

Country-Specific Interactions Among Private Investment Economic Growth And Poverty Level In Three Selected Sub-Saharan African Countries. (1985-2010).

Aremo, Adeleke Gabriel (PhD) Orisadare, Monica A. (Ph.D) and Olajide, Rasheed Jimoh
Department of Economics, ObafemiAwolowo University,Ile-Ife.

Abstract

This study specifically examines the relations among private investment, economic growth and poverty level in Nigeria and its two neighbouring sub-Saharan African (SSA) countries of Benin Republic and Cameroon between the periods 1985 and 2010. The study employed Vector Error Correction Model using data extracted from the World Development Indicators. The study revealed that the relationships among private investment, economic growth, and poverty level did not follow expected pattern in the three countries. The results in Benin Republic show that increase in private investment and reduction in poverty level rather than increase real GDP growth, reduced real GDP growth overtime while the results obtained for Cameroon and Nigeria show that increase in private investment increased poverty level and reduction in poverty level reduced private participation in business in Cameroon and Nigeria. The study suggests a weak relation between private investment and economic growth or poverty level in the three economies.The study therefore recommends measures such as macroeconomic stability and adequate legal system that will ensure proper take off of private investment to boost economic growth and reduce poverty level in these three economies.

Keywords: Private investment, public investment, economic growth, poverty and Vector Error Correction.

1. Introduction

Sub-Saharan Africa (SSA) is generally described as the poorest region of the world (Pfeffermann, 2001; World Bank, 2010). Besides, SSA is becoming poorer in the face of sustained growth and significant improvement of the living standard experienced in the world (World Bank, 2005a; United Nations, 2005). Also, there has been a tremendous divergence between poverty rates in sub-Saharan Africa and the rest of the world (Chen and Ravallion, 2004 and Artadi and Salai- Martin, 2003). As argued by Clempson (2012), for many decades now, the countries of sub-Saharan Africa have been consigned to the bottom of the world rich list, which resulted from decades of economic stagnation and declining living standards which have largely turned sub-Saharan Africa into the world's poorest region (Calderon and Severin 2010).However, in order to place sub-Saharan African Countries among the top global economies by 2020, a large and sustained increase in private investment in various sectors has been advocated by various governments and many researchers in SSA(OECD, 2006; Tan and Tang, 2011, Lee-Roy, 2012).

It has been observed that the quest for increasing private investments and reducing poverty in SSA in late 1980s has yielded positive results in some SSA while the reverse was the case in some other SSA countries (African

Development Indicators, 2011). For example, Congo DR, Malawi, Namibia and Kenya experienced a rise in private investment as a share of GDP and a rise in economic growth. As a share of GDP, private investment in Congo DR grew from about 7.75 per cent in 1985 to about 8.99 per cent in 2010, while the GDP also rose from 0.08 per cent to about 4.78 per cent over the same period. These growth rates not withstanding over 73 per cent of total population live in extreme poverty; Benin, Cameroon, Togo, Madagascar and Cape Verde experienced increases in private investments as a share of GDP but a decline in economic growth. In Central African Republic, private investment as a share of GDP declined from 7.9 per cent in 1985 to 7 per cent in 2010 with a decline in economic growth while over 62.8 per cent of population lives in extreme poverty. Cameroon experienced a rise in private investment as a share of GDP from 9.5 per cent in 1985 to 12.4 per cent in 2010 with a decline in economic growth rate from 8.06 per cent to 3.2 per cent over the same period. The poverty level, however, declined from 51.46 per cent in 1996 to about 32.81 per cent in 2001 and declined further to about 9.56 per cent in 2007. The oil producing country of Gabon also experienced high but a decline in private investments as a share of GDP from 33.8 per cent to 17.4 per cent over the period, while poverty level was as low as an average of about 4.48 per cent through period 2010. Private investment as a share of GDP in Nigerian was about 12 per cent in 1986 and still stood at an average of 12.6 per cent in the last decade. Nigeria implemented far –reaching trade policy reforms with the expectation that private investment as share of GDP would improve and non-oil export would boom, but the result was, however, disappointing.

Empirical research evidences available in sub-Saharan Africa at country-specific and cross-country level indicate that there is no consensus on the dynamic relationships among private investment, economic growth and poverty level in the region. For instance, Nazmi and Ramirez (1997), Ghura (1997), Kandenge (2006), Jecheche (2010) and Osinubi and Amaghionyeodiwe (2010) found positive impact of private investment on economic growth. Bazoumana (2004), Frimpong and Marbuah (2010), Bakare (2011) and Bayai and Nyangara (2013) found a positive impact of real GDP growth on private investment. Fan (2000), Eggenberger-Argote (2005), Suryadama and Suryahadi (2007), Yahie (2000) and Fatimah, Shabbas and Islam (2012) found positive impact of private investment on poverty reduction. Shan and Younger (2001); Adeyemi, Ijaya and Raheem (2009); Odhiambo (2009) and Akanbi and Du-Toit (2011) findings revealed that economic growth reduced poverty level.

The knowledge gap in the literature indicates that the dynamic relationships among private investment, economic growth and poverty level in sub-Saharan Africa have not been empirically examined. The present study addresses this gap in knowledge. Thus the main objective of this study is to examine the relationships among private investment, economic growth and poverty level in three selected sub-Saharan African countries within the study period. The rest of this paper is organised as follows: section 2 presents the literature review. The methodology of the study is discussed in section 3. In section 4, data analysis and discussion of findings are presented while section 5 summaries the findings, draws conclusion.

2 Literature Review and theoretical framework

2.1 Review of empirical studies

The literature is growing in recent times on the examination of relationship among private investment, economic growth and poverty level within and outside sub-Saharan African countries. Haroon and Nasir (2011), Azeem and Bashir (2011) and Hashim, Akran and Hashmi (2012) examined the role of investment in the course of

economic growth in Pakistan. They found that private investment has positive impact on economic growth. Contrarily, in assessing the impact of public investment and economic growth on private investment in Pakistan, Sakr (1993), Majeed and Khan (2008) found that private investment had a positive relation with GDP growth. In Africa, some studies like Nazmi and Ramirez (1997) and Kandenge (2006) in Namibia; Jecheche (2010) in Zimbabwe; Sakey (2009) in Africa and; Osinubi and Amaghionyeodiwe (2010) and Anthony (2011) in Nigeria, found a positive impact of private investment on real GDP growth. In assessing the determinants of private investment in African countries, some studies, however, found a positive impact of real GDP growth on private capital formation, amongst are: Bazoumana (2004) in Senegal; Bakare (2011) in Nigeria; Frimpong and Marbuah (2010) and Naa-Idar, Ayentimi and Frimpong (2012) in Ghana; Bayraktar and Fofack (2011) for 23 SSA countries and; Bayai and Nyangara (2013) in Zimbabwe. In investigating investment-poverty relation in Africa, Okpe and Abu (2009) analysed the effect of foreign private investment on poverty reduction in Nigeria. Ordinary Least Square (OLS) method was employed based on time series data between 1975 and 2003. They found that the inflow of foreign private investment and foreign loan into Nigeria significantly alleviate poverty. Similarly, Yahie (2000) and Oya and Weeks (2004) observed that increase private investment reduced poverty level in Africa. Moreover, in recent studies on growth-poverty relation in Africa, Shan and Younger (2001) in SSA countries; Adeyemi, Ijaya and Raheem (2009) from 48 SSA countries; Odhiambo (2009) in South Africa; Akanbi and Du-Toit (2011) in Nigeria indicated that productivity capacity of the economy could be improved thereby achieving sustained accelerated growth and reduction in poverty in the economy.

