general, most of these existing studies agree that inequality affects the propensity of growth to reduce poverty through different ways. The initial level of inequality affects the capacity of growth to reduce poverty, as a more equitable distribution of income and assets offers greater opportunities to the poor in terms of improved standard of living. The income poverty elasticity varies systematically with the level of inequality (Hanmer & Naschold 2000). The higher the level of income distribution, the lower the share of current and additional income that goes to the poor; thus, the smaller the poverty-reducing effect of growth. According to Hanmer and Naschold (2000), high inequality countries require as much as three times the amount of growth to reduce poverty than low inequality countries. In the same way, the capacity of growth to reduce poverty is determined by changes in distribution of income (Ravallion & Sen 1996).

In Nigeria, several studies have investigated the inequality-poverty-economic growth nexus including Nurudeen and Ibrahim (2014) and Nwosa and Ehinomen (2020). Nurudeen and Ibrahim (2014) examined the poverty-inequality-economic growth nexus for the period 2000-2012. The result found no evidence long run relationship among the variables, while the result of causality showed unidirectional causation from economic growth to poverty in Nigeria. In a similar study by Nwosa and Ehinomen (2020) for Nigeria, the result showed that inequality had significant positive impact on economic growth while poverty had an insignificant impact on economic growth. The result equally showed that the interaction of impact of inequality and poverty had significant positive impact on economic growth.

Major observation from existing studies on the inequality-growth- poverty nexus in Nigeria is that the role of government interventionists' policies (i.e. poverty-reduction policies) has not been explicitly captured. This is gap that this study attempts to fill.

Government interventionists' policies and its impact on growth, inequality and poverty

In this section we provide a highlight of the various government interventionists' policies in Nigeria and examine how they have impacted economic growth, inequality, (un)employment and poverty in the Nigerian. Before the adjustment programme, poverty reduction was not the direct focus of development planning and management (Ogwumike, 2003). The main focus of government during this period was the development of the social services including health, education, electricity and roads, which no doubt would impact positively on poverty reduction in the country. The Fourth National Development Plan, however, specified objectives that are associated with poverty reduction, with the main focus on increase in real income of the average citizen and reduction in income inequality.

Some of the programmes implemented during this era included the establishment of the River Basin Development Authorities (RBDA), Agricultural Development Programme (ADP), Agricultural Credit Guarantee Scheme (ACGS), Rural Electrification Scheme (RES) and Rural Banking Programme (RBP). As have been noted in the literature, though some significant degrees of successes were achieved with these programmes, most of them could not be sustained.

Other programme implemented to alleviate poverty before the adjustment programme included Operation Feed the Nation (OFN), Free and Compulsory Primary Education (FCPE), Green Revolution, and Low Cost Housing Scheme. Several studies have been conducted on the impact of these programmes. The major findings being that a few of these programmes actually yielded some positive effect, however, many of them failed. Most of them could not be sustained due to lack of political will and commitment, policy instability, and insufficient involvement of the real beneficiaries in these programmes (CBN, 1999). Many of them failed because of diversion from the original focus.

However, government deliberate effort at tackling the problem of poverty started after the adjustment reform. This became a matter of importance for the government because of the worsened conditions of living of many Nigerian especially the poor following the implementation of the adjustment programme. Consequently, several poverty-alleviation programmes were implemented by the government. These programmes and policies included directorate for food, roads and rural infrastructures (DFRRI), national directorate of employment, better life for rural women (BLP), People Bank of Nigeria (PBN), Family support programme (FSP), and Family economic advancement (FEAP). Other poverty-alleviation programmes instituted were National Agricultural Land Development Authority (NALDA), the Agricultural Development Programme (ADP) and the Strategic Grain Reserves Programmes (SGRP). Also in sectors, such as health, education and housing, several poverty alleviation measures were put in place. For example, in the health sector, the Primary Health Care Scheme and the Guinea Worm Eradication Programme were implemented.

Since the inception of the current democratic government, further attempts have been made to alleviate poverty. As an interim measure, government started poverty Alleviation Programme (PAP) in 1999. Under the scheme government supposed to pay #10,000 each to an agreed number of unemployed persons for up to a year to enable them begin business. However, as the programme was faced with so

many problems it was replaced with another programme called National Poverty Alleviation Programme (NAPEP). This programme is of four components namely: Youth Empowerment Scheme (YES); Rural Infrastructures Development Scheme (RIDS); Social Welfare Services Scheme (SOWESS) and the Natural Resources Development and Conservation Scheme (NRDCS). Several other measures undertaken by the government are clearly articulated in the NEEDS document and the EPRG plan.

The impact of the poverty-reduction measures on growth is shown in fig 1. Looking at fig 1, the GDP growth assumed a negative trend from 1980 to 1984 but turned positive from 1985. The positive trend continued till 1993 when it became negative till 1995. The economic growth rate increased from 4.2 per cent in 1996 to reach a peak of 15.3 per cent in 2002. It however decelerated to 7.3 per cent in 2003 only to hover around 6-8 per cent between 2005 and 2014. The economy however entered recession in 2016 but recovered in 2017 with a growth rate of 0.8 per cent. It increased marginally to 1.9 per cent in 2018.

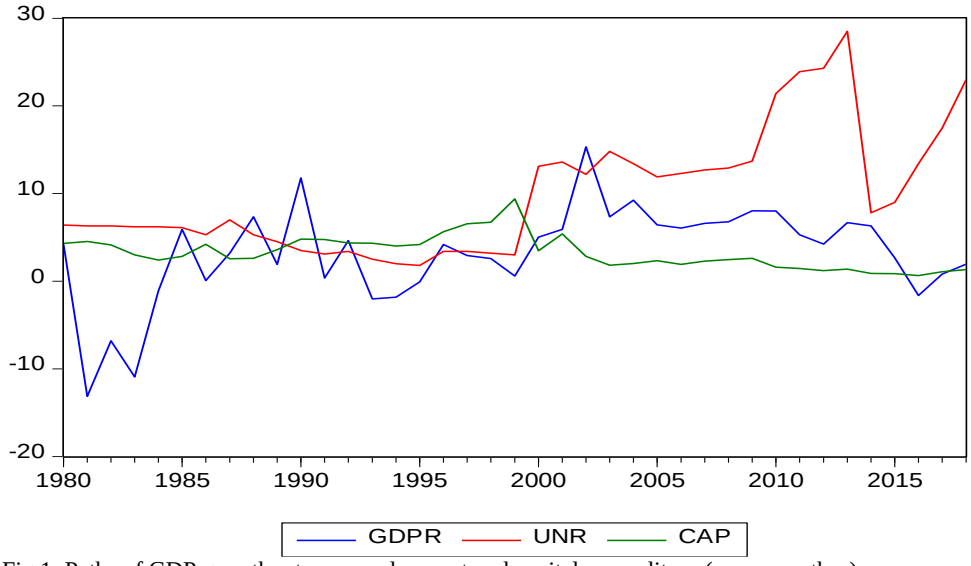

Fig 1: Paths of GDP growth rate, unemployment and capital expenditure (source: author)

