Corruption and Challenges of Sustainable Inclusive Growth in Nigeria

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Abstract:
The paper examines Corruption and Challenges of Sustainable Inclusive Growth in Nigeria. The paper adopts the theory of two publics as its framework of analysis. The theory explains the prevalence of corruption between and among public servants in Nigeria, which affects the attainment of sustainable inclusive growth. Corruption in Nigeria is caused by lack of accountability, transparency and good governance; poor leadership; monopolization of power by government officials; the utilization of discretionary powers by politicians and bureaucrats over the formulation and implementation of the rules and regulations and allocations of projects. Using system equation ordered by variables the paper revealed an indirect link between corruption and poverty and a significant negative impact on the attainment of inclusive growth in Nigeria. The test of causality using Wald test also revealed that there is a unidirectional causality running from corruption to inclusive growth. The paper therefore, argues that corruption challenges the attainment of sustainable inclusive growth in the country both in the short run and long run. This is because it drains and cripples the available national income for productive activities; discourages savings habit and increases debt burden in the country; hinders the Nigerian state to allocate resources for distributive purposes among the constituent units thereby; intensifies level of inequality and abject poverty; generates infrastructural and social services decay; and a general decline in the living standard of the ordinary Nigerian citizens.

Key Words: Corruption, inclusive growth, System equation, Nigeria

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1.0: Introduction

The challenges of development in the third world nations could be attributed to Personal Rule theory (Jackson and Roseberg, 1982; and Sandbrook, 1985). The theory states that the personalization of state by a leader impedes national development because his personal interest overrides national interest. The phenomenon motivates the leader to employ dubious mechanisms in all its ramifications to consolidate power and perpetuate political aggrandizement thus clashes with developmental objectives of the states. Besides, political decision makers use state and its organs as avenues for misappropriating the available resources at the detriment of the ordinary Nigerian citizens. This arrests development potentials since corruption hinders efficient allocation of resources for the attainment of inclusive growth.

Corruption and mismanagement of resources contribute greatly to the challenges of development in the third world nations (IMF, 1989; and World Bank, 1989). Bangura (1989) contended with internal factors as advanced by the IMF and the World Bank to be responsible for the crisis of development in the third world nations however, he considered the factors as secondary. For instance, Bangura (1989) identified the implications of mismanagement and corruption on the crisis of development as contributory rather than causative. He also argued that the crisis of development in the post-colonial states could largely be attributed to the contradictions created by the advanced capitalist world. This motivated Olukoshi (1989) to argue that the crisis: could be traced to the contradictions inherent in the pattern of development, namely dependent capitalism, pursued by most African countries. Even in the absence of corruption and mismanagement, it could not have been possible to manage African economies in such a way as to permanently avoid crisis because inherent in the capitalist system are seeds of periodic, structural and conjectural crisis (Olukoshi, 1989:23).

The prevalence of abject poverty in the global south could be attributed to globalization. Globalization advocates for free market economy, minimal state intervention in the management of the economy, economic interchange across national boundaries and adoption of liberal democracy in global politics. The wave of globalization was influenced by the failure of the IMF and the World Bank in the 1970s to regulate exchange rates. This affected stability in the international economic relations. The problem necessitated the Bretton Woods institutions to impose adjustment programmes as conditionalities for external loan facility. The conditionalities are privatization, devaluation, deregulation, trade liberalization and liberal democracy. Nigeria, a country confronted by economic crisis requires external financing thus, adopted the programmes. These programmes had brought unfavourable exchange rates and terms of trade; intensified corruption, poverty, debt crisis, unemployment, inequality and falling standard of the ordinary citizens; and eroded the political sovereignty of Nigeria. These hinder the attainment of transparency, accountability and good governance.

To contain the menace of abject poverty, unemployment and inequality, the institutions for global governance and administration as well as development partners encourage and motivate the governments of developing states to implement sustainable development agenda via the attainment of inclusive growth. Therefore, this paper examines how corruption challenges the attainment of inclusive growth in Nigeria.

2.1: Corruption and Inclusive Growth: What Works, Works not and why?

Correlation exists between corruption and economic growth because payments of bribes to bureaucrats motivate them to hasten approval of projects, contracts and disbursement of resources (Egunjobi, 2013). Advocates of the school believe that corruption reintroduces efficiency in the bureaucracy that was hitherto jeopardized by poor leadership and insufficient remuneration henceforth influences economic growth (Acemoglu and Verdier, 1998; Friendrich, 1972; Huntington, 1968; and Nye, 1967). They believed that bribery induces efficient allocation of resources, provision of social services and reduces bureaucratic redtapism. Leff (1964) and Huntington (1968) extended their arguments linking the dynamics of corruption and it effect on eliminating rigidities imposed by the government thus impacts positively on investment in the economy.

Impliedly, corruption serves as a morale booster that eliminates administrative bottlenecks and promotes growth in the economy. Similarly, a correlation exists between economic growth and incidence of corruption. The productivity theory of corruption argues that wise investment of the proceeds of corruption could contribute to rapid economic growth (Aluko, 2008). For instance, in 1962, a State Governor in the US took bribe of $8 million invested it and over 5000 people were employed (Sam Aluko, 2008). However, ethical economists are against developing an economy with iniquity.

The second school of thought argues that corruption militates against economic growth (Aliyu and Elijah, 2008; Gould and Amaro-Reynes, 1983; Krueger, 1974; Mauro, 1995; McMullan, 1961; Myrdal, 1968; Shleifer and Vishny, 1993; Tanzi, 1998, Tanzi and Davoodi, 1997; and United Nations, 1989). They believed that corruption hinders economic growth, distorts free market operation and prevents efficient and sufficient allocation of resources. Egunjobi (2013) adds that corruption is more pronounced in sectors that could not easily be detected and perceived. The argument downplays relevance of critical sectors ie education and health that seem to be glaring to all and sundry. Although, corruption increases the size and scope of public investment, equally reduces productivity since public officials compromise tax collection and alikes at the detriment of national interest.

Study conducted by Mauro (1995) on the effect of corruption on growth of per capital GDP that covered six countries between 1960 and 1985 discovered that, decrease in one standard deviation in the corruption index led to the increase of 0.8 percent of the annual per capital GDP growth rate. In a related study Mauro (1997) argued that corruption increased the allocations of public investment above the required resources. This motivated Akai et al (2005) to quantify the extent to which project allocations were inflated with a view to misappropriating the resources. The attitudes inform the relative injustice and untrust among public officials which demonstrate lack of adherence to ethical code of conduct. This correlates with the earlier arguments presented by Gould and Amaro-Reynes (1983), United Nations (1989), Mauro (1995; 1997), and Tanzi and Davoodi (1997) where bureaucrats diverted public resources to sectors that bribes could easily be collected and misappropriated thus undermining productivity at the detriment of the social values.

The effects of corruption on direct and indirect growth was carried out between 1970 and 1985 by Mo (2001) using the long term growth rates of per capita GDP and analyzed the rates through investment, human capital and political stability variables. He submitted that in an indirect effect, a unit increase in the corruption index reduces per capital growth rate by about 0.545 percent. However, in direct effect the author argued that it was insignificant

when Ordinary Least Squares (OLS) and two-stage Least Squares (2SLS) were employed and estimated. It became noticeable when the investment, human capital and political instability are controlled by the government.

Using a panel and cross-sectional data for twenty-five countries Abed and Davoodi (2002) investigated the effect of corruption on transitional economies between 1994 and 1998. Their investigations discovered that economic growth was directly related to the lower rate of corruption in both the panel and cross-sectional regression estimated. They argued that the level of corruption index was only one percent significant. Although, study conducted by Pellegrini and Gerlagh (2004) discovered negative effect of corruption on economic growth, coefficients of 2SLS regression model were insignificant. Despite this, Rock and Bonett (2004) averred that significant correlation exists between corruption and economic growth in the newly industrialized economies of East Asia ie China, Indonesia, Thailand and Korea. Therefore, concluded that corruption promotes economic growth in these countries.