2.2 Theoretical framework of the study

The empirical analysis in this study was carried out on the basis of neoclassical growth theory following Solow growth model. This theory was employed with necessary modifications to account for the interactions among the private investment, economic growth and poverty level in SSA. Solow's model of economic growth postulates a continuous production function linking output to the inputs of capital and labour which are substitutable. The Solow neoclassical growth model employed in this study is used on a standard aggregate production function of the form:

$$Y_t = A_t K_t^{\alpha} L_t^{1-\alpha} \quad ,0 < \alpha < 1 \text{……..……...1}$$

Where Y_t= Output in period t; K_t = Stock of capital which may include physical as well as human capital in period t; L_t= Labour input in period t; A_t= Efficiency parameter; α is the parameter signifying the share of capital in output while 1- α connotes the share of labour in output in period t.

If capital stock is assumed to be private, equation 1 can take the form of:

$$Y_t = A_t\left(K_t^p\right)^{u}(Z_t)^{\lambda}, \quad Z_t = H_t L_t \text{ ……..…… 2}$$

K^p is private capital stock and Z represents labour (L) adjusted for human capital development whose efficiency can be influenced by the individual well being. The parameter α and λ in equation (2) represent the elasticities of output with respect to private and human capital stock respectively. By linearising equation (2) and expressing it in terms of growth rate, we have:

$\dot{y} = a + \alpha k^p + \lambda z$ ……..3

As observed by UNDP (1990), the extent to which people can improve their capabilities depends largely on their income and the access they have to basic goods and services. The growth of per capita income/ expenditure as described by UNDP is one of the critical elements in improving human development (Z) since it provides the access to resources for decent living standard. The most important basic goods and services are food, health, safe water and sanitation and education which are critical elements of poverty.

Assume per capita income/expenditure as a linear function of human development (Z) as emphasized by UNDP, we have,

$z = \theta + kpccex$ ……4

Where θ, are other factors that determine human development like human rights, investment in technology, etc.

Substitute 4 into 3 we have

$\dot{y} = \gamma + \alpha k^p + kpccex$ …… …….5

Where $\gamma = a + \theta$

Equation 5 specifies that growth in output depends on the level of capital stocks and per capita consumption expenditure, a proxy for poverty level.

3 Methodology

3.1 Vector Error Correction (VEC) technique

A natural progression from Vector Autoregressive Model is the VEC model, especially when the series are non-stationary at level. A Vector Error Correction Model (VECM) leads to a better understanding of the nature of nonstationarity among the different component series that are cointegrated. A VECM improves longer term forecasting over an unconstrained model (Sreedharan, 2004). A dynamic model using the Vector Error Correction model (VECM) representation of Engle and Granger (1987) is applied with the insight that even though endogenous variables (y_t) are non-stationary they might be cointegrated. The VECM (*p*) form is written as:

$\Delta y_t = \alpha + \sum_{i=1}^{i=p} \Phi_i \Delta y_{t-i} + \Pi y_{t-1} + \varepsilon_t$ …….6

Where Δ is the differencing operator, such that $\Delta y_t = y_t - y_{t-1}$

Where y_t is an $(nX1)$ column vector of endogenous variables, α is an $(nX1)$ vector of constant terms, Φ and Π represent coefficient matrices. The coefficient matrix Π is known as the impact matrix, and it contains information about the long-run relationships.

The Vector error correction version pertaining to the four variables incorporated in our study is stated below:

$$\Delta LPRINV_t = \alpha + \sum_{j=1}^{p} \beta_j \Delta LPRINV_{t-j} + \sum_{j=1}^{p} \gamma_j \Delta LPUBINV_{t-j} + \sum_{j=1}^{p} \theta_j \Delta LRGDP_{t-j} + \sum_{j=1}^{p} \lambda_j \Delta LPCCEX_{t-j} + k_1 ECM_{t-1} + \varepsilon_t$$

…… 7

$$\Delta LPUBINV_t = \alpha + \sum_{j=1}^{p} \beta_j \Delta LPRINV_{t-j} + \sum_{j=1}^{p} \gamma_j \Delta LPUBINV_{t-j} + \sum_{j=1}^{p} \theta_j \Delta LRGDP_{t-j} + \sum_{j=1}^{p} \lambda_j \Delta LPCCEX_{t-j} + k_2 ECM_{t-1} + \varepsilon_t \quad \ldots 8$$

$$\Delta LRGDP_t = \alpha + \sum_{j=1}^{p} \beta_j \Delta LPRINV_{t-j} + \sum_{j=1}^{p} \gamma_j \Delta LPUBINV_{t-j} + \sum_{j=1}^{p} \theta_j \Delta LRGDP_{t-j} + \sum_{j=1}^{p} \lambda_j \Delta LPCCEX_{t-j} + k_3 ECM_{t-1} + \varepsilon_t \quad \ldots 9$$

$$\Delta LPCCEX_t = \alpha + \sum_{j=1}^{p} \beta_j \Delta LPRINV_{t-j} + \sum_{j=1}^{p} \gamma_j \Delta LPUBINV_{t-j} + \sum_{j=1}^{p} \theta_j \Delta LRGDP_{t-j} + \sum_{j=1}^{p} \lambda_j \Delta LPCCEX_{t-j} + k_4 ECM_{t-1} + \varepsilon_t \quad \ldots 10$$

Where ECM_{t-1} is the error correction term and ε_t is the mutually uncorrelated white noise residual. The size and statistical significance of the coefficient of the error correction term in each ECM model measures the tendency of each variable to return to the equilibrium state. A significant coefficient implies that past equilibrium errors play a role in determining the current outcomes. The short run dynamics are captured through the individual coefficients of the difference terms. Economic growth (LRGDP) does not Granger-cause private investment (LPRINV) if all $\theta_j = 0$, per capita consumption expenditure (LPCCEX) does not Granger-cause private investment (LPRINV) if all $\lambda_j = 0$, and private investment (LPRINV) does not Granger-cause economic growth (LRGDP) if all $\beta_j = 0$.These hypotheses can be tested using standard F-statistics.