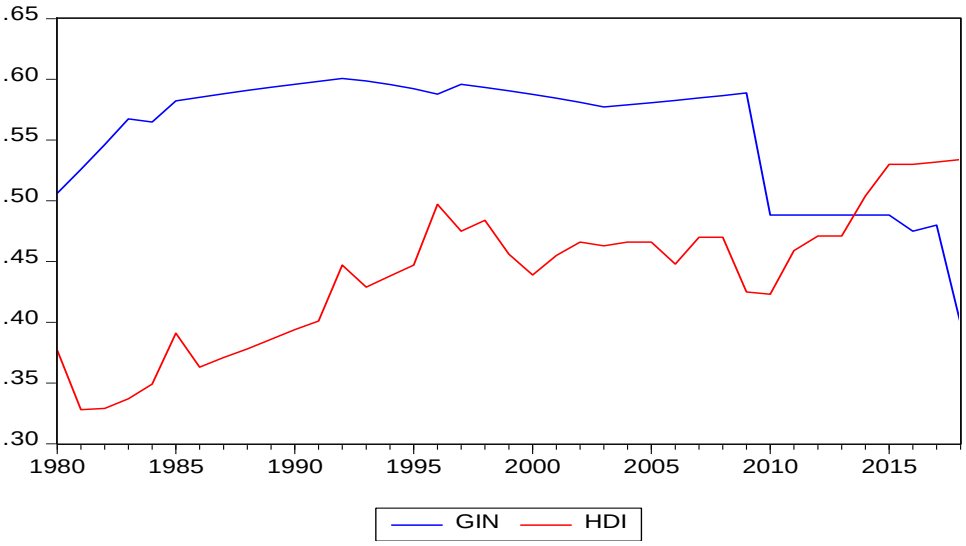

Fig. 2: Paths of Human development index and Gini coefficient (source: author)

Employment data are not readily available in Nigeria. However, available evidence showed that the formal sector employed less than 20 percent of in the labour in the 90s and has declined over the years. The few sectors that seem to have witnessed slight growth in employment were banking, transport and communication as well as distribution and trade. Declining employment in the formal sector displaced a large number of workers and young graduates into the informal sector. The path of unemployment as

shown in fig.1 buttressed declining employment if the economy. Unemployment rate remained consistently around 6% for the period 1980-1987. Indeed, the percentage dropped to around 3.4 per cent between 1990 and 1999. The decrease in unemployment rate between 1990 and 1998 can be attributed to various poverty alleviation programmes implemented by the government to address to address unemployment in Nigeria. The National Directorate Employment (NDE) introduced several measures to reduce the address the high level of employment. However, the rate of unemployment turned double digits 13.1 per cent as from year 2000. The percentage increased to 28.5 per cent in 2013. The increase in the rate of unemployment from the year 2000 was a result the downturn in the Nigerian country and the collapse of the manufacturing sector. The rate of unemployment declined to single digit in 2014 and 2015 but increased sharply from 2016 to peak at 23 per cent in 2018.

With respect to income distribution the Nigeria's Gini coefficient was consistently around 0.6, revealing that a great proportion of the national income is eluding the poor. A greater proportion of the nation's wealth is being concentrated in the hands of the wealthiest 20 percent out of the nation. However, the index improved to around 0.48 between 2010 and 2018. This positive development might be attributed partly to the adjustment in wages and salaries and partly to the various pro-poor policies implemented during this period. In terms of aggregate capital expenditure by the government, the country did not fare well. The aggregate capital government expenditure declined from 1982 to 1988 except for the year 1986 when it increased marginally. The figure increased marginally from 1990 to 1999. Aggregate capital expenditure maintained downward slide from year 2000 to 018 except for year 2001 (see Fig. 2).

Using the two measure of poverty, namely UNDP human development index and national population index, the level of poverty increased over the years. The path of human development index, shown in fig. 2, reveals that poverty worsened in the country from 1987 to 2018. The index increased from 0.36 in 1986 to 0.534 in 2018. Indeed, Nigeria ranked among the poorest countries in the world. This evidence is supported by the Human Poverty Index (HPI), which calculates deprivation in terms of longevity, knowledge and standard of livings. The human poverty index remained consistently over 53.0 from 1990 to 2018. Indeed, for some years 1996 to 2003 and 2017 to 2018, the human poverty index exceeded 60.0 point.

In sum, the various government interventionists' policies (i.e. poverty-alleviation policies of the government) have not had significant positive impact on growth and poverty level over the years. In spite of the various anti-poverty measures implemented in the country, the growth was somehow episodic, while poverty and inequality increased over the period 1980-2018.

Methodology and Data

To analyze the dynamic relationship between poverty reduction, income inequality, economic growth and government policies on poverty reduction, the study follows the multivariate VAR model developed by Johansen (1988) and Johansen and Juselius (1990, 1992). This approach is chosen as against other possible candidates for the following reasons. Firstly, no a priori assumption of exogeneity of variables is required. Secondly, vector auto regressive model allows each variable in the system to impact on itself and at the same time on each other without the need to impose a theoretical structure on the estimates. Thirdly, the approach offers us the opportunity of ascertaining not only how a given variable impact on itself but also on others through the use of impulse response functions (IRFs) and variance decomposition (VDCs).

Our objective is to examine the dynamic relationships between anti-poverty policies proxied by government capital expenditure, inequality, growth and poverty or z_t = (HDI, GIN, PCI, CAP)´. The VAR model in the general form is specified thus[2]:

[2] This is general specification of the VAR model used in the study. We have not specified the models out explicitly to conserve space.

$$\Delta z_t = \sum_{i=1}^{p} \beta_i \Delta z_{t-i} + \beta z_{t-1} + \delta x_t + \varepsilon_t \quad (1)$$

where β's (i = 1,…., ρ) are (4x4) matrices for the variables Δz_{t-1}, Δz_t is a (4x1) column vector of the first differences of z_t', β is a (4x4) matrix for the variables z_{t-1} which is a (4x1) column vector of lagged dependent variables, x_t is a (4xn) matrix containing n deterministic variables for each dependent variable; ε_t is a (4x1) column vector of disturbance terms normally distributed with zero means and constant variances. Generally, the time series characteristics of the variables determine whether to specify either vector-error corrections model (VECM) or an unrestricted vector autoregression model (VAR). If the variables are cointegrated, the correct specification is VECM. However, if the variables are not cointegrated, the appropriate specification is VAR model.

Data

Annual time series data for the four variables incorporated into the model namely, poverty level, income inequality, GDP per capita growth (as a measure of economic growth) and government capital expenditure. Poverty is measured in four ways, namely: human development index (HDI), national poverty index (NPI), life expenditure at birth (LEXB) and secondary school enrolment (SCE), The two measures of income inequality adopted are Gini coefficient index and Atkinson income inequality measure. As the various polices on poverty are difficult to aggregate and measure, we use government aggregate capital expenditure as a proxy[3]. This measure is adopted for various reasons: one, most government interventionists' programmes are on capital projects with high multiplier effect in the economy; two the data on government expenditure is readily available, and is measured with reasonable accuracy. The data for the variables are obtained from Central Bank of Nigeria, National Bureau of Statistics (NBS), 2019 edition and World Bank, World Development Indicator, 2019 edition. GDP per capita growth, life expectancy at birth, and secondary school enrolment are sourced from World Development Indicator. Gini coefficient and Atkinson index are obtained from Standard World Income Inequality Database (SWIID), Version 8.2, 2019. Human development index series are obtained from UNDP Human Development Reports (various years) and national poverty index series obtained from National Bureau of Statistics publication (various years), while government per capita expenditure is obtained from the Central Bank of Nigeria, Statistics Bulletin 2019 edition.