In exploring the relationship between corruption and economic growth from 1986 to 2007 Aliyu and Elijah (2008) adopted Barro-type endogenous growth model and employed Engle – Granger (1987) co-integration and Error Correlation Mechanism (ECM) techniques and analyzed the variables of government capital expenditure, human capital development and total volume of employment. The outcome confirmed that corruption has negative effect on growth. Additionally, corruption exerts negative effect on human capital and total employment but impacts positively on government expenditure. The development was not unconnected with inflated public expenditure geared towards misappropriating certain percentage of the resources.

Pellegrini and Gertagh (2004) centered their arguments on indirect transmission channel of investment, trade policy, schooling and political stability. Results showed that one standard deviation increase in the corruption index was associated with a decrease in the investment potentials of 2.46 percent resulting to the increase in economic growth by only 0.34 percent per annum. Similarly, a standard deviation increase in the corruption index was associated with a decrease in the growth index by 0.19 percent thus a decrease in economic growth by 0.30 percent per annum. The phenomenon motivated Pellegrini and Gertagh (2004) to conclude that the combination of the effects of the transmission channels showed 8 percent effect of corruption on growth.

The magnitude of corruption in a state is determined by the prevailing economic status (Egunjobi, 2013). The argument was earlier raised and confirmed by Shleifer and Vishny (1993) and Ali and Isse (2003) when they averred that where the economic situation of a country is poor there is high tendency for the prevalence of high corruption perception index. Conversely, they found out that a country with good macroeconomic performance has greater tendency to experience low manifestation of corruption. By implication, the country acquires the potentials of achieving economic growth and development. Besides, it is assumed that manifestation of corrupt practices is directly related to economic stagnation and miscarriage of opportunity. The observation was concord by Lipset and Lenz (2000) when they argued that hindrance to opportunity via growth as envisaged by the state could be justified on the pretext of race, parochial, ethnic sentiment and chauvinism, and lack of physical and human resources. Furthermore, they believed that where cultural values promote achievements and goal realization but deny access to propensity of opportunities high degree of corruption prevails.

The crowding-out effect of corruption was explored by Adewale (2001) from 1996 to 2009 in Nigeria, when he adopted and employed simulation approach and Error Correlation Mechanism (ECM) to address the problem of spurious regression. In addition, he employed the Augmented Dickey-Fuller (ADF) test to ensure the degree of stationary of the variables and co-integration of the properties of the data. The author found out that there exist a significant relationship between corruption and economic growth. Similarly, Ordinary Least Squares Technique was employed by Fabayo et al (2011) to investigate the effect of corruption on investment in Nigeria. Annual corruption perception index was adopted between 1996 and 2000 and discovered that Nigeria was ranked in the low index which indicates high level of corruption in the country. Therefore, results to low investment potentials and steady economic growth. A robust study on corruption and economic growth was associated with Akindele (2005) where production function that involved the variables of labour, capital and political stability were conducted. Results showed that corruption has negative relationship with economic growth and retarded and arrested growth potentials.

2.2 Inclusive Growth: Does poverty reduction, equality of opportunity and employment generation lend Credence?

The Organization for Economic Cooperation and Development (2013b) defines inclusive growth as a situation: Where the gap between the rich and the poor is less pronounced and the "growth dividend" is shared in a fair way that results in improvements in living standards and outcomes that matter for people's quality of life (eg good health, jobs and skills, clean environment, community support).

For World Bank (2009) inclusive growth refers to: Growth that I sufficient to lift large numbers out of poverty and growth that includes the largest part of the country's force in the economy The international Policy Centre for Inclusive Growth (IPC-IG) conceptualizes inclusive growth by giving more prominence to active participation of citizens in the economy. Thus: Places its emphasis on participation so that in addition to shairing in the benefits of growth, people actively participate in the wealth process and have a say in the orientation of that process (Ramos and Ranieri, 2013).

Inclusive growth from the perspective of African Development Bank refers to: tackling discrimination of the most marginalized groups is an intrinsic part of the inclusive growth process as well as key outcome. Groups that have suffered discrimination are those that have been left behind in poverty reduction and economic development, efforts-helping these groups to participate in and benefit from economic activities is a cornerstone of inclusive growth (Klusen, 2010).

The G20 as part of its commitment to include inclusive growth in the Post-2015 development agenda recognizes that: Too many of our citizens have yet to participate in the economic global recovery that is underway. The G20 must strive not only for strong, sustainable and balanced growth, but also for a more inclusive pattern of growth that will better mobilize the talent of our populations (G20, 2013).

The need to speed the rate of achieving inclusive growth in the international economies has become the agenda for institutions for global governance and administration as well as governments of many developing states. Despite this, variations in defining the concept pose a serious challenge to its actualization. For instance, the African Development Bank argues that some of these concepts are vague and do not lend themselves to easy quantitative

operationalizations, whilst others are quite specific but do not capture the essence of the concept. Moreover, the World Bank, the Organization for Economic Cooperation and Development (OECD), the United Nations Development Programme (UNDP) and the academia have all provided a range of policy documents on closely related concepts eg pro-poor growth and equal opportunity (Klasen, 2010).

The extent to which a state reduces the level of poverty that bedevils its citizens is a function of effective policy making and evaluative mechanisms. Therefore, democratic ideals under democratic government ought to have a stable and dynamic policy framework that could not only alleviate poverty but also eradicate it on the political and economic map of a state. However, World Bank (2000) argued that not all growth potentials could reduce poverty despite the efforts that are being made by international donor agencies in developing countries. The argument motivated Ortiz and Cummins (2011) to argue that over 1.2 billion people across the global were living on less than $1.25 per day and the figure was equivalent to 24% of the world population.

In an argument raised by Ravallion (2013) and confirmed by World Bank (2013b) that between 1990 and 2010 the level of poverty across the globe was reduced by one half. This inspired confidence among the development partners that eradicating abject poverty could be achieved in the next generation. However, study conducted by Chandy et al (2013) presented a counteractive position because it becomes very difficult to reduce poverty or get it to zero level since the composition of some people have been replaced by fragile states or suffer discrimination and social exclusion. Therefore, the success of eradicating poverty depends upon the benefits to be derived from inclusive growth. Indeed, Ortiz and Cummins (2011) had earlier argued that failure by the states to change their growth potentials and pattern of distribution via inclusive growth could make the world population of billion people to spend 800 years before they could achieve 10% of global income.

Macroeconomic stability and economic openness are central to achieving growth and development (CAFOD, 2014). This position has its genesis from the strategies envisaged by the growth theories and development schema. Therefore, the clarion call for sustainable development by the development partners, international financial institutions and their affiliates motivated and widen the scope of growth and development strategies to cover issues not only poverty, unemployment and inequality but also social protection, investment in human capital, strong institutions, progressive tax policies and non-discrimination, social inclusion and participation (EU Green Paper, 2010 and G20, 2012).

The Organization for Economic Co-operation and Development (2012) identifies three major challenges of growth that requires urgent global attention ie abject and extreme poverty, unemployment and inequality. OECD argues that in recent years the implementation of growth and development agenda had not been achieved because the benefits have not cut across all the groups. It further argues that the phenomenon has only intensified widening inequality among the marginalized groups. This conclusion motivated CAFOD (2014) to quantify the inequality believing that: Today, the gap between the rich and poor is widening almost everywhere. Earlier on, the debate was already presented by OECD (2012b) when it reported that within the spectrum of OECD countries only the scenario reads that: It is the widest in 30 years.