The components of equations 7 to 10 i.e. the VEC model can be expressed explicitly in matrix form below:

$$\begin{bmatrix} \Delta LPRINV_t \\ \Delta LPUBINV_t \\ \Delta LRGDP_t \\ \Delta LPCCEX_t \end{bmatrix} = \begin{bmatrix} \alpha \\ \alpha \\ \alpha \\ \alpha \end{bmatrix} + \begin{bmatrix} \beta_j & \gamma_j & \theta_j & \lambda_j \\ \beta_j & \gamma_j & \theta_j & \lambda_j \\ \beta_j & \gamma_j & \theta_j & \lambda_j \\ \beta_j & \gamma_j & \theta_j & \lambda_j \end{bmatrix} \begin{bmatrix} \Delta LPRINV_{t-j} \\ \Delta LPUBINV_{t-j} \\ \Delta LRGDP_{t-j} \\ \Delta LPCCEX_{t-j} \end{bmatrix} + \begin{bmatrix} K_1 \\ K_2 \\ K_3 \\ K_4 \end{bmatrix} \begin{bmatrix} ECM_{t-1} \\ ECM_{t-2} \\ ECM_{t-3} \\ ECM_{t-4} \end{bmatrix} + \begin{bmatrix} \varepsilon_{\Delta LPRINV} \\ \varepsilon_{\Delta LPUBINV} \\ \varepsilon_{\Delta LRGDP} \\ \varepsilon_{\Delta LPCCEX} \end{bmatrix} \quad \ldots 11$$

Hence, equations 11 was estimated to verify the interactions among private investment (LPRINV), public investment (LPUBINV), real GDP growth (LRGDP) and per capita consumption expenditure (LPCCEX) in each country under consideration.

The expected a priori relationships among private investment (PRINV), public investment (PUBINV), real GDP growth (RGDP) and poverty (POV) are shown in the matrix form below:

$$\begin{bmatrix} & prinv & pubinv & rgdp & pov \\ prinv & +/- & +/- & + & - \\ pubinv & +/- & +/- & + & - \\ rgdp & + & + & +/- & - \\ pov & - & - & - & +/- \end{bmatrix}$$

4.2 Data source and measurement of variables

The investments, real GDP and poverty indicators data employed in this study were extracted from World Bank African Development Indicators (2011). The cross-country investment, real GDP and per capita consumption

expenditure data for the selected 3 sub-Saharan African countries - Benin, Cameroon and Nigeria, were obtained annually, for a period of 1985 to 2010. The investment and per capita consumption expenditure data for Nigeria were obtained from the Central Bank of Nigeria Statistical Bulletin (2010).

Gross fixed capital formation, private sector (% of GDP) is considered as a proxy for private investment; real gross domestic product (constant 2000 US$) is considered as a proxy for economic growth; while per capita consumption expenditure (constant 2000 US$) is a proxy for measure poverty.

GDP per capita is always taken as a single indicator to measure poverty because total consumption of basic needs (e.g. food, housing and clothing) and essential needs (e.g. transportation and social activities) are difficult to quantify, (Liu and Wu, 1998). However the assessments of poverty based on income have to be qualified because assessing the standards of living by income alone may understate or overstate the standard of living, if the compositions of the families or the market supply situation are not taken into consideration. Hence, in this study, the welfare approach measures of poverty were employed. The approach associated the standard of living with individual consumption generally measure using per capita consumption expenditure in the country, Roemer and Gugerty (1997), Quartey (2003), Adeyemi, Ijaya and Raheem (2009),Odhiambo (2009). Due to the unavailability of poverty headcount ratio and other poverty indicator data and the short coming of the measure, per capita consumption expenditure was used as proxy for poverty in this study because the lower the per capita consumption expenditure, the higher the poverty will tend to be and vice versa.

Since the study makes use of time series secondary data, our data analysis involves: (i) Checking the temporal properties of the variables in the model via unit root tests in order to determine the stationarity of the variables using Augmented Dickey Fuller (ADF) test statistic (ii) Verification of long run relationship and (iii) Estimation of Vector Error Correction Model (VECM), and extract the relationships among private investment, economic growth and per capita consumption for each of selected countries.

4.3. Analysis of data

Table 1: Results of Stationary (Unit Root) Test for annual data

VARIABLES	**BENIN**		**CAMEROON**		**NIGERIA**	
	C	**C &T**	**C**	**C &T**	**C**	**C &T**
LPRINV	1.118	2.196	2.252	2.659	4.078*	4.293*
LPUBINV	2.909	2.768	3.025*	3.895*	2.279	2.821
LRGDP	2.435	4.581*	2.002	2.438	1.612	0.971
LPCCEX	3.144*	3.604	2.868	3.154	1.534	2.899
5% critical	**2.998**	**3.622**	**3.029**	**3.690**	**2.986**	**3.603**
ΔLPRINV	4.596*	4.902*	7.266*	7.342*	8.292*	4.602*

ΔLPUBINV	6.977*	7.431*	3.780*	3.631*	6.790*	6.683*
ΔLRGDP	7.737*	7.001*	4.566*	4.591*	3.137*	3.618*
ΔLPCCEX	5.880*	5.866*	6.460*	6.482*	4.211*	4.129*
5% critical	**3.012**	**3.644**	**3.029**	**3.644**	**2.991**	**3.632**

Source: author's calculation

Note: *C-Constant, C& T-Constant with trend, at 5% significance level. ADF and * denote Augmented Dickey Fuller and decision about the order of integration respectively .The null hypothesis (H_0) is that there is a unit root process.*

From table 1, it could be seen that the series in each of selected SSA could adequately be regarded as a random walk when they are in their levels but revert to their mean level after first differencing. The null hypothesis that a variable under investigation has a unit root, against the alternative that it does not, could not be rejected for all the data series in their levels at 5% significance level. Having taken the first difference of all the series, the ADF was further carried out in testing for the stationary of these differenced series. A co-integration test was further embarked upon to verify if long run relationship exists among the variables.

Co integration test

The relevance of the co-integration test statistic is to ascertain if long- run relationship exists. To achieve this, a more powerful multivariate approach that uncover possible co-integration that was proposed by Johansen (1998) and Johansen and Juselius (1990) were employed. Present below is the summary result of unrestricted co integration Rank (Trace and Maximum Eigen value) test for selected SSA countries.

Table 3: Unrestricted Co-integration Rank Tests for selected SSA countries

H_0	H_1	Benin		Cameroon		Nigeria		0.05 Critical Values	
		TS	MES	TS	MES	TS	MES	**TS**	**MES**
r=0	r=1	126.05	62.27	103.93	58.90	80.56***	52.19	**47.85**	**27.58**
r<1	r=2	63.77	40.76	45.03	29.32***	28.36	21.48***	**29.79**	**21.13**
r<2	r=3	23.00	14.88	15.70***	13.19	6.88	6.61	**15.49**	**14.26**
r<3	r=4	8.11***	8.11***	2.51	2.51	0.27	0.27	**3.84**	**3.84**

Source: Author's calculation

*Note: TS is Trace statistic test; MES is Max-Eigen statistic test; *** indicate the number of co integrating equation using either Trace statistic or Max-Eigen statistic tests. The null hypothesis in each case is rejected at 5 percent significance level.*

From table 3 above, the null hypothesis of no co integration among the variables is rejected at 5% significance level for the three selected sub-Saharan African countries. Thus, there is no integration among private investment, public investment, economic growth and per capita consumption expenditure in the selected sub-Saharan African countries. This indicates that long run relationship exist among private investment, economic growth and poverty level. The results, however, confirm most of the empirical results found in the literature. For example, Bakare (2011) in Nigeria and Jecheche (2010) in Namibia found that long run relationship exist among the variables. Thus, Vector Error Correction Model (VECM) was employed for the SSA countries under study. Moreover, based on the information criteria employed, the lag length of order 1 was chosen for Cameroon. The lag length of order 2 was chosen for Benin Republic while the lag length of order 5 was chosen for Nigeria.