Empirical Results

Before the estimation of the VAR, the study of employed Augmented Dickey Fuller and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test. The use of KPSS in addition to ADF is informed by the argument that when the size of the sample in small, the test of ADF have no strong power. The two test show that all the variables are stationary at first difference (see table 1)[4]. Next we check whether the variables are cointegrated using both the Autoregressive Distributed Lag Model (ARDL) bounds test (Pesaran et al. (2001) and Johansen-Juselius (1990) cointegration test. The results from both approaches show that the null hypothesis of no cointegration is accepted as 5 per cent significant level in all equations (see Tables 2&3). The results from both Johansen-Juselius test and Autoregressive Distributed Lag Model (ARDL) show that the variables are not cointegrated. Since the variables are not cointegrated, we use VAR approach with differences of all system variables.

[3] The existing empirical work is far from reaching a conclusion on the measurement of government interventionists' policies, with some using aggregate government spending, other have used such variables as public-sector investment as share of GDP, fixed capital formation, subsidies and productive expenditure. Yet, few other have adopted indices generated from the combinations of these variables. (Thomas & Wang, 1996).

[4] A further test of stationarity of the data was conducted using the break-point unit root test; the results showed that series were stationary at first difference. This indicates that structural breaks were not strong for the data series suggesting that series are I(1) and they take the structural breaks into cognizance.

Table 1: Results of unit root tests

variables	ADF		KPSS	
	Level	First Diff.	level	First Diff.
LDHI	-1.518	-5.425***	1.542	0.062***
LGIN	0.888	-2.871*	0.976	0.703**
LPCI	-0.629	-3.156**	1.447	0.643**
LCAP	-1.085	-4.292***	1.198	0.078***

*Note ***,** and * denotes 1%,5% and 10% significant levels respectively. For ADF test, critical values are -3.621, -2.943 and –2.610 at 1%,5% and 10% respectively. For KPPSS test, critical values are 0.739, 0.463 and 0.347 at 1%, 5% and 10% respectively.* Source: computed by author

Table 2: Cointegration results (with a linear trend) where r is the number of co-integrating vectors

Estimates of ʎ-max and trace tests					
Null	Alternative r	ʎ-max	Critical value (95%)	Trace	Critical value (95%)
0	1	17.489	27.884	29.247	47.856
≤ 1	2	7.603	21.132	11.758	29.797
≤ 2	3	4.150	14.264	4.156	15.494
≤ 3	4	0.006	3.841	0.006	3.841

Source: Generated from Computer by author

Table 3: Bounds *F*-test for cointegration

Model	k	M	*F*-statistics	Outcome
F(HDI/LGIN, LPCI, LCAP)	3	1	2.202	No-cointegration

Note: The critical values are from Pesaran, Shin, and Smith (2001) (k=3; 2.37-3.2) at 10%, (k=3; 2.79-3.67) and (k=3; 3.65-466) for 5% and 1% respectively. Source: computed by author

As has been pointed out in the literature, individual coefficients from VAR model are hard to interpret (Akinlo & Akinlo 2007; Ajilore & Ikhide, 2013; Sunce & Akanbi, 2016). Consequently, the dynamic properties of the model are analysed by examining the impulse response functions and the variance decompositions from the estimated VAR. The impulse response function describes the reaction of one variable to the innovation in another variable in the system, while holding all other sources equal to zero. Variance decomposition on the other hand, measures the contribution of each source of check to the (forecast error) variance of each endogenous variables, at a given forecast horizon. The graphs of the impulse response functions at 5% error bonds generated by Monte Carlo simulation for the 4-variable model for various measures of poverty and inequality are shown in figures 3a,b – 6a,b. The response of poverty measured as human development index to income inequality is negative both in the short and long run (fig. 3a). The same pattern obtains when poverty is measured as national poverty index, and income inequality measured as Atkinson index (fig. 4a&4b). The results shows that income inequality tends to amplify the problem of poverty in Nigeria. The response of poverty to a one standard deviation innovation in economic growth is relatively constant in the short and medium term but positive in the long term when poverty is measured as human development index and income inequality as Gini coefficient. However, when poverty is measured as national poverty index, the response of poverty to income is for both measures of income inequality. A one standard deviation shock to government capital expenditure shows a negative impact on poverty measured as HDI and NPI (fig 3a&b – 4a&b).

With respect to poverty measured as expected life expectancy at birth and secondary school enrolment, the impulse response functions are depicted in fig 5a&b and 6a&b. A one standard deviation shock applied to income inequality measured gini coefficient produces a negative impact on the poverty measured as the life expectancy at birth in the long run. The same applies to a shock to per capita income. However a shock to aggregate capital expenditure has a positive impact on poverty (measured as life expectancy at birth) in the medium and long run. A similar pattern is observed in the response of poverty (measured as life expectancy) to all the variables except for poverty measured using Atkinson index. A one standard deviation shock to income inequality (measured using Atkinson index) has a positive impact on poverty in the medium and long run period. When poverty is measured as level of

secondary school enrolment, a shock to income inequality measured using gini coefficient is marginally positive both in the short and long run. However, for income inequality measured using Atkinson index, the response is negative in the long run. A one standard deviation innovation in GDP per capita produces a positive impact on poverty (SCE) for both measures of income inequality. In contrast, the response of poverty (measured as secondary school enrolment) is negative for both measures of income inequality.

The results of the variance decompositions are as shown in tables 4-7. When poverty is measured as HDI, income inequality variable had a relatively large impact on poverty and the magnitude of the impact increases overtime. The proportion of the variation in poverty explained by aggregate capital expenditure is between 2 - 6 per cent over the period. However, when poverty is measured as national poverty index, the proportion of variation explained by income inequality decreased sharply while that of GDP per capita growth increased. GDP per capita growth accounts for almost 25% of the variation in poverty (measured as national poverty index) in the long run.

In respect of the two other measures of poverty, namely life expectancy at birth and secondary school enrolment, aggregate capital expenditure had a relatively larger impact on these two measures of poverty. However, the proportion of poverty explained at aggregate capital expenditure in higher for secondary school enrolment than for poverty measured as life expectancy at birth.

In summary, the results from impulse response functions and variable decompositions show that income inequality irrespective of how it is measured is a major driver of poverty when measured as human development index and national poverty index. However, GDP per capita growth is a significant for determinant of poverty measured as life expectancy at birth, while aggregate capital expenditure explains a major variation in poverty measured as secondary school enrolment. In short, from our results one might be safe to conclude that these factors income inequality, GDP per capita growth and aggregate capital expenditure are major determinants of poverty in Nigeria.