To quantify the level of inequality Oxfam (2014) reported that the rich 85 people across the globe own the amount of resources as the bottom of 3.5 billion populations. This demonstrates the intensity of inequality and calls for redesigning strategies to achieve inclusive growth. Indeed, the increasing prevalence and manifestation of inequality has been a serious challenge to match for meeting sustainable growth and inclusive growth.

Inequality becomes a major challenge to match for the attainment of inclusive growth not only for the emerging markets and developing countries but also among the advanced capitalist world (Dabla-Norris et al, 2015). The intensity of the widening inequality across the globe has received considerable attention amidst development partners. President Barrack Obama quantifies the widening income inequality as the "the defining challenge of our time". A survey carried out by Pew Research Centre discovered that the gap between the rich and the poor has become a serious challenge to more than 60 percent of the respondents worldwide (PRC, 2014). Additionally, Pope Francis was unsupportive of the prevailing economy of inclusion across the globalized world (Dabla-Norris, 2015). Therefore, inclusive growth becomes relevant in contemporary match to attainment of sustainable development. Equality has been a crucial component of an ideal society irrespective of differences in ideological orientation, cultural upbringing, religious denomination and inclination. The wave of globalization and its forces have permeated many nation-states and become a contributory factor for the spread of inequality. The dynamics of inequality reflects lack of income and opportunity (Dabla-Norris, 2015).

3.0: Methodology

3.1: Sources of Data

Annual time series data covering the period 1981-2014 was employed for the study. The data was sourced from various sources that have been publicly acknowledged. These are Transparently International, Central Bank of Nigeria and the World Bank. Due to paucity of data, the corruption perception index (CPI) from 1981 to 1993 was obtained by a backward 3-year moving average. This is in line with the theory of rational expectation hypothesis which state that "expectations are rational in the sense that expectations and events differ only by a random forecast error"...., Muth, (1961), cited by Jhingan, 2010:638).

3.2: Model Specification and Estimation Procedure

To estimate the impact of corruption on the attainment of inclusive growth, a system of equations order by variable were estimated through VECM to analysis the impact of corruption on inclusive growth objective. Marxist School of thought argued that corruption is determined primarily by the prevailing social relations of production; that is the mode of production of material life conditions the social, political and intellectual life process in general (Marx, 1847). In a production relation where the people in government and political offices constitute a cabal that controls the national resources, live above the law and are 'first among equals'. The rest of the citizens are left to die in abject poverty. Therefore, the Marxist Perspective clearly identifies a key consequence of corruption as poverty. In line with Marxist theory and other extant literatures that corruption impacts on the attainment of inclusive growth, a multiple regression equation is specified below (Anoruo and Braha, 2005; Mustapha, Kilishi, and Akanbi, 2015).

$$COR = \alpha_0 + \alpha_1 INCG + \alpha_2 RL + \alpha_3 DD + \alpha_4 FDI + \alpha_5 POV + \alpha_6 RGDP_P + \varepsilon_t \ldots\ldots 1$$

Where

COR= corruption
RL = Rule of law
UNEM= Unemployment rate
POV= Poverty level
FDI= Foreign Direct Investment
ε_t. = A white noise error term assumed to be normally and identically distributed.

Apriori, we expect a negative relationship between all the independents variables and the depended variable.

3.3: Measurement of Variables

In the literature, corruption could be of different dimensions depending on the depth and sector involved. Therefore, for this study corruption was proxy by Corruption Perception Index (CPI) sourced from Transparency International and has been widely used in empirical works this inclusive (Mustapha, Kilishi, and Akanbi, 2015). The concept of inclusive on the other hand is relatively new in growth literatures and this explains its difficulty in measurement. According to Anand, et, al., (2013) inclusive growth can be termed to consists of two parts; rate of growth in income (growth in GDP per capita) and (b) change in income distribution using change in Gini coefficient (or equity index). In line with the above, researchers (see Anand, et, al., 2013; Aoyagi and Ganelli, 2015) have developed an equation that combines growth in income and equity into an index of inclusive growth as

$$\frac{dy^*}{y^*_t} = \frac{dy}{y} + \frac{dw}{w} \text{.....(2)}$$

Where $\frac{dy^*}{y^*}$ is the inclusive growth (INCG) and $\frac{dy}{y}$ and $\frac{dw}{w}$ represent the change income per capita and change in equity (Gini coefficient) over time

As earlier mentioned inclusive growth is multidimensional in nature and encompasses not only growth in income equity, but also other indicators that aid inclusiveness and equity like: declining rate of unemployment, poverty and equality of access among others. In view of this, inclusive growth is captured both in it aggregated (INCG) and disaggregated term as poverty level (POV), rule of law (RL) and growth in income (RGDP). Poverty rate (POV) as an indicator of inclusive growth was proxy by Per Capital private consumption expenditure (PPCE). The PPCE reflects well-being over some period. It is argued that consumption expenditure reflects not only the affordability of the household based on its current income but also ability to access credit market or resort to savings to smoothen consumption (Quartey, 2005; Sin-Yu Ho and Odhiambo, 2011). It is calculated as private consumption expenditure divided by the total population. Apriori, the more endemic corruption becomes, the more the manifestation of abject poverty therefore, there is the need to ensure equality of access to economic resources thereby opening opportunities for all and sundry in the path to attainment of inclusive growth. Thus, in this study equality of access was proxy by quality of rule of law (RL) measured by Law and Order sourced from international Country Risk Guide (ICRG). In the same vein, Real Gross Domestic Product (RGDP) was used as a proxy for growth in income and expected to be negatively related to corruption. As control variables, rate of Foreign Direct Investment (FDI), and total domestic debt were introduced. It is

expected that FDI should be negatively related to corruption, while total debt are expected to be a positive function of corruption.

3.4: Estimation Procedure

Estimation of equation (1) commenced with examination of the stochastic properties of the time series data used in order to avoid spurious regression. This was carried out by conducting a unit root test using Augmented Dickey Fuller (ADF) and Philips-Perron (PP). The test for the long run relationships among the variables are carried out following Johansen (1988) methodology. The choice of the Johansen Cointegration test is based on its superiority over the Engle-Granger methodology because the latter is unsuitable for more than two variables and does not report more than one cointegrating vector. . If the Johansen-Juselious suggest the existence of long run relationship we develop an error correction model in VECM environment as shown in equation (4-10).

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$$\Delta INCG_t = \sum \alpha_i \Delta COR_{t-i} + \sum \beta_i RL_{t-1} + \sum \delta_i \Delta FDI_{t-i} + \sum \gamma_i DD_{t-1} + \eta \sum \alpha_i \Delta POV_{t-i} + \sum \lambda RGDP_{t-1} + Z_1^* ect_{t-i} + \varepsilon_i ...(4)$$

$$\Delta COR_t = \sum \theta_i \Delta INCG_{t-i} + \sum \beta_i RL_{t-1} + \sum \delta_i \Delta FDI_{t-i} + \sum \gamma_i DD_{t-1} + \eta \sum \alpha_i \Delta POV_{t-i} + \sum \lambda RGDP_{t-1} + Z_1^* ect_{t-i} + \varepsilon_i ...(5)$$

$$\Delta RL_t = \sum \theta_i \Delta INCG_{t-i} + \sum \alpha_i COR_{t-1} + \sum \delta_i \Delta FDI_{t-i} + \sum \gamma_i DD_{t-1} + \eta \sum \alpha_i \Delta POV_{t-i} + \sum \lambda RGDP_{t-1} + Z_1^* ect_{t-i} + \varepsilon_i ...(6)$$

$$\Delta FDI_t = \sum \theta_i \Delta INCG_{t-i} + \sum \alpha_i COR_{t-1} + \sum \delta_i \Delta FDI_{t-i} + \sum \gamma_i DD_{t-1} + \eta \sum \alpha_i \Delta POV_{t-i} + \sum \lambda RGDP_{t-1} + Z_1^* ect_{t-i} + \varepsilon_i ...(7)$$