Robustness test of the individual countries data residuals

Having determined the lag length of the individual countries VAR, the next approach is to examine whether the chosen VAR have appropriate properties. The following tests, namely, the residual portmanteau test of autocorrelation and the residual serial correlation LM tests were conducted. To verify the existence of serial correlation at selected lag h in the individual countries VAR/ VEC model, VAR/VEC Residual Serial Correlation LM Tests is employed. This is reported in Table 6 below:

Table 6: Result of individual countries VAR/VEC Residual Serial Correlation LM Tests

	BENIN		CAMEROON		NIGERIA	
Lags	LM-Stat	Prob	LM-Stat	Prob	LM-Stat	Prob
1	30.59	0.015	13.55	0.631	6.28	0.98
2	30.61	0.015	11.29	0.791	10.62	0.83
3	15.86	0.462	9.53	0.889	13.17	0.65
4	78.23	0.000	150.64	0.000	64.34	0.00
5	16.33	0.430	5.04	0.995	19.47	0.24
6	2.86	0.999	5.20	0.994	8.04	0.94
7	9.15	0.906	1.09	1.000	21.23	0.16
8	32.50	0.008	91.91	0.000	55.99	0.00
9	32.98	0.007	7.90	0.951	15.12	0.51
10	1.818	1.000	5.30	0.994	7.56	0.96
11	30.59	0.015	13.55	0.631	6.28	0.98
12	30.61	0.015	11.29	0.791	10.62	0.83

Source: Author's calculation

Prob from chi-square with n^2dof where n=4.

NB: *Chi-square at 5% level =26.3 (from statistical table)*

From Table 6, we accept the null hypothesis of no serial correlation at lag order h. The implication here is that the models for each country are appropriate to explain the interactions among private investment, public investment, real GDP growth and per capita consumption spending in each of the selected sub-Saharan African countries.

Individual countries Impulse Response Analysis

For the purpose of examining the effects of shocks to the adjustment path of private investment, economic growth and per capita consumption expenditure, the IRFs estimated from the VEC models were used as analytical tool. Appendix 1 shows the estimated IRFs when non recursive identification is used. The IRFs

indicate the direction and size of the effect of a one standard deviation shock to one variable on other system variables over time.

We observed from Appendix 1 (panel1) that a shock to private investment (LPRINV) in Benin, Cameroon and Nigeria had a positive effect on private investment in the short and in the long runs. The estimate appeared with positive values through the time horizon. Thus, given all other endogenous factors in the model, private investment could be expansionary in the short run and in the long runs. A shock to public investment had a crowding–out (negative) effect on private investment in Benin and Cameroon in the medium and in the long runs while crowding-in (positive) effect was found in Nigeria. The estimate appeared with zero (0.0000) value in period 1 in the three economies signaling no immediate effect of public investment on private investment. A shock to real GDP growth (LRGDP) in Benin, Cameroon and Nigeria did not have effect on private investment in 1st period as the estimate assumed zero value (0.00). The estimate assumed positive value in 4th period and was sustained till the end of the time horizon. Thus, real GDP growth had expansionary effect on medium and long term private investment in the selected countries. The result was in line with Majeed and Khan (2008) in Pakistan, Kadr (2010) in Turkey, Bakare (2004) in Nigeria and Patrick (2006) in Botswana that increase in real GDP increase private investment. A shock to per capita consumption expenditure (LPCCEX), a proxy for poverty level in the VAR model, had no effect on private investment in the three countries in the short run. The estimate assumed zero value (0.00) in 1st period. The estimate in Benin became positive in the 4th and 8th periods and was sustained till the end of time horizon while negative values were observed in Cameroon and Nigeria. Thus, increase in per capita consumption expenditure in Benin, which signified a reduction in poverty level, had expansionary effect on private capital formation in the medium and long runs.

From Appendix 1 (panel 2), a shock to private investment (LPRINV) in Benin and Nigeria produced an expansionary effect on real GDP growth in the short and in the long runs while an innovation to private investment produced a negative effect on real GDP growth in Cameroon. The estimate for Benin and Nigeria assumed positive value in 1st period and was sustained with positive values till the end of the time horizon. Thus, private investment impacts positively on short and long runs real GDP growth in Benin and Nigeria. The result obtained in Cameroon is consistence with Nara-Idar and Fripong's (2012) for Ghana while the result obtained for Benin and Nigeria is consistent with findings in Sakr's (2010) for Pakistan, Anthony (2011) for Nigeria and Hashim, Akran and Hashim (2012) for Pakistan.

A shock to public investment also had a positive and expansionary effect on real GDP growth of Benin and Cameroon in the short and long runs while negative effect was observed in Nigeria. The estimate for Benin and Cameroon assumed positive value in 1st period and was sustained with positive values till the end of the time horizon. Thus, an innovation to public investment in Benin and Cameroon increased real GDP growth in the short, medium and long runs. An innovation to per capita consumption expenditure (LPCCEX) had a negative effect on real GDP growth of Benin and Nigeria while positive effect was observed for Cameroon. The estimated value for Benin and Nigeria assumed zero (0.00) per cent in the 1st period signals no short run effect. It assumed a negative value from the 4th period till the end of the time horizon indicating a contractionary effect in the medium and long runs. Thus, an increase in per capita consumption expenditure, indicating reduction in poverty level, increased real GDP growth in Nigeria but did not increase real GDP growth in Benin and Cameroon in the

medium and long runs. The implication is that efforts toward reduction of poverty do not transform the economy of Benin and Cameroon. These countries should, therefore, embark on growth-oriented policies to improve the economy rather than poverty reduction.

From Appendix 1 (panel 3), a shock to private investment produced an expansionary effect on per capita consumption expenditure, the proxy for poverty level, for Benin while contractionary effect was observed for Cameroon and Nigeria in the short and long runs. The estimated value were positive in 1st period for Benin and was sustained with positive sign till the end of the time horizon signaling short and long runs positive effect of private investment on per capita consumption. Hence, increase in private investment in Republic of Benin increased per capita consumption and thus reduced poverty level in the short and long runs. The result in Benin was consistence with finding from Yahie (2000) and Oya and Weeks (2004) for Africa. A shock to public investment had a mixed effect on per capita consumption of Benin while negative effect was observed for Cameroon and Nigeria. The estimated negative value of -0.007 for Benin Republic in the 1st period signals short run contractionary effect. The estimated value became positive in the 8th period and positive value sustained till the end of time horizon signaling medium and long run expansionary effect. The estimated value for Cameroon and Nigeria appeared with negative value in the 1st period and was sustained with the negative values till the end of the time horizons. Thus, a shock to public investment increased consumption level and reduced poverty in the medium and in the long run in Republic of Benin but reverse was the case in Cameroon and Nigeria.