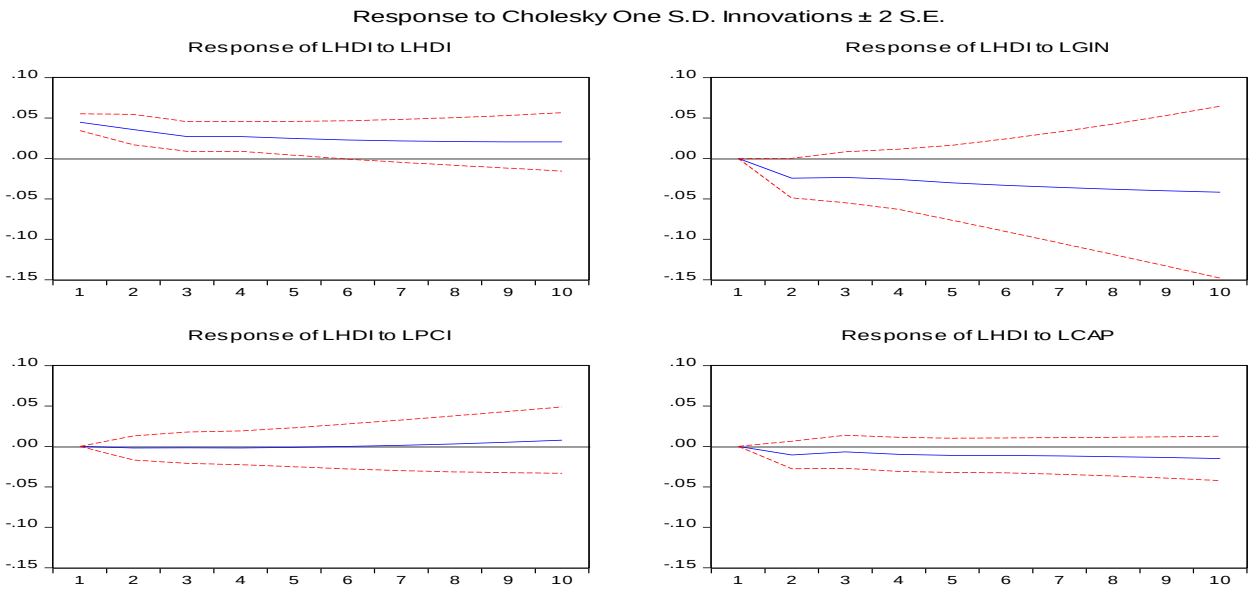

Figure 3a: IRFs with Human development (HDI) and Gini coefficient (Source: computed by author)

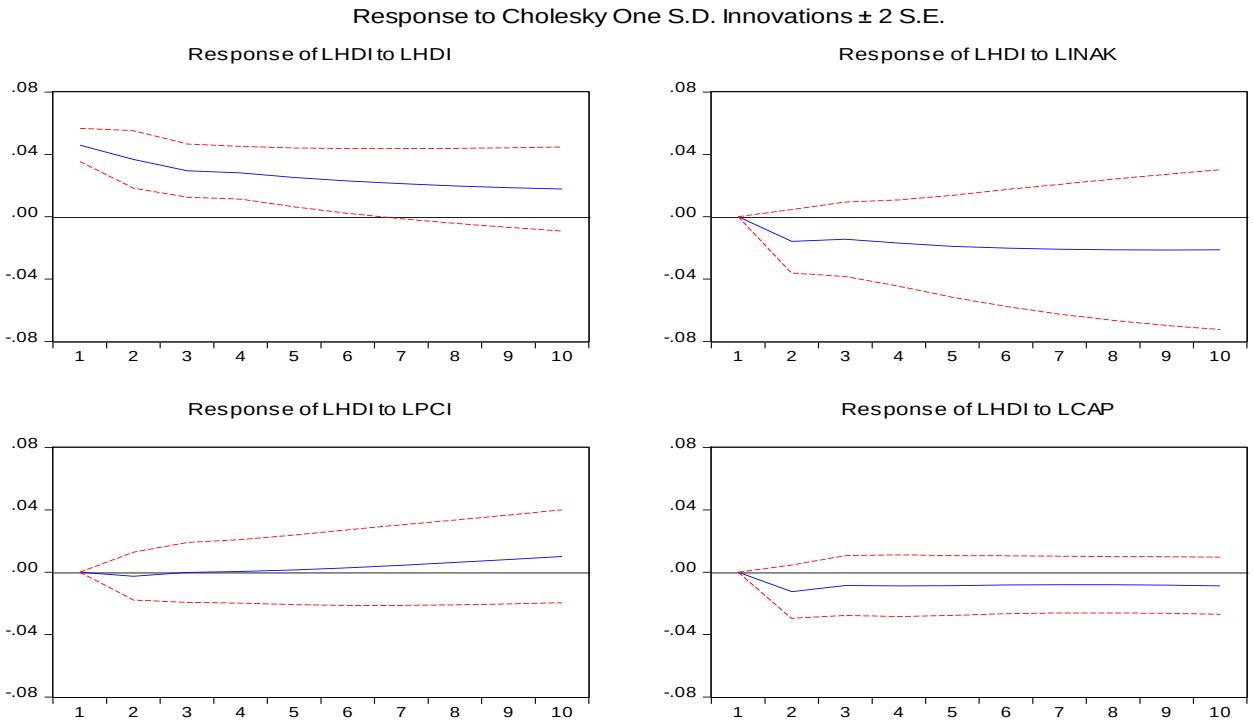

Figure 3b: IRFs with human development index and Atkinson index (Source: computed by author)

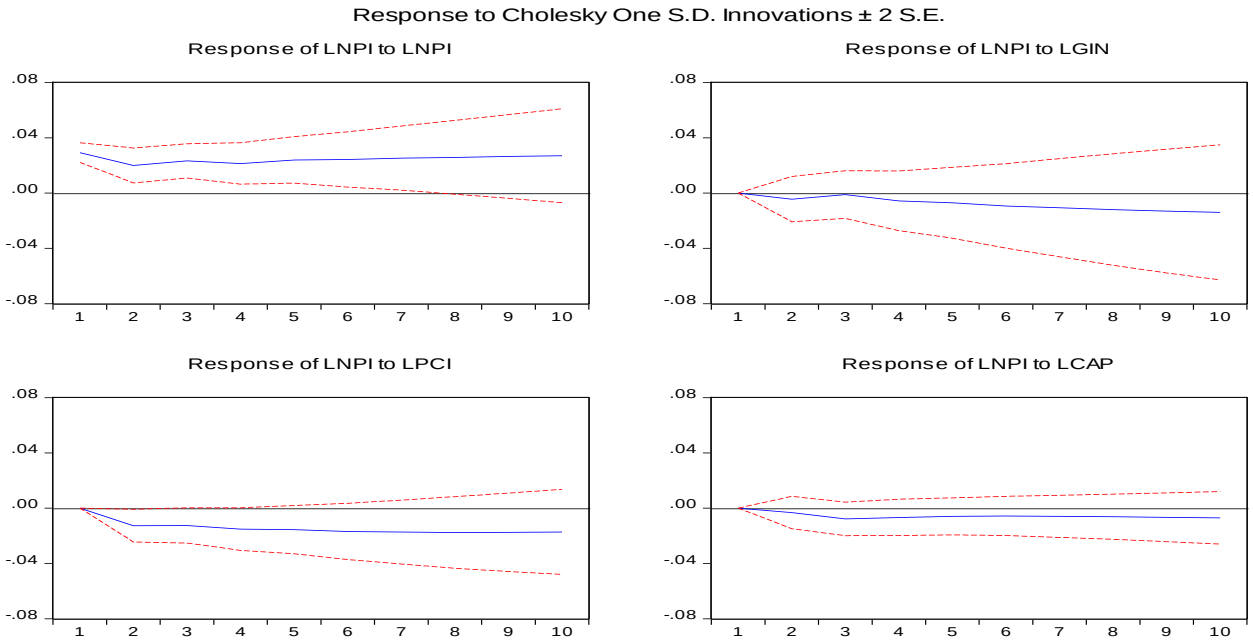

Figure 4a: IRFs with National Poverty index (NPI) and Gini coefficient (Source: computed by author)