$$\Delta DD_t = \sum \theta_i \Delta INCG_{t-i} + \sum \alpha_i COR_{t-1} + \sum \delta_i \Delta FDI_{t-i} \beta_i RL_{t-1} + \sum \delta_i FDI_{t-1} + \eta \sum \alpha_i \Delta POV_{t-i} + \sum \lambda RGDP_{t-1} + Z_1^* ect_{t-i} + \varepsilon_i ...(8)$$

$$\Delta POV_t = \sum \theta_i \Delta INCG_{t-i} + \sum \alpha_i COR_{t-1} + \sum \delta_i \Delta FDI_{t-i} \beta_i RL_{t-1} + \sum \delta_i FDI_{t-1} + \sum \gamma_i \Delta DD_{t-i} + \sum \lambda RGDP_{t-1} + Z_1^* ect_{t-i} + \varepsilon_i ...(9)$$

$$\Delta RGDP_t = \sum \theta_i \Delta INCG_{t-i} + \sum \alpha_i COR_{t-1} + \sum \delta_i \Delta FDI_{t-i} + \beta_i RL_{t-1} + \sum \delta_i FDI_{t-1} + \eta \sum \gamma_i \Delta DD_{t-i} + \sum \alpha POV_{t-1} + Z_1^* ect_{t-i} + \varepsilon_i ...(10)$$

Where α and θ are the coefficients, and ε_i. is residuals. The ect_{t-i} is the lagged value of the cointegrating regression of equation (4) to (10).

The VECM model as shown in equations (4-10) will then be estimated out of which we now make a system equation order by variable to investigate the impact of corruption on inclusive growth indicators. If the α, the coefficient of corruption is found positive or negative and significant using the probability value in each of the equations, we conclude that corrupt

practices have positive or negative influence on our dependent variables as shown in equation (4) to (10) with the exclusion of equation (5).

4.0: Result and Discussion

4.1: Pre Estimation Test

The result of the unit root test is presented in table (I) below. From the test, the result of both Augmented Dicky Fuller and Philip Peron tests revealed that all the variables were stationary at first difference I(I) with exception of (FDI) and GFC that was only stationary at level with intercept and trend using ADF statistics. However, PP confirms that the variable is stationary at first difference. The study therefore concludes that the variables are integrated of order 1

Table 1: Unit root test results

	Level				Ist Difference				
Variables	PP†	ADF†	PP‡	ADF‡	PP†	ADF†	PP‡	ADF‡	Order of Integration
COR	-0.7651	-1.0507	-2.8878	-3.0099	-9.2167*	-7.6853*	-13.8260*	-7.6921*	1(1)
INCG	-2.853***	-2.3936	-2.8125	-2.3763	-7.0947*	-4.4718*	-6..6760*	-4.3934*	1(1)
RL	-1.6787	-2.2010	-1.5097	-2.0969	-3.4275**	-3.4785**	-3.3349***	-3.4853**	1(1)
RGDP	1.7606	-1.9170	**-1.8750**	-1.9981	-4.2328*	**3.3454***	-4.9203*	4.8124*	1(1)
POV	-1.6923	-1.1679	-3.4735	-3.1490	-7.7123*	-7.7627*	-8.2920*	-8.4167*	1(1)
FDI	-1.0025	0.5734	-4.7137*	-4.6623*	-11.1864*	11.2837*	-11.0037*	11.1014*	1(1)
DD	-1.5937	-1.7042	-1.4152	-1.1010	-4.3054*	-4.2354*	-4.3368*	-4.3303*	1(1)

ADF† and PP† = unit root tests with constant.

ADF‡ and PP‡ = unit root tests with constant and trend.

*,** and *** indicates statistical significance level at 1%, 5% and 10% respectively

Source: Author's Computation using E-view 9.1

The stationarity of the variables at the same order of integration supports the test for cointegration using Engle Granger methodology. To test for cointegration, the selection optimum lag order becomes necessary. For this study, minimum Schwarz Information Criteria (SIC) was used to determine the optimum lag and it's suggests optimum lag of one.

Table 2: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-33.20971	NA	2.91e-08	2.513107	2.833737	2.619387
1	136.0617	253.9071	1.71e-11	-5.003855	-2.438817*	-4.153618
2	212.5844	81.30535*	4.94e-12*	-6.724023*	-1.914577	-5.129828*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Using the optimum lag selected the result of the test of cointegration provides evidence for the existence of at least three cointegrating equations at 5% level of significance as shown in table (3)

Table 3. Johansen Cointegration Test Results

Hypothesized Null	Alternative	Eigenvalue	λ_{max}	5% critical value	λ_{trace}	5% critical value
r = 0	r ≥ 1	0.869259	65.10512*	46.2314	170.0686*	125.6154
r ≤ 1	r ≥ 2	0.628914	31.7223	40.0776	104.9634*	95.7537
r ≤ 2	r ≥ 3	0.587358	28.3256	33.8769	73.2411**	69.8189
r ≤ 3	r ≥ 4	0.491828	21.6619	27.5843	44.9155	47.8561
r ≤ 4	r ≥ 5	0.329324	12.7829	21.1316	23.2536	29.7971
r ≤ 5	r ≥ 6	0.197892	7.0564	14.2646	10.4706	15.4947
r ≤ 6	r ≥ 7	0.101200	3.4142	3.8415	3.4142	3.8415

r indicates the number of cointegrating vectors. *Indicates rejection of the null hypothesis at 5% level of significance.

Source: Authors' Computations using E-view 9.1

This allows the study to proceed with the test of Causality without fear of spurious regression. The study applied an error correction based on the Granger causality test to establish the flow of relationship between the variables in the model in both the short run and long run using Wald test. The results of the application of this technique is presented in table (4).below

TABLE 4. Granger Non-Causality Test Results

	Long Run Causality	**Short Run Causality**						
Dependent Variables	ϕ_{t-1}	$\sum_{i=1}^{q_1} \Delta INCG_{t-i}$	$\sum_{i=1}^{r_1} \Delta COR_{t-i}$	$\sum_{i=1}^{s_1} \Delta RL_{t-i}$	$\sum_{i=1}^{t_1} \Delta FDI_{t-i}$	$\sum_{i=1}^{u_1} \Delta DD_{t-i}$	$\sum_{i=1}^{v_1} \Delta POV_{t-i}$	$\sum_{i=1}^{v_1} \Delta RGDP_{t-i}$
ΔINCG [χ^2]	71.0351 (1)*		**4.663 (1)****	3.6265 (1)***	23.5058 (1)*	18.9109 (1)*	0.5846 (1)	36.6092 (1)*
Δ COR [χ^2]	14.136 (1)**	**0.02196 (1)**		**3.396 (1)*****	**0.3563 (1)**	**8.4129 (1)***	**1.4191 (1)**	**0.3421 (1)**
Δ RL [χ^2]	6.3957 (1)	4.6135 (1)**	**0.4743 (1)**		2.9512 (1)**	0.3704 (1)	1.7576 (1)	2.4009 (1)
Δ FDI[χ^2]	1.9594 (1)	0.1705 (1)	**0.0650 (1)**	0.0112 (1)		0.8232 (1)	0.0699 (1)	0.4897 (1)
Δ DD[χ^2]	18.9084 (1)*	2.777 (1)***	**9.7386 (1)***	1.8237 (1)	0.0035 (1)		9.2457 (1)*	2.7772 (1)
Δ POV [χ^2]	6.9076 (1)	0.8552 (1)	**1.7608 (1)**	0.0363 (1)	0.2575 (1)	0.8006 (1)		1.6174 (1)
Δ RGDP [χ^2]	7.1663 (1)	0.0579 (1)	**2.625 (1)*****	0.4344 (1)	2.769 (1)***	2.7174 (1)***	0.1692 (1)	

JB = 12.42727 (0.5720); ARCH [χ2, 1] = 460.7566(0.3284);
LM Stat @lag 1 = 35.3168 (0.9289)

Notes, **, and ** *denote statistical significance at 1%, 5% and 10% levels respectively. Figures in parenthesis indicates the number of degree of freedom .*

Source: Authors' Computations using E-view 9.1

From table (4) the test of causality between corruption and inclusive growth index (INCG) denotes a unidirectional causality running from corruption to inclusive growth at 5% level of significant in the short run. In general, all the endogenous variables cause INCG with the exception of poverty in the short run mostly at 1% level of significant. In addition, there is a long run causality running from all the variables to INCG going by probability value of overall causality in the inclusive growth index equation. This is not surprising because in an environment where rent-seeking behavior is endemic achievements of macroeconomic policy objectives of declining rate of unemployment, poverty, growth in income, declining gap of inequality that accumulate into growth that is inclusive remain futile. Thus, the behaviour of all the variables in the model determines the extent of the inclusiveness of growth in the long run. .