The result in Benin was contrary to that of Fan (2000) for developing countries of China, India, Thailand, Vietnam and Uganda that increase in public investment reduced poverty level. A shock to real GDP growth produced a mixed effect on per capita consumption expenditure in Benin while expansionary effect was observed for Cameroon and Nigeria. The estimated negative value in 1st period for Benin Republic indicates short run contractionary effect. The estimated positive value for the three countries in the 4th period till the end of the time horizon signals medium and long run expansionary effect. Hence, a shock to real GDP growth increased per capita consumption and thus reduced poverty level in the three countries in the medium and in the long runs. The result was consistence with findings from Shan and Younger (2001) for SSA countries; Adeyemi, Ijaya and Raheem (2009) for 48 SSA countries; Odhiambo (2009) for South Africa and; Akanbi and Du-Toit (2011) for Nigeria that increased in economic performance reduced poverty level.

Given all other endogenous variables, an innovation to per capita consumption expenditure had expansionary effect on per capita consumption in the three economies and thus reduced poverty level both in the short and in the long runs. It can be inferred from the case of the three economies that higher real GDP growth rates could potentially achieve a reduction in poverty level in the medium and long runs. The implication is the policy effort to increase economic growth had immediate and long term positive impact on poverty reductions.

Individual countries Variance Decomposition Analysis

In order to further analyse the linkages among private investment, economic growth and poverty level in selected countries, the variance decomposition derived from VEC was generated and analysed. Forecast error variance decomposition shows the explanatory contribution of the shock to the variables.

Appendix 2 (Panel 1) depicts the proportions of forecast error variance in private investment in Benin explained by innovations to the endogenous variables considered. The three variables that appear crucial in determining the variations in LPRINV are LPRINV, LRGDP and LPCCEX. The magnitude of LPRINV reduced from 100 per cent in the 1st period to 77.9 per cent in the 20th period. This indicates that private investment explained between 100 and 77.9 per cent of its own variations overtime. The magnitude of LRGDP increased from 0.00 per cent in period 1 to 2.7 per cent in period 4 and further to 6.8 per cent in period 20 while the magnitude of LPCCEX increased from 0.00 per cent in period 1 to 0.76 per cent in period 4 and further to 10.8 per cent in period 20. This indicates that real GDP growth explained between 0.0 and 6.8 per cent of variation in private investment overtime while poverty level explained between 0.0 and 10.8 per cent. It can thus be inferred from the results that an innovation to private investment has greater potential to increase private investment in the short, medium and long runs than real GDP growth and consumption expenditure.

Appendix 2 (Panel 2) shows the proportion of forecast error variance in real GDP growth in Benin explained by innovations in the endogenous variables considered. The four variables that appeared crucial in the determination of real GDP growth are LPRINV, LPUBINV, LRGDP and LPCCEX. The magnitude of LPRINV varied between 12.5 per cent in period 1 and 12.9 per cent in period 20.This indicates that private investment explained between 12.5 and 12.9 per cent of variation in real GDP growth overtime. The magnitude of LPUBINV declined from 20.6 per cent in period 1 to 7.02 per cent in period 20. This indicates that public investment explained between 20.6 and 7.02 per cent of variation in real GDP growth overtime. The magnitude of LRGDP declined from 66.8 per cent in period 1 to 30.05 per cent in period 20, while the magnitude of LPCCEX increased from 0.00 per cent in period 1 and to 43.9 per cent in period 20.This indicates that real GDP growth explained between 66.8 and 30.5 per cent of its own variations overtime. Thus, apart from shock to real GDP growth, both private investment and public investment contributed more to variations in real GDP growth in the short run than poverty level. Poverty level has potential to explain variation in real GDP growth in the long run.

Appendix 2 (panel 3) depicts the proportion of forecast error variance in per capita consumption expenditure (LPCCEX) in Benin explained by innovations in the endogenous variables considered. The three variables that appeared crucial in the determination of LPCCEX are LPRINV, LPUBINV and LPCCEX. The magnitude of LPRINV increased from 0.09 per cent in period 1 to 52.27 per cent in period 20.This indicates that private investment explained between 0.09 and 52.27 per cent of variations in poverty level overtime. The magnitude of LRGDP increased from 1.19 per cent in period 1 to 3.59 per cent in period 20 while the magnitude of LPCCEX decreased from 94.3 per cent in period 1 to 44.01 per cent in period 20. It can thus be inferred that, private capital formation (private investment) had greater potential to increase consumption pattern and reduce poverty level in the short and long runs than public investment.

Appendix 3 (panel 1) depicts the proportion of forecast error variance in private investment in Cameroon explained by innovation to the endogenous variables considered. The four variables that appeared important in determining the variations in LPRINV are LPRINV, LPUBINV, LRGDP and LPCCEX. The magnitude of LPRINV reduced from 100 per cent in period 1 to 47.7 per cent in period 20. The magnitude of LPUBINV increased over time from 0.00 per cent in period 1 to 3.25 per cent in period 4. It increased further to 26.5 per cent in period 20. The magnitude of LRGDP increased from 0.00 per cent in period 1 to 1.09 per cent in period 4

and it increased further to 14.8 per cent in period 20 while the magnitude of LPCCEX increased from 0.00 per cent in period 1 to 3.2 per cent in period 4. It increased further to 10.8 per cent in period 20. A shock to private investment explained the largest proportion of its own variation in the short run. Public investment had greater potential to explain variation in private investment in the long run than both real GDP growth and poverty level. The implication here is that Cameroon should focus on private investment and growth-oriented policies to increase private participation in business rather than focus on poverty reduction.

Appendix 3 (panel 2) shows the proportion of forecast error variance in real GDP growth in Cameroon explained by innovations to the endogenous variables considered. The two variables that appeared crucial in the determination of the variations in real GDP (LRGDP) are private investment (LPRINV) and LRGDP. The coefficient of LPRINV varied between 14.9 per cent in period 1 and 14.01 per cent in period 20. The coefficient of LRGDP increased from 84.9 per cent in period 1 to 85.9 per cent in period 20. Hence, Private investment has greater potential to influence real GDP growth in Cameroon than increase in public investment and reduction in poverty level.