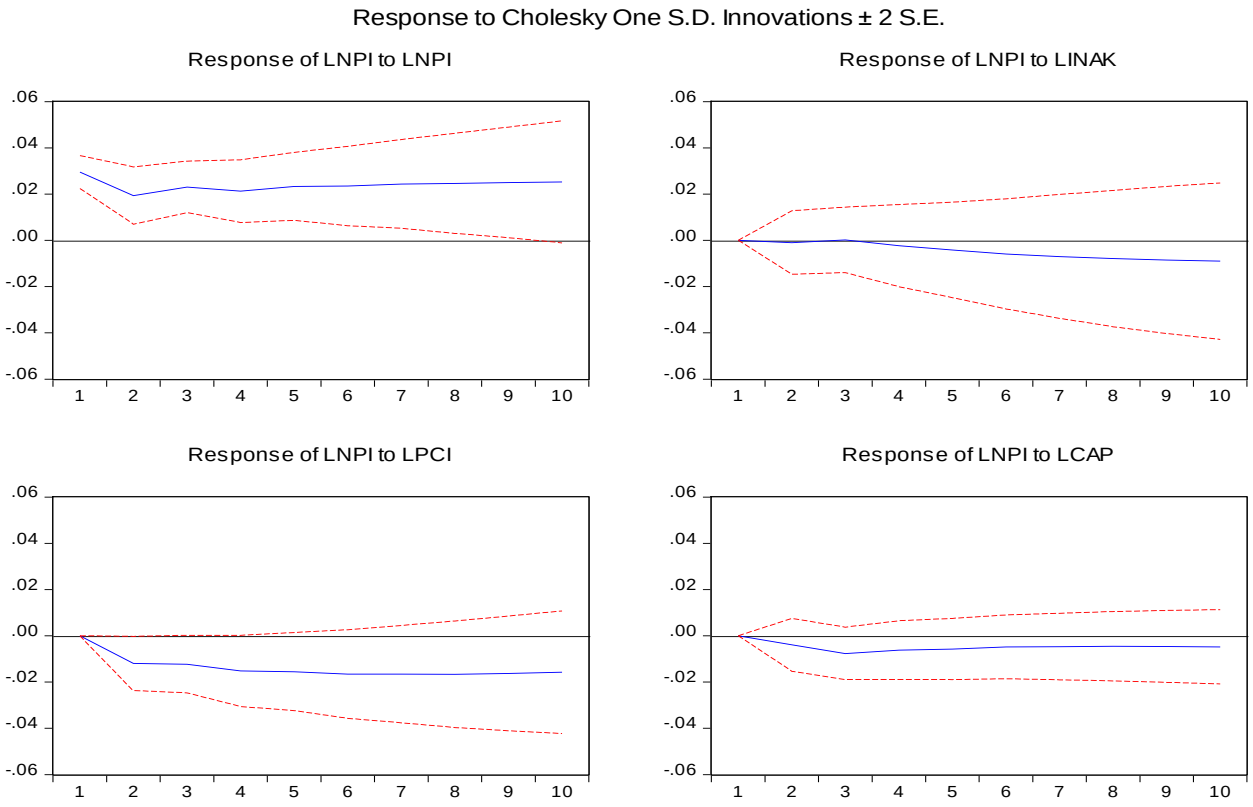

Figure 4b: IRFs with National Poverty index and Atkinson index (INAK) (Source: computed by author)

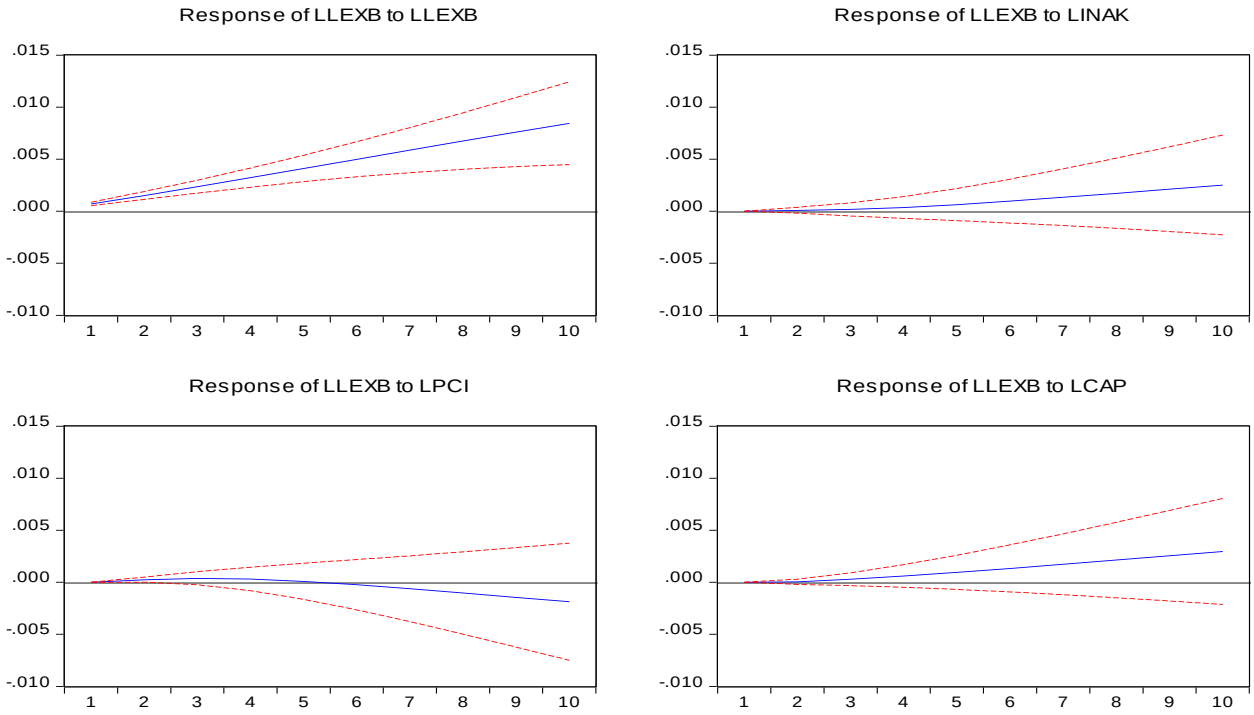

Figure 5a: IRFs with Life Expectancy at Birth and Atkinson index (Source: computed by author)