Looking at the result of equation (5) where we have corruption as depended variables, going by the chi-square probability value of 0.0654, a short run unidirectional causality flowing from rule of law to corruption. A further X-ray of the short run analysis of chain of causality shows that there is a feedback relationship between domestic debt (DD) and corruption (COR) at 1% level of significance, indicating that in Nigeria, domestic debt causes corruption and corruption also causes domestic debt. The above result implies rule of law and accumulation of debt have causal effects on the level of corruption. It is worthy to note that the high debt burden faced by the country might be because debt facilities as instruments of stabilizations serve as an avenue for rent seeking among the political office holders. In addition, the significance of the chi- square value of overall causality of the same equation confirms the existence of bi-directional causality between corruption and inclusive growth in the long run in Nigeria.

In the rule of law equation (equation 6) with the exception of INCG, FDI, and RGDP that granger cause rule of law (RL) in the shotr run, there is no either short run or long run causality running from all the other endogenous variables to rule of law. Thus the null hypothesis that rule of law does not Granger cause INCG, and INCG does not granger cause (RL) in the system is rejected at 10% level of significant, hence confirming a bidirectional causality between the two.

The FDI equation support the hypothesis that there is no causality running from all the other endogenous variables in the model to foreign direct investment either in the short run or in the long run. These results further confirm the existence of short and long run unidirectional causality running from FDI to rule of law, INCG, and RDGP. Economic implication of this result is that growth in income (RGDP), inclusive growth and effectiveness of rule of law are all functions of foreign direct investment. Further in the test of causality, the result revealed that poverty, corruption and INCG causes domestic debt both in the short run and long run going by the chi-square value of the endogenous variables and that of overall causality. This result confirmed a bidirectional relationship between domestic debt and corruption as well as between INCG and domestic debt (DD).

A unidirectional causality exists from FDI to corruption at the 5% level. This implies that the nature of foreign direct investment in Nigeria perpetuates corrupt practices. The result also reveals that causality flows from Growth to corruption at 1% level of significance. .

Moreover, there is no flow of Causality of whatever form between poverty and corruption while a unidirectional causality running from corruption, foreign direct investment, domestic debt and growth in income (RGDP) at 10% level of significant. This correlates with the findings of Umeh, Richard and Iyoboyi, (2013) and Egunjobi,(2013). It is apposite therefore, corruption of whatever dimension discourages investment in real sector due to it positive impacts on cost to businesses, encourage waste, and in most cases serves as avenue for leakages from the circular flow, most especially if it is not reinvested within the economy as in Nigeria case.

It is worth mentioning that although there is no direct causality of whatever form between corruption and poverty in the short run, but one could not rule out the possibility of an indirect causality between the two variables. For instance, a long run causality running from poverty to corruption could be confirmed from the result of corruption equation, while corruption causes growth in income (RGDP). The implication is that a corrupt economy would negatively influence growth objectives thereby causes poverty, while a poverty endemic environment could push an individual to collect bribes in order to survive. Therefore, the chain of transmission between poverty and corruption might be through growth in income.

4.2: Analysis and Discussion of OLS System Equation

The result of OLS system equation indicating the impacts of corruption on inclusive growth and other indicators from equations (4) through (10) are presented in Table (5). Starting with equation (4), the error correction term is significant at 1% and correctly signed. This implies about 14% of the deviation from equilibrium due to shock in from any of the varioables in the model is been restored. Looking at the impacts of corruption on inclusive growth index, the result reveals that corruption (COR) has negative impacts on the achievements of inclusive growth at 10% level of significant in line with our expected result. A 1% increase in the rate of corruption in the country will result into about 7% decline in the inclusiveness of economic growth in the country. From the result, the adjusted coefficient of determination (Adjusted R2) of 0.70 indicates that about 70% of the variation in the explanatory variables in Nigeria explains the level of INCG.

In equation (6) with quality of rule of law as dependent variable, the result portrays the relationship between corruption and the quality of rule of law to be negative. From the result, it could be concluded that corruption has a negative impact on the effectiveness of rule of law hence discourages equality of opportunities and widens the gap of inequality. This is not surprising in Nigeria where corruption has eaten deep into the fabrics of the social formation. Equation (7) provides support in favour of the negative impact of corruption on Foreign Direct Investment (FDI). The negative sign before the coefficient of (FDI) indicates that an increase in the level of corruption thus results into about 29% decline in the amount foreign direct investment, though the impact remains insignificant. The reason could be attributed to the fact that corruption increases cost of production and makes profit maximization objectively elusive hence, no private investor would be encouraged to invest his resources in such economy.

The coefficient of corruption in the FDI equation portrays an insignificant positive relationship in between the two against our expected result. This indicates that an increase in the level of corruption spurs foreign direct investments in Nigeria. This may not be out of

place because corruption creates the avenue for tax evasion and weakened efficiency of rule of law. This allows entrepreneurs with highest bribe giver to win a bid, bypass inefficient bureaucracies, maximize profit at the expense of the economy, which serves as a impetus for a private foreign investors. Domestic debt also exhibits a significant positive relationship with corruption as in equation (8). One should notes that an increasing rate of corruption distorts economic planning and hindered efficient allocation of scarce resources thereby encourages waste. Surprisingly not and correlates with apriori expectation, it is expected that as level of corruption worsened, debt rate increases about 21%. The estimated error-correction term (ECT) is negative, but statistically insignificant. This implies that there are no significant short-run effects of the explanatory variables on inclusive growth.

In the present study, corruption has negative impact on per capita private consumption of an individual used as proxy for level of poverty (POV). This situation implies a reduction in standard of living of average citizens, increases the level of poverty and by deduction widens the inequality gap. In a specific term, a unit increase in the level of corruption would worsen the level of poverty by 3%. Previous studies had also found a negative relationship between level of corruption and poverty rate. For instance, Shleifer and Vishny (1993) and Ali and Isse (2003) had provided results in support of the fact that, in a country where economic condition is poor there is tendency for such country to experience high level of corrupt practices.