Appendix 3 (panel 3) depicts the proportion of forecast error variance in per capita consumption (LPCCEX) in Cameroon explained by innovation to the endogenous variables considered. The three variables that appear crucial in determining the variations in LPCCEX are LPRINV, LRGDP in term of magnitude. The coefficient of LPRINV increased from 13.6 per cent in period 1 to 39.7 per cent in period 20. The coefficient of LRGDP increased from 5.71 per cent in period 1 to 9.78 per cent in period 20 while the magnitude of LPCCEX decreased from 80.6 per cent in period 1 to 47.7 per cent in period 20. Innovation to private investment explained a larger proportion of variations in per capita consumption expenditure than real GDP growth and it has the potential to reduce poverty level in the short and long runs.

Appendix 4 (panel 1) shows the proportion of forecast error variance in private investment (LPRINV) in Nigeria explained by innovations to the endogenous variables considered in the study. The three variables that appeared crucial in determining the variations in LPRINV are LPRINV and LPUBINV, and LPCCEX. The magnitude of the coefficient of private investment was large and it declined from 100 per cent in period 1 to 79.6 per cent in period 20. The magnitude of public investment increased from 0.0 per cent in period 1 to 0.33 in period 4. It increased further to 5.7 per cent in period 20. The magnitude of per capita consumption expenditure increased from 0.00 per cent in period 1 to 7.7 per cent in period 4. It increased further to 13.3 per cent in period 20. Hence, innovation to per capita consumption spending, proxy for poverty level had larger potential to explain variations in long run private capital formation than real GDP growth.

Appendix 4 (panel 2) shows the proportion of forecast error variance in real GDP growth (LRGDP) in Nigeria explained by innovation to the endogenous variables considered in the study. The three variables that appeared to be important to determination of the variations in LRGDP are LPRINV, LPUBINV and LRGDP. The magnitude of LPRINV increased from 5.4 per cent in period 1 to about 16.0 per cent in period 8. It increased further to 21.2 per cent in period 20. The magnitude of LPUBINV also increased from 7.56 per cent in period 1 to 28.3 per cent in period 20 while that of LRGDP declined from 86.9 per cent in period 1 to 44.9 per cent in period 20. Hence,

both public and private investments are capable of explaining variations in the medium and long run real GDP growth in Nigeria with more effect from public investment.

Appendix 4 (panel 3) depicts the proportion of forecast error variance in per capita consumption expenditure (LPCCEX) in Nigeria explained by innovation to the considered endogenous variables. The three variables that appeared crucial to determination of the variations in LPCCEX are LPRINV, LRGDP and LPCCEX. The magnitude of LPRINV increased from 0.58 per cent in period 1 to about 27.3 per cent in period 20. The magnitude of LRGDP varied between 20.1 per cent in period 1 and 35.7 per cent in period 20 while the magnitude of LPCCEX fell from 79.2 per cent in period 1 to 36.03 per cent in period 20. Consequently, both private investment and real GDP growth were capable of explaining variations in short and long run poverty levels in Nigeria. This is consistent with the findings of Suryadama and Argote (2005) in Indonesia, Yahie (2000) in SSA, and Akanbi and Du Toit (2011) in Nigeria. Hence, an economic growth policy-oriented programme is necessary to reduce poverty level in Nigeria.

Results from Individual Countries VEC Model estimation

The results in Benin Republic show that increase in private investment and reduction in poverty level rather than increase real GDP growth, reduces real GDP growth overtime. Hence, the results suggest a disconnection from both private investment and poverty level to real GDP growth in Benin Republic. The results obtained for Cameroon and Nigeria suggested no connection between private investment and poverty level as increase in private investment increased poverty level and reduction in poverty level reduced private participation in business.

Overall, the results obtained for Benin Republic and Nigeria confirm the thesis of the neo-classical growth model that higher levels of investment and therefore, higher level of capital per worker will generate higher levels of per capita output. Thus, it may be concluded that policy reforms that are not private investment-oriented may retard economic growth and increase poverty level in these SSA countries. On the contrary, the results obtained for Cameroon confirm the thesis of the accelerator investment model that output is a determinant factor of desired capital stock. The result for Cameroon, however, calls for policy reforms that are growth-oriented to promote private investment and reduce poverty level.

5 Conclusion

This study specifically examined the relationships among private investment, economic growth and poverty level between Nigeria and her two neighbouring SSA countries of Benin Republic and Cameroon between the periods 1985 and 2010. In trying to achieve this objective, Vector Error Correction (VEC) analysis was conducted. From the empirical results, the evidence obtained in this study suggests that public investment does crowd-out private investment in Benin and Cameroon this suggested that majority of their public investments are non-infrastructure investment that could compete with private investment and thereby crowd-out private enterprises. Also, most of the physical and financial resources that are utilized by public sector in the two countries might exert a negative influence on private investment.

The study therefore recommend measures for improving the environment for investment such as macroeconomic

stability and adequate legal system that will ensure proper take off of private investment to boost economic growth and /or reduce poverty level. The African countries should also continue to reform their business environment which will give better investment climate both for foreign and local investors. This means that the African governments should endeavour to embark on serious reforms that will focus on developing business rules and regulations that promote efficiency, high productivity and will reduce cost of doing business.

REFERENCES

Adeyemi, S., Ijaya G. and Raheem U. (2009) "Determinants of poverty in Sub-Saharan Africa". *An international Multi-Disciplinary Journal*, Ethiopia Vol 3 (2), African Research Review.

African Development Indicators (2011) "World Bank African Development Indicators 2011".accessed at http:/data.worldbank.org/data-catalog/Africa-development indicators.

Artadi, E. and Sala-i-Martin, A (2003) "The economic tragedy of the XXth Century: Growth in Africa". *Department of Economic Discussion Paper,* Columbia University, New York

Bouton, L and Sumlinski, M (1999) "Trends in Private Investment in Developing Countries*". International Finance Corporation Discussion Paper.*Number 41.The World Bank Washington, D.C.

Calderon, S and Severin, L (2010) "Infrastructure and Economic Development in SSA". *Journal of African Economies*. Volume 19, AERC Supplement PP 113-187.

Canova, F and Ciccarelli, M (2003) "Panel index VAR models: Specification, Estimation, Testing and Leading Indicators" CEPR Discussion Papers 4033,

Chen, S and Ravallion, M (2004) "How have the world's poorest fared since the early 1980s? " *World Bank Policy Research Working Paper* 3341, June 2004.

Clemson, R. (2012) "Combating poverty in Sub-Saharan Africa". *E-international Relations*. April 25, 2005.

Gujarati, D.N (2004) "Basic Econometrics" Fourth Edition. McGraw-Hill Companies

Hoffmann, B (2003) "Bank Lending and Property prices: Some international Evidence". HKIMR Working paper. No 22/2.

Hsiao, F. and Hsiao, M (2006) "FDI, Exports, and Growth in East and Southeast Asia: Evidence from Time-Series and Panel Data Causality Analyses*". Paper presented at 2006 International Conference on Korea and the World Economy*, July 7-8, 2006 at Korea University Seoul, Korea

Joseph, F (2012) "Agricultural Investment, growth and Poverty reduction: What will be the outcomes of the comprehensive Africa Agricultural Development Program in Guinea-Bissau?" *Journal of Development and Agricultural Economics.* Vol 4(1) pp 1-16.