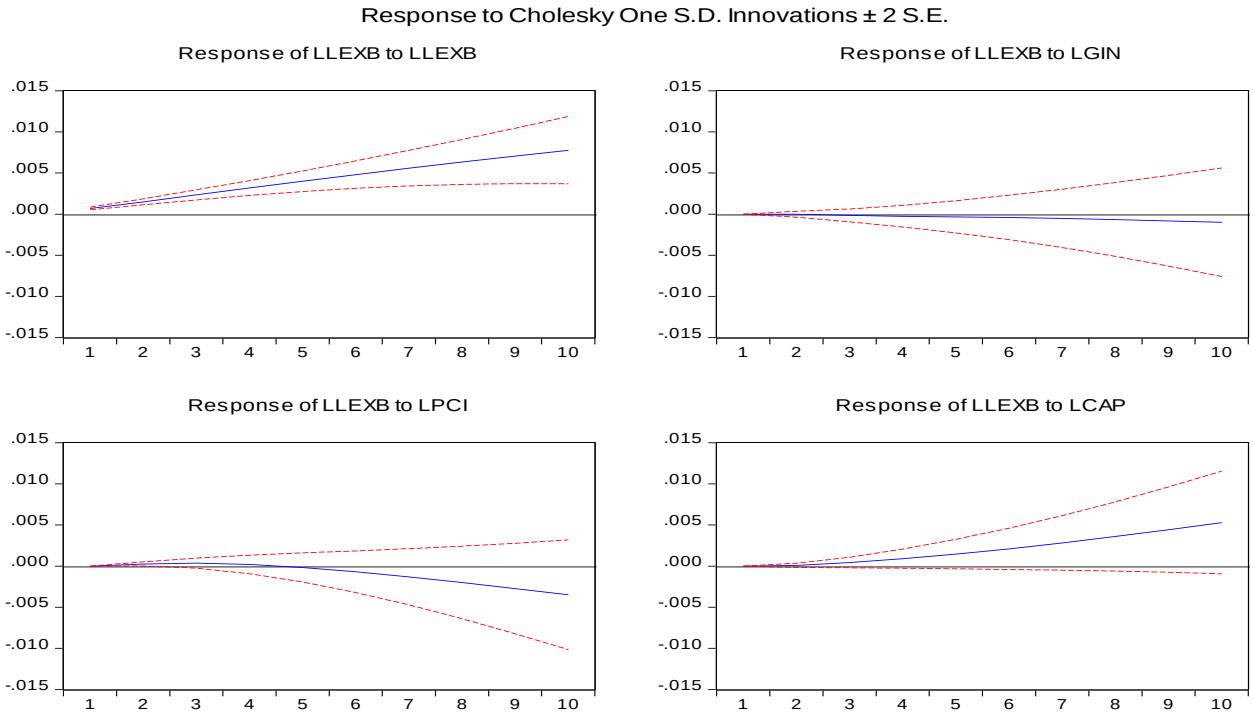

Figure 5b: IRFs with Life Expectancy at Birth and Gini coefficient (Source: computed by author)

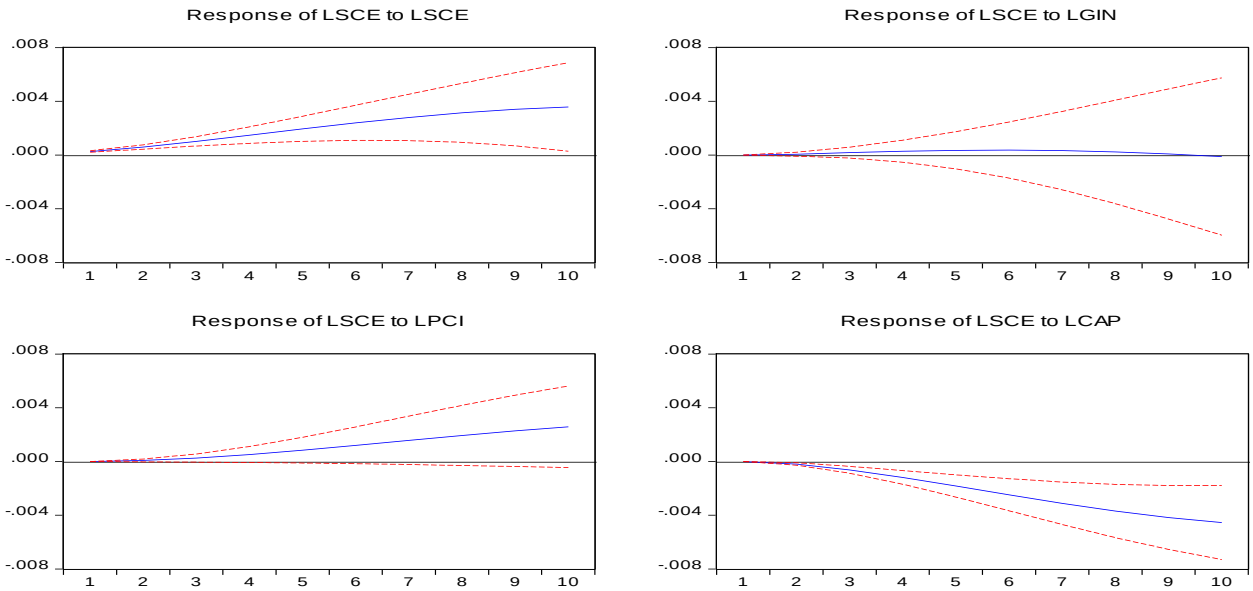

Figure 6a: IRFs with Secondary School enrolment and Gini coefficient (Source: computed by author)

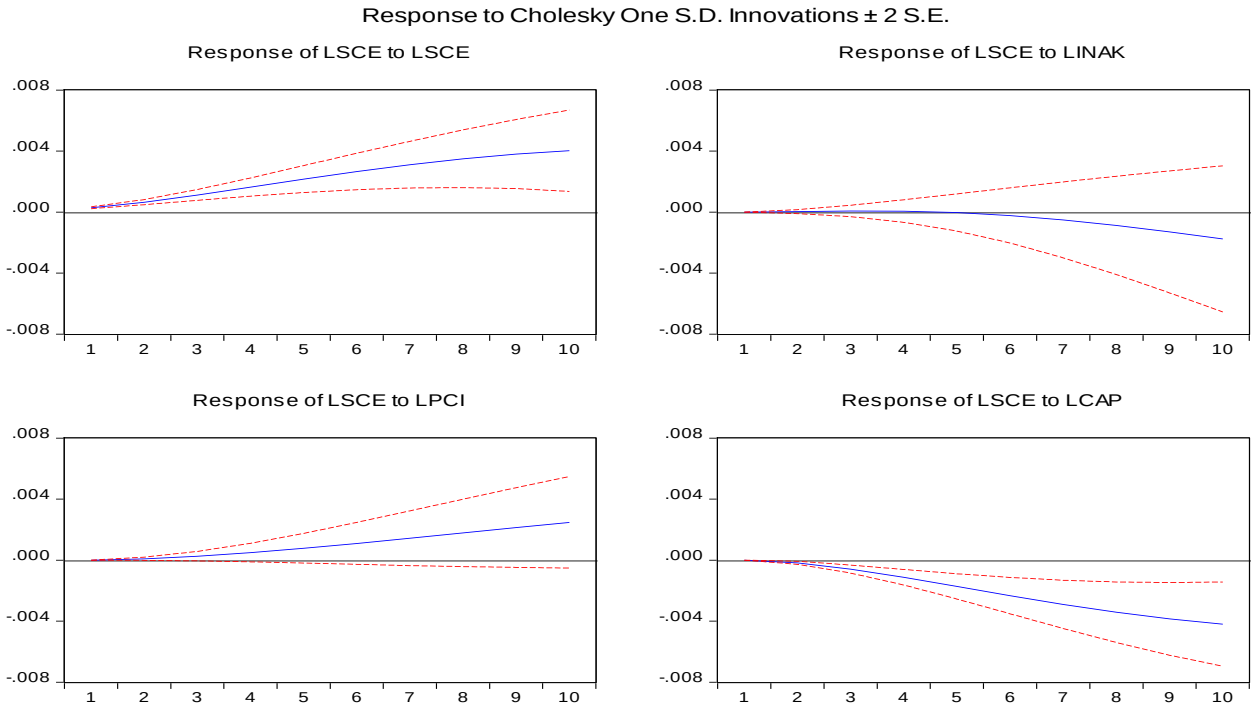

Figure 6b: IRFs with Secondary School enrolment and Atkinson index (Source: computed by author)

Table 4: Decomposition of variance error from VAR

Explained by innovation: LHDI, LGIN, LPCI, LCAP						LHDI, LINAK, LPCI, LCAP				
Period	S.E	LHDI	LGIN	LPCI	LCAP	S.E	LHDI	LINAK	LPCI	LCAP
1	0.0448	100.000	0.000	0.000	0.000	0.0459	100.000	0.000	0.000	0.000
2	0.0632	82.143	14.944	0.096	2.817	0.0622	89.349	6.452	0.168	4.031
3	0.0729	75.392	21.514	0.120	2.974	0.0709	86.172	9.143	0.130	4.555
4	0.0626	69.515	26.605	0.140	3.740	0.0786	82.876	12.081	0.109	4.934
5	0.0921	63.249	32.161	0.128	4.462	0.0851	79.371	15.282	0.124	5.223
6	0.1011	57.530	37.446	0.106	4.918	0.0908	76.080	18.323	0.211	5.386
7	0.1101	52.407	42.196	0.105	5.292	0.0960	72.955	21.127	0.407	5.511
8	0.1191	47.863	46.329	0.161	5.647	0.1008	70.003	23.606	0.755	5.636
9	0.1282	43.880	49.795	0.312	6.017	0.1054	67218	25.708	1.294	5.780
10	0.1374	40.399	52.595	0.593	6.413	0.1097	64.574	27.420	2.048	5.958

Source: computed by author

Table 5: Decomposition of variance error from VAR

Explained by innovation: LNPI, LGIN, LPCI, LCAP						LNPI, LINAK, LPCI, LCAP				
Period	S.E.	LNPI	LGIN	LPCI	LCAP	S.E	LNPI	LINAK	LPCI	LCAP
1	0.0293	100.000	0.000	0.000	0.000	0.0295	100.000	0.000	0.000	0.000
2	0.0381	86.804	1.350	11.129	0.717	0.0375	88.669	0.068	10.175	1.088
3	0.0470	81.442	0.944	14.388	3.226	0.0463	82.855	0.046	13.665	3.434
4	0.0545	75.887	1.778	18.413	3.922	0.0536	77.616	0.226	18.255	3.903
5	0.0623	73.039	2.621	20.413	3.927	0.0609	74.804	0.641	20.647	3.909
6	0.0698	70.203	3.892	22.109	3.797	0.0678	72.429	1.278	22.628	3.665
7	0.0772	68.140	5.065	23.102	3.693	0.0744	70.852	1.944	23.766	3.438
8	0.0843	66.391	6.268	23.704	3.637	0.0806	69.654	2.611	24.492	3.242
9	0.0913	65.071	7.390	23.910	3.628	0.0865	68.862	3.235	24.801	3.102
10	0.0980	64.044	8.449	23.837	3.670	0.0920	68.336	3.815	24.840	3.009

Source: computed by author

Table 6: Decomposition of variance error from VAR

Explained by innovation: LLLEXB, LGIN, LPCI, LCAP						LNPI, LINAK, LPCI, LCAP				
Period	S.E	LLEXB	LGIN	LPCI	LCAP	S.E	LLEXB	LINAK	LPCI	LCAP
1	0.0001	100.000	0.000	0.000	0.000	0.0007	100.000	0.000	0.000	0.000
2	0.0011	97.410	0.016	2.344	0.230	0.0017	97.638	0.247	2.062	0.053

3	0.0029	95.308	0.311	2.226	2.154	0.0029	96.279	0.420	2.318	0.983
4	0.0044	93.321	0.480	1.172	5.027	0.0044	96.379	0.814	1.522	2.285
5	0.0061	90.591	0.535	0.686	8.189	0.0061	94.120	1.470	0.811	3.598
6	0.0081	86.965	0.563	1.118	11.353	0.0081	92.383	2.278	0.556	4.782
7	0.0103	82.715	0.601	2.296	14.387	0.0102	90.350	3.121	0.717	5.812
8	0.0128	78.203	0.656	3.926	17.215	0.0126	88.230	3.928	1.146	6.697
9	0.0156	73.730	0.721	5.754	19.794	0.0152	86.164	4.668	1.712	7.455
10	0.0185	69.499	0.789	7.605	22.107	0.0179	84.232	5.336	2.328	8.103

Source: computed by author

Table 7: Decomposition of variance error from VAR

Explain by innovation: LSCE, LGIN, LPCI, LCAP						LSCE, LINAK, LPCI, LCAP				
Period	S.E	LSCE	LGIN	LPCI	LCAP	S.E	LSCE	LINAK	LPCI	LCAP
1	0,0003	100.000	0.000	0.000	0.000	0.0003	100.000	0.000	0.000	0.000
2	0.0007	90.405	0.748	1.248	7.599	0.0007	92.363	0.132	1.414	6.091
3	0.0014	73.312	1.719	3.517	21.452	0.0015	79.009	0.239	3.341	17.412
4	0.0024	61.338	1.896	5.688	31.078	0.0025	68.952	0.141	4.975	25.931
5	0.0037	53.479	1.677	7.526	37.318	0.0038	61.913	0.069	6.309	31.709
6	0.0052	48.082	1.335	9.087	41.496	0.0053	56.787	0.215	7.470	35.528
7	0.0069	44.178	0.990	10.446	44.385	0.0070	52.814	0.664	8.544	37.979
8	0.0086	41.219	0.698	11.663	46.420	0.0088	49.543	1.430	9.578	39.448
9	0.0104	38.883	0.484	12.776	47.856	0.0106	46.715	2.492	10.597	40.196
10	0.0122	36.977	0.363	13.809	48.851	0.0125	44.178	3.805	11.610	40.407

Source: computed by author

To further explore the relationship between the variables of the model, we conduct Granger causality test. The results of the Granger causality test are presented in Table 8. The results show that income inequality Granger cause poverty and poverty Granger cause income inequality. It shows that there is bidirectional causal relation between income inequality and poverty. Also, the results show that per capita income growth Granger cause government capital expenditure. This means that short run changes in government capital expenditure (measure of government interventionists' policies) are most driven by changes in economic growth rate. However, changes in income inequality leads to changes in poverty level and vice-versa.

Table 8: Pairwise Granger Causality test

Null Hypothesis	F-Statistic	P-value
LING does not Granger LHDI	3.11875	0.05
LHDI does not Granger LING	3.39881	0.04
LPCI does not Granger LHDI	0.43080	0.65
LHDI does not Granger LPCI	0.93417	0.40
LCAP does not Granger LHDI	1.95731	0.15
LHDI does not Granger LCAP	1.15912	0.32
LPCI does not Granger LGIN	2.70373	0.08
LGIN does not Granger LPCI	0.46650	0.63
LCAP does not Granger LGIN	2.29290	0.11
LGIN does not Granger LCAP	1.49901	0.23
LCAP does not Granger LPCI	0.40984	0.66
LPCI does not Granger LCAP	3.64909	0.03

Source: computed by author

To validate the robustness of the results and to test whether the established relationships are stable over the sample period, diagnostic test were conducted. The results show that there is no presence of conditional heteroscedsticity (χ^2 = 168.91, p-value 0.2.992) and serial correlation. All roots of AR characteristic polynomial, in Figure 7, have an absolute value less than one and fall inside the unit circle. Thus the VAR used in this work meet all the necessary econometric assumptions.

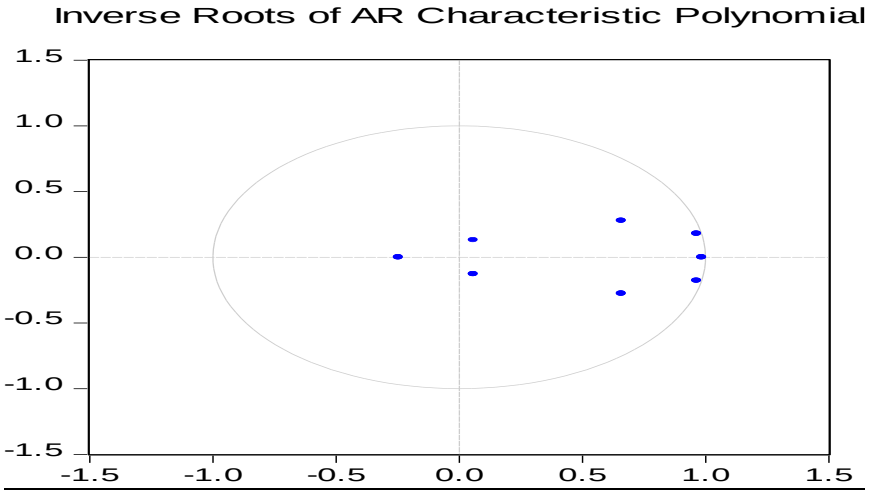

Fig. 7: Inverse Roots of AR Characteristic Polynomial
Source: computed by author

Concluding Remarks

In this paper, we examine the relationship between economic growth, income inequality, government interventionists' policies and poverty in Nigeria. Specifically, we investigate how these variables interact and the causal relation among them using vector autoregressive approach. The results of the analysis show that several intervention policies were implemented by the government over the study period but with little impact of the level of poverty in the country. Moreover, the results reveal that income inequality, economic growth and aggregate government capital expenditure are major drivers of poverty in the country. The causality results show that bidirectional causal relation between income inequality and poverty, while unidirectional causal relation runs from per capita income growth to government capital expenditure.

The question is: what policy lessons can be learnt from the last two decades? One, the problem of high income inequality needs to be adequately addressed in country to reduce of poverty. There is need for deliberate efforts on the part of government to institute policies that will address the needs of the poor in the country. Since majority of the poor live in the rural areas and are more into agricultural, government efforts at developing the rural areas will be in the right direction. There is need for incentives to support the agricultural sector so as boost agriculture production and rural income. In addition, it is necessary to incorporate reforms of rural environment in order to increase growth in agriculture in a sustainable manner. For the urban households and non-agricultural rural household that are directly affected by both high inflation rate and retrenchment, safety nets are necessary to care of them.

Two, in addition to protecting social expenditure in the process of carrying out reforms, it is important to maintain capital expenditures that enable the poor to exploit new economic opportunities. The reduction in capital expenditures on basic services during the period of reforms appears to have compounded the difficulties faced by rural households, by discouraging the private sector from stepping in quickly to provide necessary inputs and services after the withdrawal of state provision. What that suggests is that policymakers need to be conscious of the complimentary expenditures that may be necessary to ensure that reforms are successful and reforms are successful and cautious about simultaneously implementing reforms that may jeopardise their ability to undertake such expenditures.

Finally, even if the right economic policies are put in place, the existence of good governance is very important to ensure that growth is achieved and subsequently poverty reduction. In Nigeria, corruption related to weak governance, and patronage-based politics tend to fuel unproductive public investment,

while an unsustainable increase in external debt has left the economy vulnerable to falling oil prices. This is why good governance is imperative to tackle the problem of income inequality, poor economic growth and high poverty level. Pro poor growth in Nigeria will require investment in key public goods including improvement in rural marketing, extension and infrastructure. This will entail a development of the rural areas and improved access to education, health, nutrition and other social services.

In the urban areas, the need to maintain fiscal stability will definitely continue to place strong pressure on employment in the parastatals and public sectors, and trade liberalisation will continue to force further restructuring in traditional manufacturing industries. The implication of this is that pro poor growth should place more emphasis on the development of labour – intensive export oriented agro-processing industries. As pointed out earlier, government needs to provide a conducive environment for the establishment of such industries. This entails government providing the basic infrastructures such as electricity, water, good roads, and other basic facilities that could motivate private investors to participate in such venture/business.

Finally, for the country to achieve growth with equity and poverty reduction government must develop good institutions and provide good governance. The way in which the interaction between civil society and the government is played out no doubt has major implications for the growth outcome. In order to carry many people along in the reform process, majority of the populace must see the benefits of growth. However, various groups in the society, poor, average and rich must be included. The ruling class must allow competing groups to progress, as well as allow new competitors to enter the political arena. This is yet to emerge clearly in the case of Nigeria.

Poverty can be reduced if there is sufficient growth. However, countries that combine rapid growth with improved income distribution would likely reduce poverty faster than countries that do not. In Nigeria, the reforms and the various poverty alleviation programmes have not translated into higher growth. Rather the economy has witnessed greater inequality, low income and growing poverty level. This situation no doubt calls for institution of pro poor programme in the country.

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