Table IV: System Equation Result Using OLS

PENDENT VARIABLE	EQU (4) INCG	EQU (5) COR	EQU (6) RL	EQU (7) FDI	EQU (8) DD	EQU (9) POV	EQU (10) RGDP
ECM_{t-1}	**0.1437**	**-0.5988**	**0.5143**	**-0.7516**	**-0.1248**	**0.0469**	**0.1954**
	(0.0055)	**(0.0410)**	**(0.1032)**	**(0.1032)**	**(0.3663)**	**(0.7501)**	**(0.0004)**
INCG	0.0655	-0.0459	-1.9646	0.8815	0.4131	0.1879	0.01543
	(0.6494)	(0.9553)	(0.4963)	(0.4963)	(0.2888)	(0.6512)	(0.9199)
COR	**-0.0752**	0.0428	**-0.2295**	**0.297230**	**0.2098**	**-0.0369**	**-0.1027**
	(0.0876)	(0.8637)	**(0.4505)**	**(0.4505)**	**(0.0773)**	**(0.7700)**	**(0.0287)**
RL	0.02656	-0.2216	0.4854	-0.0124	0.1362	0.0156	0.04659
	(0.4410)	(0.2594)	(0.9679)	(0.9679)	(0.1441)	(0.8754)	(0.2047)
FDI	0.054167	0.147033	-0.2515	-0.4822	-0.0068	0.0255	0.0244
	(0.0072)	(0.1960)	(0.0077)	(0.0077)	(0.8990)	(0.6576)	(0.2515)
DD	0.0175	0.2358	0.3009	-0.2409	0.2659	-0.0676	-0.1488
	(0.8128)	(0.5754)	(0.7168)	(0.7168)	(0.1835)	(0.7511)	(0.0598)
POV	0.0879	0.5939	-0.7103	0.2922	0.4155	-0.5085	-0.0506
	(0.3004)	(0.2192)	(0.7011)	(0.7011)	(0.0704)	(0.0385)	(0.5743)
RGDP	-0.8301	0.8118	1.7422	0.7362	0.0172	0.7565	0.2116
	(0.0000)	(0.4082)	(0.6341)	(0.6341)	(0.9705)	(0.1286)	(0.2489)
R^2	0.70	0.34	0.47	0.48	0.35	0.25	0.48
ADJ R^2	0.59	0.11	0.29	0.30	0.12	-0.02	0.29
D.W	1.81	2.24	1.93	2.08	1.83	1.73	2.08

Notes*, **, and ** *denote statistical significance at 1%, 5% and 10% levels respectively. Figures in parenthesis indicates the probability Values.

Source: Authors' Computations using E-view 9.1

Finally, the coefficient of growth in income (RGDP) depicts a negative significant relationship between growth in income and level of corruption. This indicates that corruption has a declining impact on growth in income. This result gives further credence to the result of test of causality, which depicts that there is a unidirectional causality running from corruption to growth in income. The result provides evidence in support of earlier empirical findings of a dampening effect of corruption on growth in output by Egunjobi, (2013) and Mauro (1995) but refutes the empirical evidence of the earlier studies in support of those in the school of thought of "beneficial grease hypothesis". The hypothesis is based on the premise that corruption (most especially public sector corruption) acts like oil that greases and facilitates economic growth since it helps government officials to process project approval more efficient. It also ensures the efficiency of the price mechanism which allows entrepreneurs with highest bribe giver to win a bid, bypass inefficient bureaucracies, maximize output subject to given cost thereby produced at lowest cost of production. The present findings is against the earlier submission made by Huntington (1968), Friedrich (1972), Acemoglu and

Verdier (1998), that corruption facilitates efficiency in the economy and affects economic growth positively might not be out of place in an investment environment largely dominated by multinational companies, coupled high level of capital flight among corrupts public office holders.

4.3: Post Estimation Test

The diagnostic statistics are quite satisfactory. The Durbin-Watson (DW) Statistic for most of the equations are quite satisfactory ranging from 1.73 to 2.24 signifies absence of autocorrelation in the residuals. Also, the Jaque-Bera (JB) statistics of about 12.43 and its associated p-value of (0.5720) which is greater than 5% level of statistical significant shows the normality of the residuals of the estimated model, indicating that the residuals are normally distributed. The test of serial correlation LM test rejects the null hypothesis of the existence of serial correlation with LM-Stat value of 35.3168 and its associated p-value of (0.9289). The insignificants p-value of (0.3284) for VEC residual heteroskedacity test result accepts the null hypothesis of homoskedasticity and thereby ruling out the possibility of heteroskedacity.

5.0: Summary and Conclusion

The paper is an x-ray of the various ways corruption impact the achievement of an inclusive growth in Nigeria over a period of 1981 – 2014 using simple OLS techniques of estimation. Pre-estimation test were carried out which revealed that all the series in the model are stationary at 1(1) and there is existence of long run relationship among the variables in the model using Johansen Cointegration test. The study also employs the use of VAR Granger Causality test to determine the chain of transmission among the variables. At lag 1, the result shows that there is a unidirectional causality running from corruption to inclusive growth, rule of law, and growth in income. Also, a bidirectional relationship exists between corruption and domestic debt while there is no causality of whatever form between corruption and poverty proxy by private consumption expenditure. The result further shows that between corruption and the fotreign Direct investment (FDI) the relationship is independent. This implies that there could not be a direct link between corruption on the level of POV and FDI but through a transmission mechanism. The result of the regression equation provides evidences to support the existing school of thought that corruption decreases growth in output and worsened the achievement of an inclusive growth. The economic implication is that the way and manner government allocates its budget or planned its expenditure encourages corruption, influences growth in income negatively and widened inequality gap. This view is supported by the model result which assumes a positive sign in between domestic debt and FDI, and a negative sign between inclusive growth, Per capita Private Consumption Expenditure proxy for Poverty, rule of law, and growth in output. Overall, the above result supports the argument that corruption has damaging impact on the attainment of inclusive growth. An economy in which corruption strives could experience growth in income but the growth would remain remains non- inclusive due to increasing level of poverty, ineffective rule of law and high debt burden. The Nigerian experience of achieving growth of about 7% and above with an increasing rate of unemployment, poverty and widening gap of inequality is a corollary of the conclusion of this paper. Therefore, it is recommended that for Nigeria to achieve inclusive growth and sustainable development the strengthening capacity of the country to fight corruption becomes imperative.

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Appendix I

VAR Lag Order Selection Criteria
Endogenous variables: INCG COR RL DD FDI POV RGDP
Exogenous variables: C
Date: 02/03/16 Time: 09:37
Sample: 1981 2014
Included observations: 32

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-33.20971	NA	2.91e-08	2.513107	2.833737	2.619387
1	136.0617	253.9071	1.71e-11	-5.003855	-2.438817*	-4.153618
2	212.5844	81.30535*	4.94e-12*	-6.724023*	-1.914577	-5.129828*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Appendix II: Johasen Cointegration Result

Date: 02/03/16 Time: 10:01
Sample (adjusted): 1983 2014
Included observations: 32 after adjustments
Trend assumption: Linear deterministic trend
Series: INCG COR RL DD FDI POV RGDP
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.869259	170.0686	125.6154	0.0000
At most 1 *	0.628914	104.9634	95.75366	0.0100
At most 2 *	0.587358	73.24114	69.81889	0.0260
At most 3	0.491828	44.91554	47.85613	0.0920
At most 4	0.329324	23.25360	29.79707	0.2338
At most 5	0.197892	10.47061	15.49471	0.2463
At most 6	0.101200	3.414221	3.841466	0.0646

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.869259	65.10512	46.23142	0.0002
At most 1	0.628914	31.72230	40.07757	0.3184
At most 2	0.587358	28.32560	33.87687	0.1989
At most 3	0.491828	21.66194	27.58434	0.2382
At most 4	0.329324	12.78299	21.13162	0.4724
At most 5	0.197892	7.056387	14.26460	0.4825
At most 6	0.101200	3.414221	3.841466	0.0646

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Appendix III: Test of Causality Results

Dependent variable: D(INCG)

Excluded	Chi-sq	df	Prob.
D(COR)	4.663712	1	0.0308
D(RL)	3.626516	1	0.0569
D(FDI)	23.50583	1	0.0000
D(DD)	18.91097	1	0.0000
D(POV)	0.584580	1	0.4445
D(RGDP)	36.60922	1	0.0000
All	71.03511	6	0.0000

Dependent variable: D(COR)

Excluded	Chi-sq	df	Prob.
D(INCG)	0.021958	1	0.8822
D(RL)	3.395894	1	0.0654
D(FDI)	0.356297	1	0.5506
D(DD)	8.412892	1	0.0037
D(POV)	1.419070	1	0.2336
D(RGDP)	0.342114	1	0.5586
All	14.13623	6	0.0282

Dependent variable: D(RL)

Excluded	Chi-sq	df	Prob.
D(INCG)	4.613478	1	0.0317
D(COR)	0.474291	1	0.4910
D(FDI)	2.951162	1	0.0858
D(DD)	0.370430	1	0.5428
D(POV)	1.757585	1	0.1849
D(RGDP)	2.400868	1	0.1213
All	6.395730	6	0.3803

Dependent variable: D(FDI)

Excluded	Chi-sq	df	Prob.
D(INCG)	0.170489	1	0.6797
D(COR)	0.065008	1	0.7987
D(RL)	0.011186	1	0.9158
D(DD)	0.823179	1	0.3643
D(POV)	0.069852	1	0.7916
D(RGDP)	0.489737	1	0.4840
All	1.959405	6	0.9234

Dependent variable: D(DD)

Excluded	Chi-sq	df	Prob.
D(INCG)	2.777157	1	0.0956
D(COR)	9.738569	1	0.0018
D(RL)	1.823637	1	0.1769
D(FDI)	0.003529	1	0.9526
D(POV)	9.245686	1	0.0024
D(RGDP)	0.036359	1	0.8488
All	18.90843	6	0.0043

Dependent variable: D(POV)

Excluded	Chi-sq	df	Prob.
D(INCG)	0.855233	1	0.3551
D(COR)	1.760828	1	0.1845
D(RL)	0.036258	1	0.8490
D(FDI)	0.257538	1	0.6118
D(DD)	0.800581	1	0.3709
D(RGDP)	1.617398	1	0.2035
All	6.907674	6	0.3295

Dependent variable: D(RGDP)

Excluded	Chi-sq	df	Prob.
D(INCG)	0.057861	1	0.8099
D(COR)	2.625979	1	0.1051
D(RL)	0.434348	1	0.5099
D(FDI)	2.769506	1	0.0961
D(DD)	2.717398	1	0.0993
D(POV)	0.169175	1	0.6808
All	7.166299	6	0.3057

Appendix IV: Diagnostic Test

VEC Residual Serial Correlation LM Tests
Null Hypothesis: no serial correlation at lag order h
Date: 02/02/16 Time: 10:12
Sample: 1981 2014
Included observations: 32

Lags	LM-Stat	Prob
1	35.31680	0.9289
2	40.35867	0.8056

Probs from chi-square with 49 df.

VEC Residual Normality Tests
Orthogonalization: Cholesky (Lutkepohl)
Null Hypothesis: residuals are multivariate normal
Date: 02/02/16 Time: 10:13
Sample: 1981 2014
Included observations: 32

Component	Skewness	Chi-sq	df	Prob.
1	-0.218094	0.253680	1	0.6145
2	0.162400	0.140659	1	0.7076
3	-0.336218	0.602894	1	0.4375
4	0.414454	0.916120	1	0.3385
5	0.475798	1.207381	1	0.2719
6	-0.403523	0.868429	1	0.3514
7	0.254132	0.344442	1	0.5573
Joint		4.333606	7	0.7407

Component	Kurtosis	Chi-sq	df	Prob.
1	3.963493	1.237758	1	0.2659
2	2.479574	0.361125	1	0.5479
3	4.953082	5.086038	1	0.0241
4	3.020891	0.000582	1	0.9808
5	2.586071	0.228449	1	0.6327
6	2.343765	0.574192	1	0.4486
7	2.326102	0.605517	1	0.4365
Joint		8.093662	7	0.3244

Component	Jarque-Bera	df	Prob.
1	1.491438	2	0.4744
2	0.501784	2	0.7781
3	5.688932	2	0.0582
4	0.916701	2	0.6323
5	1.435831	2	0.4878
6	1.442621	2	0.4861
7	0.949959	2	0.6219

Joint	12.42727	14	0.5720

VEC Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares)
Date: 02/02/16 Time: 10:14
Sample: 1981 2014
Included observations: 32

Joint test:

Chi-sq	df	Prob.
460.7566	448	0.3284

System Residual Portmanteau Tests for Autocorrelations
Null Hypothesis: no residual autocorrelations up to lag h
Date: 01/31/16 Time: 21:17
Sample: 1983 2014
Included observations: 32

Lags	Q-Stat	Prob.	Adj Q-Stat	Prob.	df
1	17.22164	1.0000	17.77718	1.0000	49
2	51.64215	1.0000	54.49239	0.9999	98
3	107.2983	0.9942	115.9061	0.9726	147
4	139.5636	0.9992	152.7807	0.9902	196
5	185.7538	0.9981	207.5246	0.9606	245
6	218.7584	0.9996	248.1456	0.9757	294
7	257.3763	0.9998	297.5766	0.9634	343
8	302.9880	0.9997	358.3923	0.8873	392
9	329.3572	1.0000	395.0798	0.9430	441
10	363.9696	1.0000	445.4250	0.9262	490
11	393.3757	1.0000	490.2344	0.9347	539
12	424.2993	1.0000	539.7122	0.9235	588

*The test is valid only for lags larger than the System lag order.
df is degrees of freedom for (approximate) chi-square distribution

Appendix V: Result of System Equations Order by Variables

System: SYS03VAR
Estimation Method: Least Squares
Date: 01/31/16 Time: 18:34
Sample: 1983 2014
Included observations: 32
Total system (balanced) observations 224

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.143700	0.051031	2.815962	0.0055
C(2)	0.065508	0.143849	0.455391	0.6494
C(3)	-0.075164	0.043729	-1.718844	0.0876
C(4)	0.026556	0.034381	0.772401	0.4410
C(5)	0.054167	0.019884	2.724204	0.0072
C(6)	0.017491	0.073757	0.237143	0.8128
C(7)	0.087848	0.084550	1.039004	0.3004
C(8)	-0.830050	0.171788	-4.831827	0.0000
C(9)	0.026090	0.017970	1.451855	0.1485
C(10)	-0.598771	0.290602	-2.060451	0.0410
C(11)	-0.045944	0.819172	-0.056086	0.9553
C(12)	0.042831	0.249024	0.171995	0.8637
C(13)	-0.221612	0.195789	-1.131895	0.2594
C(14)	0.147033	0.113230	1.298531	0.1960
C(15)	0.235769	0.420023	0.561325	0.5754
C(16)	0.593931	0.481484	1.233542	0.2192
C(17)	0.811182	0.978276	0.829195	0.4082
C(18)	-0.019061	0.102334	-0.186264	0.8525
C(19)	0.514274	0.270094	1.904056	0.0587
C(20)	-1.964537	0.761362	-2.580292	0.0108
C(21)	-0.229476	0.231450	-0.991470	0.3229
C(22)	0.485423	0.181972	2.667573	0.0084
C(23)	-0.251537	0.105239	-2.390138	0.0180
C(24)	0.300860	0.390382	0.770680	0.4420
C(25)	-0.710305	0.447506	-1.587252	0.1144
C(26)	1.742159	0.909239	1.916063	0.0571
C(27)	-0.086305	0.095112	-0.907395	0.3656
C(28)	-0.751635	0.458583	-1.639036	0.1032
C(29)	0.881482	1.292692	0.681896	0.4963
C(30)	0.297230	0.392972	0.756364	0.4505
C(31)	-0.012441	0.308964	-0.040266	0.9679
C(32)	-0.482192	0.178683	-2.698596	0.0077
C(33)	-0.240862	0.662816	-0.363392	0.7168
C(34)	0.292186	0.759805	0.384554	0.7011
C(35)	0.736170	1.543766	0.476866	0.6341
C(36)	0.142494	0.161488	0.882379	0.3789
C(37)	-0.124745	0.137696	-0.905945	0.3663
C(38)	0.413139	0.388149	1.064381	0.2888
C(39)	0.209816	0.117995	1.778174	0.0773
C(40)	0.136182	0.092771	1.467937	0.1441
C(41)	-0.006822	0.053652	-0.127149	0.8990
C(42)	0.265861	0.199020	1.335848	0.1835
C(43)	0.415507	0.228142	1.821263	0.0704
C(44)	0.017183	0.463538	0.037069	0.9705
C(45)	0.116231	0.048489	2.397053	0.0177
C(46)	0.046937	0.147125	0.319026	0.7501
C(47)	0.187867	0.414727	0.452989	0.6512
C(48)	-0.036925	0.126075	-0.292880	0.7700
C(49)	0.015562	0.099123	0.156992	0.8754

C(50)	0.025455	0.057326	0.444048	0.6576
C(51)	-0.067554	0.212648	-0.317679	0.7511
C(52)	-0.508536	0.243764	-2.086185	0.0385
C(53)	0.756524	0.495278	1.527475	0.1286
C(54)	-0.015724	0.051809	-0.303496	0.7619
C(55)	0.195407	0.054306	3.598252	0.0004
C(56)	0.015425	0.153082	0.100763	0.9199
C(57)	-0.102739	0.046536	-2.207710	0.0287
C(58)	0.046588	0.036588	1.273317	0.2047
C(59)	0.024350	0.021160	1.150779	0.2515
C(60)	-0.148795	0.078492	-1.895680	0.0598
C(61)	-0.050642	0.089977	-0.562837	0.5743
C(62)	0.211549	0.182815	1.157177	0.2489
C(63)	0.057676	0.019124	3.015971	0.0030

Determinant residual covariance	1.88E-13

Equation: D(INCG) = C(1)*(INCG(-1) + 0.919801731461*COR(-1) - 0.333152712967*RL(-1) + 0.268508220717*FDI(-1) + 0.292484861727*DD(-1) + 1.16711239448*POV(-1) - 2.95274481926 *RGDP(-1) + 58.5090231997) + C(2)*D(INCG(-1)) + C(3)*D(COR(-1)) + C(4)*D(RL(-1)) + C(5)*D(FDI(-1)) + C(6)*D(DD(-1)) + C(7)*D(POV(-1)) + C(8)*D(RGDP(-1)) + C(9)

Observations: 32

R-squared	0.694918	Mean dependent var	0.003505
Adjusted R-squared	0.588802	S.D. dependent var	0.083246
S.E. of regression	0.053382	Sum squared resid	0.065540
Durbin-Watson stat	1.812240		

Equation: D(COR) = C(10)*(INCG(-1) + 0.919801731461*COR(-1) - 0.333152712967*RL(-1) + 0.268508220717*FDI(-1) + 0.292484861727*DD(-1) + 1.16711239448*POV(-1) - 2.95274481926 *RGDP(-1) + 58.5090231997) + C(11)*D(INCG(-1)) + C(12)*D(COR(-1)) + C(13)*D(RL(-1)) + C(14)*D(FDI(-1)) + C(15)*D(DD(-1)) + C(16) *D(POV(-1)) + C(17)*D(RGDP(-1)) + C(18)

Observations: 32

R-squared	0.338713	Mean dependent var	0.047253
Adjusted R-squared	0.108700	S.D. dependent var	0.321994
S.E. of regression	0.303990	Sum squared resid	2.125428
Durbin-Watson stat	2.236435		

Equation: D(RL) = C(19)*(INCG(-1) + 0.919801731461*COR(-1) - 0.333152712967*RL(-1) + 0.268508220717*FDI(-1) + 0.292484861727*DD(-1) + 1.16711239448*POV(-1) - 2.95274481926 *RGDP(-1) + 58.5090231997) + C(20)*D(INCG(-1)) + C(21)*D(COR(-1)) + C(22)*D(RL(-1)) + C(23)*D(FDI(-1)) + C(24)*D(DD(-1)) + C(25) *D(POV(-1)) + C(26)*D(RGDP(-1)) + C(27)

Observations: 32

R-squared	0.469685	Mean dependent var	0.031250
Adjusted R-squared	0.285228	S.D. dependent var	0.334189
S.E. of regression	0.282537	Sum squared resid	1.836029
Durbin-Watson stat	1.924885		

Equation: D(FDI) = C(28)*(INCG(-1) + 0.919801731461*COR(-1) - 0.333152712967*RL(-1) + 0.268508220717*FDI(-1) + 0.292484861727*DD(-1) + 1.16711239448*POV(-1) - 2.95274481926 *RGDP(-1) + 58.5090231997) + C(29)*D(INCG(-1)) + C(30)*D(COR(-1)) + C(31)*D(RL(-1)) + C(32)*D(FDI(-1)) + C(33)*D(DD(-1)) + C(34) *D(POV(-1)) + C(35)*D(RGDP(-1)) + C(36)

Observations: 32

R-squared	0.482154	Mean dependent var	0.084119
Adjusted R-squared	0.302033	S.D. dependent var	0.574198
S.E. of regression	0.479711	Sum squared resid	5.292812
Durbin-Watson stat	2.075971		

Equation: D(DD) = C(37)*(INCG(-1) + 0.919801731461*COR(-1) - 0.333152712967*RL(-1) + 0.268508220717*FDI(-1) + 0.292484861727*DD(-1) + 1.16711239448*POV(-1) - 2.95274481926 *RGDP(-1) + 58.5090231997) + C(38)*D(INCG(-1)) + C(39)*D(COR(-1)) + C(40)*D(RL(-1)) + C(41)*D(FDI(-1)) + C(42)*D(DD(-1)) + C(43) *D(POV(-1)) + C(44)*D(RGDP(-1)) + C(45)

Observations: 32

R-squared	0.349383	Mean dependent var	0.181973
Adjusted R-squared	0.123081	S.D. dependent var	0.153817
S.E. of regression	0.144040	Sum squared resid	0.477193
Durbin-Watson stat	1.833397		

Equation: D(POV) = C(46)*(INCG(-1) + 0.919801731461*COR(-1) - 0.333152712967*RL(-1) + 0.268508220717*FDI(-1) + 0.292484861727*DD(-1) + 1.16711239448*POV(-1) - 2.95274481926 *RGDP(-1) + 58.5090231997) + C(47)*D(INCG(-1)) + C(48)*D(COR(-1)) + C(49)*D(RL(-1)) + C(50)*D(FDI(-1)) + C(51)*D(DD(-1)) + C(52) *D(POV(-1)) + C(53)*D(RGDP(-1)) + C(54)

Observations: 32

R-squared	0.244646	Mean dependent var	0.001463
Adjusted R-squared	-0.018086	S.D. dependent var	0.152530
S.E. of regression	0.153903	Sum squared resid	0.544780
Durbin-Watson stat	1.732062		

Equation: D(RGDP) = C(55)*(INCG(-1) + 0.919801731461*COR(-1) - 0.333152712967*RL(-1) + 0.268508220717*FDI(-1) + 0.292484861727*DD(-1) + 1.16711239448*POV(-1) - 2.95274481926 *RGDP(-1) + 58.5090231997) + C(56)*D(INCG(-1)) + C(57)*D(COR(-1)) + C(58)*D(RL(-1)) + C(59)*D(FDI(-1)) + C(60)*D(DD(-1)) + C(61) *D(POV(-1)) + C(62)*D(RGDP(-1)) + C(63)

Observations: 32

R-squared	0.479606	Mean dependent var	0.040544
Adjusted R-squared	0.298600	S.D. dependent var	0.067831
S.E. of regression	0.056808	Sum squared resid	0.074224
Durbin-Watson stat	2.083091		