Lee-Roy, C (2012) "The importance of private sector growth and development in Africa". Posted in Mail and Guardian online network. June 20, 2012.

Liu, E. and Wu, J (1998) "The Measurement of Poverty". Research and Library Services Division Provisional Legislative Council Secretariat, Hong Kong.

Lustig, N, Arias, O and Lugolini, J (2002) "Poverty Reduction and Economic growth: A two-way causality". *Sustainable Development Department Technical papers Series*, Inter-American Development Bank, Washington DC.

Odhiambo, N (2009) "Finance-Growth-Poverty nexus in South Africa: A dynamic causality linkage". *The Journal of Socio-Economics.*Vol.38, pp 320-325

OECD (2006) " Annual Reports" Organisation for Economic Co-operation and Development

Okpe, I. and Abu, J (2009) "Foreign Private Investment and Poverty Reduction in Nigeria". *Journal of Social Sciences*. Vol.19.No.3.pp 205-211.

Oya, C and Weeks, J (2004) "Investment for poverty reducing employment in Africa: Review of case studies and analytical framework". *UNDP and ILO, report.*

Pfeffermann, G (2001) "Poverty Reduction in developing countries: The role of private enterprise". *Quarterly Magazine of the IMF*,Vol 38,No.2, June 2001.

Roemer, M and Gugerty, M (1997) "Does economic growth reduce poverty". *Technical paper* Harvard Institute for International Development.

Schumpeter, J (1939) "Business cycle, A theoretical Historical and Statistical analysis of Capitalist Process". McGraw Hill Book Company.

Sengupta, A (2003) "Poverty eradication and Human Rights". *Paper presented at UNESCO Seminar.* September,2003

System of National Account (1993) "United Nation Statistics Division". Accessed at *unistats.un.org/unsd/national account/docs/1993.*
Tan, B and Tang, C (2011) "The dynamic relationship between private domestic investment, the user cost of capital and economic growth in Malaysia".*Munich Personal REPEC Archive (MPRA) paper* No. 27964.
United Nations (1998) " Statement on poverty". United Nations Website accessed at *http:/www.un.org/esa/socda/unvin/documents/ydiDavidGordon poverty.pdf*
United Nations (2005) "United Nations World Summit 2005". 14-16 September, 2005.
United Nations Development Programme (UNDP) (1990) " Human development report 1991". New York. Oxford University.
World Bank (2005a) "Expanding opportunities and building competency for young people". *World Development Report*. World Bank Washington.
Yahie, M (2000) "Poverty reduction in Sub-Saharan Africa: Is there a role for the private sector?".*Economic research paper.* No 52, Africa Development Bank.

Appendix 1: Results of Individual countries Impulse Response Analysis

.	BENIN				CAMEROON				NIGERIA			
	Response of DLPRINV to:				Response of DLPRINV to:				Response of DLPRINV to:			
Periods	DLPRINV	DLPUBINV	DLRGDP	DLPCCEX	DLPRINV	DLPUBINV	DLRGDP	DLPCCEX	DLPRINV	DLPUBINV	DLRGDP	DLPCCEX
1	0.022614	0.000000	0.000000	0.000000	0.026750	0.000000	0.000000	0.000000	0.192187	0.000000	0.000000	0.000000
4	0.013402	-0.002840	0.004342	0.002528	0.010977	-0.005977	0.003734	-0.004719	0.063877	-0.009041	0.002098	-0.053813
8	0.010292	-0.003739	0.004092	0.006221	0.006024	-0.008251	0.006200	-0.005132	0.007831	0.023338	0.008672	0.001589
12	0.012660	-0.003147	0.004169	0.005704	0.005428	-0.008525	0.006496	-0.005183	0.014473	0.005635	0.004420	-0.020216
16	0.012112	-0.003300	0.004154	0.005425	0.005356	-0.008558	0.006531	-0.005190	0.031001	0.011240	0.002904	-0.014662
20	0.012054	-0.003307	0.004153	0.005584	0.005347	-0.008562	0.006535	-0.005190	0.023814	0.010964	0.005740	-0.010537
	Response of DLRGDP to:				Response of DLRGDP to:				Response of DLRGDP to:			
Periods	DLPRINV	DLPUBINV	DLRGDP	DLPCCEX	DLPRINV	DLPUBINV	DLRGDP	DLPCCEX	DLPRINV	DLPUBINV	DLRGDP	DLPCCEX
1	0.000951	0.001221	0.002198	0.000000	-0.00158	0.000146	0.003785	0.000000	0.000793	-0.000934	0.003166	0.000000
4	0.001369	0.000714	0.001575	-0.001710	-0.00152	8.65E-05	0.003847	4.97E-05	0.000817	-0.001521	0.002442	-0.000888
8	0.000881	0.000654	0.001542	-0.002016	-0.00156	6.48E-05	0.003870	4.57E-05	0.001886	-0.002103	0.001919	-0.000862
12	0.000767	0.000629	0.001538	-0.001831	-0.00157	6.22E-05	0.003873	4.52E-05	0.001602	-0.001241	0.001637	-0.000358
16	0.000785	0.000636	0.001539	-0.001852	-0.00157	6.19E-05	0.003873	4.52E-05	0.001274	-0.001661	0.002046	-0.000703
20	0.000844	0.000647	0.001540	-0.001868	-0.00157	6.18E-05	0.003873	4.52E-05	0.001435	-0.001575	0.001809	-0.000625
	Response of DLPCCEX to:				Response of DLPCCEX to:				Response of DLPCCEX to:			
Periods	DLPRINV	DLPUBINV	DLRGDP	DLPCCEX	DLPRINV	DLPUBINV	DLRGDP	DLPCCEX	DLPRINV	DLPUBINV	DLRGDP	DLPCCEX
1	0.000218	-0.000788	-0.00151	0.007018	-0.00353	-0.000111	0.002284	0.008583	-0.00618	-0.001110	0.036273	0.071977
4	0.012261	0.003534	0.000566	0.015783	-0.00630	-0.001462	0.003103	0.007731	-0.02225	-0.005037	0.041094	0.031068
8	0.016262	0.004173	0.000607	0.012048	-0.00743	-0.001983	0.003668	0.007636	-0.03520	-0.004786	0.024234	0.022106
12	0.014158	0.003646	0.000563	0.012099	-0.00757	-0.002046	0.003736	0.007625	-0.02328	-0.001970	0.026428	0.022670
16	0.014439	0.003735	0.000570	0.012460	-0.00758	-0.002053	0.003744	0.007623	-0.02553	-0.005548	0.028408	0.023972
20	0.014569	0.003762	0.000573	0.012328	-0.00759	-0.002054	0.003745	0.007623	-0.02581	-0.002918	0.026239	0.023775

Appendix 2: Results of forecast error variance decomposition for Benin.

Variance Decomposition of DLPRINV :

Period	S.E.	DLPRINV	DLPUBINV	DLRGDP	DLPCCEX
1	0.022614	100.0000	0.000000	0.000000	0.000000
4	0.038767	95.91882	0.587717	2.730108	0.763352
8	0.046184	86.09414	3.297433	5.192121	5.416307
12	0.054600	81.34241	3.790970	6.027688	8.838933
16	0.061812	79.44207	4.056262	6.514376	9.987296
20	0.068082	77.96821	4.292647	6.857368	10.88178

Variance Decomposition of DLRGDP:

Period	S.E.	DLPRINV	DLPUBINV	DLRGDP	DLPCCEX
1	0.002689	12.52173	20.62474	66.85353	0.000000
4	0.005165	19.53818	11.49815	50.88634	18.07733
8	0.007718	17.65823	8.571052	38.58375	35.18697
12	0.009330	14.64967	7.637138	37.28215	40.43104
16	0.010706	13.62114	7.267809	36.59452	42.51652
20	0.011945	12.99000	7.021427	36.05319	43.93538

Variance Decomposition of DLPCCEX:

Period	S.E.	DLPRINV	DLPUBINV	DLRGDP	DLPCCEXB
1	0.007225	0.090954	1.190213	4.375637	94.34320
4	0.031068	25.56406	2.448365	0.306331	71.68125
8	0.052686	45.63135	3.343244	0.166671	50.85873
12	0.065372	50.12189	3.521882	0.139223	46.21700
16	0.075877	51.32091	3.557794	0.125562	44.99573
20	0.085302	52.27104	3.593743	0.117393	44.01783

Cholesky Ordering: DLPRINV DLPUBINV_BENIN DLRGDP_BENINDLPCCEX_BENI

Apendix3: Results of forecast error variance decomposition for Cameroon.

Variance Decomposition of DLPRINV:

Period	S.E.	DLPRINV	DLPUBINV	DLRGDP	DLPCCEX
1	0.026750	100.0000	0.000000	0.000000	0.000000
4	0.040792	92.44931	3.254449	1.093680	3.202562
8	0.048398	74.50015	12.60288	6.284985	6.611985
12	0.055000	61.77658	19.23213	10.33417	8.657112
16	0.060916	53.47091	23.55877	13.01142	9.958906
20	0.066310	47.72961	26.54947	14.86548	10.85544

Variance Decomposition of DLRGDP:

Period	S.E.	DLPRINV	DLPUBINV	DLRGDP	DLPCCEX
1	0.004108	14.95252	0.125990	84.92149	0.000000
4	0.008239	13.57144	0.073139	86.33919	0.016240
8	0.011720	13.77650	0.050267	86.15889	0.014348
12	0.014397	13.90558	0.040914	86.04003	0.013478
16	0.016650	13.97514	0.036126	85.97571	0.013025
20	0.018633	14.01721	0.033252	85.93678	0.012752

Variance Decomposition of DLPCCEX:

Period	S.E.	DLPRINV	DLPUBINV	DLRGDP	DLPCCEX
1	0.009559	13.65943	0.013446	5.710687	80.61644
4	0.019661	25.09263	0.893942	6.842468	67.17096
8	0.029869	34.04672	1.957225	8.601831	55.39422
12	0.037740	37.30344	2.385428	9.276166	51.03497
16	0.044270	38.85532	2.592717	9.599808	48.95216
20	0.049957	39.74733	2.712166	9.786046	47.75446

Cholesky Ordering: DLPRINV_CAM DLPUBINV_CAM DLRGDP _CAM DLPCCEX_CAM

Apendix4: Results of forecast error variance decomposition for Nigeria.

Variance Decomposition of DLPRINV:

Period	S.E.	DLPRINV	DLPUBINV	DLRGDP	DPCCEXG
1	0.192187	100.0000	0.000000	0.000000	0.000000
4	0.257783	91.92689	0.338838	0.030029	7.704241
8	0.269289	84.38873	5.076020	0.316829	10.21842
12	0.277476	80.85065	5.120521	1.277588	12.75125
16	0.284504	80.23977	5.255362	1.239099	13.26577
20	0.291820	79.66943	5.725717	1.251431	13.35342

Variance Decomposition of DLRGDP:

Period	S.E.	DLPRINV	DLPUBINV	DLRGDP	DPCCEX
1	0.003395	5.450050	7.565070	86.98488	0.000000
4	0.006533	4.793499	15.80345	75.40602	3.997032
8	0.009809	16.05869	29.00839	48.47733	6.455593
12	0.010995	20.84210	27.67851	45.42860	6.050794
16	0.012670	20.67745	27.60501	46.44913	5.268412
20	0.013903	21.12826	28.39833	44.96262	5.510792

Variance Decomposition of DPCCEX:

Period	S.E.	DLPRINV	DLPUBINV	DLRGDP	DPCCEX
1	0.080845	0.584593	0.018857	20.13094	79.26561
4	0.127900	6.127379	0.216143	36.74007	56.91641
8	0.156648	20.11163	0.780267	35.35452	43.75359
12	0.181629	25.41093	0.595352	34.24079	39.75293
16	0.202350	25.90973	0.856253	35.92351	37.31051
20	0.220264	27.37758	0.808967	35.77940	36.03405

Cholesky Ordering: DLPRINV_NIG DLPUBINV_NIG DLRGDP_NIG DPCCEX_NIG

Biography

First Author

The author , Adeleke Gabriel, Aremo (PhD), is from Nigeria. He is a lecturer and senior research fellow in the department of Economics, Obafemi Awolowo University, Ile-Ife, Nigeria. He joined Nigeria Economics Society (NES) in 2005 and African Econometrics Society (AES) in 2013. His areas of specialisation include: Human Resource Development, Labour Economics and Applied Econometrics. He holds a PhD degree in Economics from Obafemi Awolowo University, Ile-Ife, Nigeria. He is a reviewer of both national and international Journals. He consults for both national and international organizations in his areas of specialisation.

Second Author

The Author, Monica A. Orisadare (PhD) is a Lecturer and Senior Research Fellow in the Department of Economics, Obafemi Awolowo University, Ile-Ife, Nigeria; she also consults for International and Non Governmental Organisations in her area of specialisation. Her areas of specialization are; Development Economics, Gender and Public Finance. She holds a B.Sc (Economics)- 1997, M.Sc Economics – 2004, PhD Economics- 2012 from Obafemi Awolowo University, Ile-Ife, Nigeria and a Certificate in E-learning Design and Facilitation – 2015 from the Open Polytechnic, New Zealand. She became member of Nigerian Economics Society (NES) - 2009, Organisation for Women in Science for Developing World (OWSDW) - 2012, African Econometric Society (AES) – 2013, International Association of Feminist Economics (IAFFE)-2013 and Association for the Advancement of African Women Economists (AAAWE) - 2015.

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:
http://www.iiste.org

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: http://www.iiste.org/journals/ All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: http://www.iiste.org/book/

Academic conference: http://www.iiste.org/conference/upcoming-conferences-call-for-paper/

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar