



## On the causal links between poverty and HIV in Nigeria, 1990-2009: An application of Granger causality and co-integration techniques

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### Abstract

The increasing rates of HIV/AIDS epidemics in Nigeria are posing serious challenges to the individuals, community, government and international donor agencies and raise critical questions as to whether poverty is a significant contributor to the growth of the disease. This paper utilises the Granger Causality Test to investigate the causative relationship between poverty and HIV in Nigeria. The results indicate no direct and significant linkages between poverty and HIV, meaning that poverty is not the driving force behind the increased rates of HIV prevalence in the country. Conversely, HIV was found to have caused increased rates of poverty in the country. In the light of these findings it is suggested that policies that would improve health and education should be implemented, together with the awareness enhancement of the public on the imperative of HIV screening prior to marriage contracts.

**Keywords:** education policies, Granger Causality Test, health policies, HIV/AIDS, poverty, public awareness

### Introduction

Poverty is believed to be a manifestation of several intertwining sectors that combine to reinforce themselves in a vicious circle. According to a BBC news item posted on 8<sup>th</sup> may 1998, a team of international medical doctors on a tour in Africa, Asia and Latin America reports that poverty is one of the main threatening factor to poor health of most children in these parts of the world; world poverty is threatening to wipe out medical advances made over the last 30 years. They further found that people's health could improve dramatically with the introduction of clean drinking water, better sanitation and hygiene, female education, access to food, higher wages and labour legislation; thus implying the need for reducing poverty. This means that, for the poorest countries, the health sector alone cannot ensure better health even if it were able to function at maximum effectiveness without eradicating poverty through making provisions for all facilities that makes living conditions better.

Poverty, hunger, disease and unemployment have become a scourge and are widespread and their occurrence is increasing its devastating impact on the economy and the quality of life of the people continuously. The scourge of poverty is not restricted to only accessibility to the minimum income earned by an individual, but it includes the level of accessibility to clean water, air, sanitation, electricity, drainage system, health facilities and the general environmental condition of a person. Lack of all these affects the quality of life of an individual and the society at large. In Nigeria and most parts of sub-Saharan Africa, most of these facilities are absent, and where they are available, they are beyond the reach of ordinary people whom are poverty ridden. High level of poverty and degrading environmental conditions was found to increase people's vulnerability to disease according to the Central Intelligent Agency (CIA, 2010). It was further found that the degree of risk to major infectious diseases like; food or waterborne diseases, vector borne disease, respiratory disease, aerosolized dust or soil contact disease, water contact disease, HIV/AIDS and animal contact disease in most African countries Nigeria inclusive is very high.

More than two out of three (68percent) adults and nearly 90percent of children infected with HIV live in this region, and more than three in four (76percent) AIDS deaths in 2007 occurred there. The rising disease burden from HIV/AIDS and other diseases are straining an already weak health system. Nigeria has the second highest number of people living with HIV in the world, taking about 9percent of the global HIV burden as at 2008. Adult (age 15-49) HIV prevalence is estimated at 3.6percent and approximately 2.6 million people in Nigeria are living with HIV/AIDS. In 2008, the prevalence among pregnant women was 4.6percent. Current estimates by the Federal Ministry of Health (FMH) indicate that 2.98 million people are living with HIV/AIDS in Nigeria in 2009 with a total AIDS death of 192,000. The prevalence of HIV epidemic has resulted in the rise in death rate of women which continue to increase the number of AIDS orphans which was estimated at 2.12million in 2008 and 2.175million in 2009 (NACA, 2010). Nigeria was ranked as the second-worst affected country based on the number of HIV infections. This raises the question on the kind of relationship that exists between poverty and HIV.

This paper intends to investigate the relationship between poverty and health in Nigeria using HIV prevalence as the case study. The research intends to prove whether poverty has any causal linkage with HIV or there are other unknown factors that could be attributed it. More precisely, using Vector Error Correction Model (VECM) the paper seeks to establish the long-run relationship between poverty and HIV. Knowledge of this causal relationship will guide further policy and/or provide a lead way for further research.

The paper is organized as follows. The next section comprises of literature on the linkages between poverty and HIV. Section 3 presents the methods to be used in estimations. Section 4 describes the data source, coverage and also provides definition of the variables Section 5 presents the results of the causality analysis, and Section 6 concludes the paper.

## Literature review

Theoretically, Health economists have advanced linkage between poverty / low income and poor health. This is based on the assumptions that; government's share of health expenditure in most low and middle income countries is diminishing and costs are increasingly being borne by individuals and households, which in turn further affect their health status; providers are increasingly acting as private agents, whether or not they are formally employed in the private sectors in order to generate more income, and thus making it more difficult for the poor to get the needed health care and also, health care benefits such as insurance schemes and free services are rarely effective in reaching the poor (Ensor & Witle, 2001; Gilson, 1997).

HIV/AIDS has a tremendous impact on the development of the infected countries because it is not just a biomedical or demographic problem but a socio-economic one as well. Loewenson and Whiteside (2001) identified it as the single most important obstacle to attaining the Millennium Development Goal of national poverty reduction targets. Link between poverty and HIV/AIDS is neither simple nor direct (Collins & Rau, 2001). There has been link between poverty and prevalence of HIV/AIDS especially in Sub Saharan Africa (Acemoglu & Johnson, 2006; Young, 2005; Mbirimtengerenji, 2007) and with certain race as reported by Terrell (2011). This is despite other arguments that some of the countries with such problems in Southern Africa, like Botswana and South Africa, are not exactly poor. However, the following have been identified by FAO (2002) as the major factors that explain the rapid spread of HIV/AIDS in the Southern Africa region: poor nutrition, deprivation, poverty, marginalization, migration, war, opportunistic infection, migration, sexual networking and patterns of sexual contact and gender inequality; Terrell (2011) identified more factors that include race, poverty, low education, drug abuse, indiscriminate sex, broken homes and accessibility to healthcare and social support for African American communities of the USA; and Mbirimtengerenji (2007) blames poverty, polygamy, sexual trade, migration and teenage marriages as additional factors in Sub Saharan Africa. Young (2005) found that HIV/AIDS epidemic in Africa tends to have positive impact on their economy. Using micro estimates and calibration of the neoclassical growth model, he shows that the decline in population resulting from HIV/AIDS may increase income per capita despite significant interference and human suffering caused by the disease.

Researchers have shown that the health status of any economy with high rate of poverty/low income decreases by increasing the risk of depression, vulnerability to diseases, increase infant mortality, drug abuse among others (Mackenbach et al., 2004; Newton, 2007; ACPH, 1999; Bonds et al., 2009; Ezeamama et al., 2005). In Canada, 13% of women within the lowest income group reported depression compared with 5% of women within the highest income group; average infant mortality rate in Canada is 5.8 per 1000 live births. However, this rate is 5.0 in the highest income group, and 7.5 in the lowest income group (ACPH, 1999). Findings of Mackenbach et al. (2004) have proved this assertion, the study showed that there is a positive relationship between income and health among people within the a middle and high income range; these set of people are found to be less vulnerable to diseases; they also have higher accessibility to better health and preventive measures. In another survey conducted by Gallup in US using over 1000 households between 2004-2007, the result obtained, shows that the highest percentage of people who believe to be in an excellent physical and mental health condition come from the higher income status, possess post graduate degrees and also between the age of 18-29 (Newton, 2007).

Thus, two opposing thoughts regarding HIV-poverty direction of relationship arises: while some scholars believe poverty is the one that leads to increase in HIV prevalence or HIV intensifies poverty, the other opine that HIV/AIDS among individuals, households or communities tend to affect the capabilities and asset base of affected individuals and families, thus intensifying their poverty status (Loewenson & Whiteside, 2001; UNAIDS, 2002). The former school of thought argues that deprivation and poverty can force people to engage in risky lives such as prostitution, drug abuse, and migration, un-safe health activities among others, which eventually raise their likelihood of contracting the disease (Barnett & Whiteside 2002; Bloom et al., 2002; Masanjala, 2006).

Recurrent link of poverty and HIV/AIDS epidemic can be seen in all of the literature above although poverty has so far not been blamed for the proliferation of HIV in Sub Saharan Africa (Mbirimtengerenji, 2007). Despite the arguments put forward by some of these scholars, the factors attributed to the proliferation of the disease in many parts of the world as identified earlier form part of the sustainable livelihood approach of defining poverty which includes not only income but deprivation in other capital assets like education, accessibility to healthcare services and social support among others.

Sub Saharan Africa with 60% population living under \$1 per day has 14000 daily HIV infections and 11000 HIV/AIDS related death daily (Mbirimtengerenji, 2007) and accounts for 75% of HIV/AIDS related death worldwide despite being just about 10% of the entire world's population (Wilson, 2003). Other countries at risk according to the UNAIDS 2004 Annual Reports are China, India, Russia and Brazil. The pandemic is also noticed to be in the increase in Asia and Eastern Europe. Despite this situation, it was reported that up to 40% of the countries suffering the HIV/AIDS pandemic have not evaluated its impacts yet (Casale & Whiteside, 2006).

HIV/AIDS could be both determinant and consequence of socio-economic variable. Its impact is felt most at the households where, according to Casale and Whiteside, "socio-economic combines with socio-cultural and epidemiological variables to influence prevalence". A common illustration is when a breadwinner is lost, as HIV/AIDS is most prevalent among working age group. Death results in increasing number of the widowed and orphans; additional cost of funerals, reduction of the working force destruction of the needed skills and experience among others (UNAIDS, 2004). Where the patient has not died yet, there are other problems including loss of income and increase medical expenditure (HUE, 2009). Consequently, these would affect the households' poverty status and governments' health expenditure thus directly limiting the future impact on efforts on human development and poverty alleviation (Loewenson & Whiteside, 2001).

### **Model specification**

In this paper, a dynamic Granger causality test is used to examine the direction of causality between HIV and poverty in Nigeria. The time series properties of the variables were examined using the augmented Dicker-Fuller (1976, henceforth ADF) and Phillips-Perron (1988, henceforth PP) unit root test. Testing for stationary property of a data is essential because most economic and financial time series exhibit trending behavior in their means when plotted against time (Ramasamy & Helmi, 2011;

Zivot & Wang, 2006; Razzak, 2007). Thus data must be transformed to stationary mode prior to analysis. In this case, the null hypothesis of presence of unit root would be tested. As the Granger-causality tests require the data to be stationary, the time series is tested for the presence of unit roots based on the equation below (including trend and constant). The stationarity test determines if the estimate of  $\beta_2$  is equal to zero or not.

$$\Delta y_t = \beta_0 + \beta_1 T + \beta_2 y_{t-1} + \sum_{j=1}^p \psi_j \Delta y_{t-j} + \varepsilon_t \dots \dots \dots \text{(eq1)}$$

Where  $\Delta$  is the difference operator,  $Y$  is the natural logarithm of the series,  $\beta_0$  is a constant,  $T$  is a trend variable,  $\beta$  and  $\psi$  are the parameters to be estimated and  $\varepsilon$  is the error term. The stationary linear combination of the two variables as suggested by economic and financial time series will converge to a long-run equilibrium over time and is called the “cointegrating equation”, which in this research is tested using Johansen test (Johansen, 1991; Johansen and Juselius, 1990) based on trace statistics. Although there exists a number of other co-integration tests, such as the Engle and Granger (1987) method and the Stock and Watson (1988) test, Johansen’s test has a number of desirable properties, including the fact that all test variables are treated as endogenous variables.

Co-integration shows the existence of causality between series of variables, but does not indicate the direction of the causal relationship (Mozumdar & Marathe, 2007). The dynamic Granger causality is best captured from the vector error correction model (VECM) derived from the long-run co-integrating relationship. If the two series are co-integrated, the vector-error correction model for the short and Long-run dynamics between poverty and HIV series is given below as proposed by Sawhney et al. (2006) and Riman & Akpan (2010).

$$\Delta HIV = \alpha + \sum_{t=1}^p \phi_t \Delta \ln PGNI_{t-1} + \phi_i Z_{t-1} \dots \dots \dots \text{(eq2)}$$

$$\Delta \ln GNI = \alpha + \sum_{t=1}^p \phi_i \Delta HIV_{t-1} + \phi_i Z_{t-1} \dots \dots \dots \text{(eq3)}$$

Where HIV and  $\ln GNI$  stands for HIV prevalence and Gross national income (proxy for poverty) and  $\Delta$  stands for difference operator. The maximum lags determined by the modified AIC are represented by  $p$  which is obtained through unconstrained VAR estimation (1 lag interval in first differences for both series).  $Z_{t-1}$  is the error-correction term lagged by one period and derived from the long-run co-integrating relationship. The error correction term assesses the deviations of the variables from the long run equilibrium association. Under the VECM, the null hypothesis of non-causality is rejected if the sum of the regression coefficients on the independent variable is significantly different from zero and/or the error correction term is statistically significant. Thus, the null hypothesis is to test the non-existence of causal linkage between poverty and HIV.

**Data source**

Annual time series data, which covers the 1990–2009 periods, is utilized in this study. The choice of this period is based on the fact that HIV was first reported in Nigeria in 1986; as such data on HIV are only available from the year 1990. The data used in the study are obtained from different sources, including World Bank Statistical Yearbooks, United Nations Programme on AIDS (UNAIDS), World Health Organization (WHO), National Bureau of Statistics (NBS).

**Definition of variables**

**HIV:** HIV prevalence is the percentage of the population living with HIV. In most countries, it defines the rate of HIV epidemic at a given period of time. An epidemic is either generalized (HIV

prevalence is 1% or more in the general population), concentrated (HIV prevalence is below 1% in the general population but exceeds 5% in specific at-risk populations like injecting drug users or sex workers) or low level (HIV prevalence is not recorded at a significant level in any group (UNAIDS/WHO, 2008). The HIV data is for adult group which comprises mostly of men and women between the ages of 15-49 that are infected with HIV. Data was taken from UNAIDS/WHO epidemiological fact sheet.

**Poverty:** Poverty incidence in the country is the proportion of families with per capita incomes below the poverty threshold at a particular period of time. For this research, the research considers 1990- 2009 as the study period. Data was taken from the National Bureau of Statistics.

### Empirical analysis

A reasonable first step in empirical analysis is to look at the descriptive statistics of the data. Table 1 shows the characteristics of the series for the sample period of 1990-2009. Obviously, both data reveals a reasonably goodness-of-fit measure based on their asymmetry of distribution of the series around its mean (*skewness*) which is closer to normal value of zero and the height of the distribution relative to a normal distribution (*Kurtosis*) which is also close to the value of a uniform distribution of 3.

**Table 1. Descriptive statistics**

	POV	HIV
Mean	2.6000	58.0700
Median	3.0500	59.8000
Maximum	3.6000	70.2000
Minimum	0.7000	42.7000
Std. Dev.	0.8796	8.4916
Skewness	-0.9508	-0.3791
Kurtosis	2.5878	2.2974
Jarque-Bera	3.1547	0.8904
Probability	0.2065	0.6407
Sum	52.0000	1161.400
Sum Sq. Dev.	14.7000	1370.042
Observations	20	20

In order to test for Granger-causality between POV and HIV, it is necessary that the two time series are stationary. Table 2 examines the stationary property of the two time series using the Augmented Dicky-Fuller (hence forth ADF) and Phillips Perron (hence forth PP) unit root test.

**Table 2. Unit Root test**

Variables	Unit Root based on level 1(0)				Unit Root based on first difference 1(1)			
	ADF	95% CV	PP	95% CV	ADF	95% CV	PP	95% CV
POV	-3.1996 (0.1193)	-3.7332	-1.9459 (0.5920)	-3.6736	-3.6926 (0.0471)**	-3.6908	-3.6038 (0.0583)**	-3.6908
HIV	-1.7160 (0.7039)	-3.6736	-1.7160 (0.7039)	-3.6739	-4.1466 (0.0220)**	-3.6908	-3.9967 (0.0289)**	-3.6908

Note: Each test uses both intercept and trend and the lag length has been chosen based on minimum AIC. \*\* implies significance at 0.05; figures in parentheses are the p-values. Each p-value of ADF and PP test statistics is reported for shortest lag length.

The result of both ADF and PP unit root shows that all the variables were not stationary at their levels; however, after applying the first order-differencing, they all became stationary at both 5 % and 10% critical values. From this result, it is evident that the null hypothesis of the presence of unit root

(non-stationary) is rejected and which eventually lead to the conclusion that the variables can co-integrate.

Upon achieving the requirement for stationary of the series, we proceed to test for co-integration based on the Johansen co-integration statistics. The trace statistics employed will determine the existence of long run equilibrium among the series. Johansen co-integration test on table 3 below indicates that the two series POV and HIV have one co-integrating equation. The co-integration test uses both intercept and trend, while the optimum lag length for the test is based on minimum AIC through unconstrained VAR estimation (1 lag interval in first differences for both series).

**Table 3. Johansen co-integration based on trace test**

Hypothesized no. of CE(s)	Eigenvalue	Trace statistic	0.05 Critical value	Prob.**
None	0.8991	50.3632	25.8721	0.0000
At most 1	0.4877	11.3714	12.5180	0.0771

The trace statistics on Table 3 indicates the existence of one co-integrating equation which implies a long-run relationship among the series. Thus the research was able to reject the null hypothesis for no co-integration at 5% significance level. However, it does not necessarily imply causality; this can only be confirmed using Granger causality test which would be presented later on Table 5. Having been able to achieve co-integration, an additional room has been provided to estimate the vector error correction model (VECM), which essentially contains the co-integration relation which is able to restrict the long-run behavior of the variables to converge to their co-integrating relationship, while allowing for short-run adjustments to take place.

The VECM test was conducted to asses both the short and the long run relationship between POV and HIV. The result of the VECM also highlights the variable that has the most significant impact on the adjusting shocks and restoring equilibrium between short-run and long-run in the model. Table 4 reveals the short and long-run characteristics of the model. The long-run VECM estimate on Table 4 also gives us the Johansen suggested co-integration equation.

**Table 4. VECM results**

<b>Short-run estimates</b>			
Error Correction	D(POV)	D(HIV)	
CointEq1	-0.1877 (0.0348)	-0.0035 (0.0033)	
D(POV(-1))	0.1644 (0.1793)	-0.0195 (0.0168)	
D(HIV(-1))	25.7400 (4.0375)	0.0084 (0.3801)	
C	0.0055 (0.1052)	-3.0685 (1.1182)	

R<sup>2</sup>= 0.24, Adjusted R<sup>2</sup>= 0.11, F= 0.70, Akaike AIC=0.29, Schwarz SC=0.58. ( ) - standard errors

The error correction coefficient measured by ECM is -0.19 for POV, but insignificant for HIV, meaning that the speed at which the system will adjust to shocks and restore equilibrium between the two periods is slow. In other words, only about 19% of disequilibrium in HIV is “corrected” annually by poverty. This shows that all adjustments are done by POV alone.

**Long-run estimate**

Regressors	Estimate	Standard error	t-values
POV	1.0000		
HIV	47.0037	5.9796	7.8606
C	-74.3279		

The estimate on Table 4 shows that, HIV had a value of 25.7 in the short run and 47 in the long run period. This suggests that the relationship between POV and HIV is positive in both the short-run

and long-run, which explains that with say a 1 per cent increase in POV does not reduce the chances of becoming infected with HIV but rather increase it by a significant percentage in both periods. This finding could be proved if we look at HIV prevalence statistics across the country. According to UNAIDS (2004), HIV prevalence is higher in the North with an average of 4.6 compared to the southern region with an average prevalence of 4.2. The high rate of disease prevalence including HIV in northern Nigeria according to Ahmad (2011) and UNAIDS (2004) is attributed to low level of education, high birth rate and polygamy among the people especially the women. A recent study of young Nigerians, ages 15-24, found that only half (51%) of young men and less than half (45%) of young women knew that a healthy looking person could be infected with HIV (UNAIDS, 2004). In fact, in a World Bank survey of 128 countries between 2003-2004, Nigeria ranks at the rear in terms of both knowledge economy index (KEI) with a rank of 1.55 and education with a rank of 1.79 out of 10. However, an increase in HIV from the short run estimate on table 4 returns in a negative feedback to decrease POV though by an insignificant amount of 0.01%.

The result on Table 5 presents the direction of causality between per capita POV and HIV. The variables in previous tables have shown to be stationary and well integrating. The Granger test was conducted using the Block Exogeneity Wald test at 5 percent significant level to test the null hypothesis of non-causality between poverty and HIV.

**Table 5. VEC Granger Causality/ Block Exogeneity Wald test**

Null Hypothesis	Chi-square	df	Probability	Decision
POV does not Granger cause HIV	1.8327	2	0.4000	Unable to reject H <sub>0</sub>
HIV does not Granger cause POV	47.3286	2	0.0000	Reject H <sub>0</sub>

From the table above, there existed no statistically evidence showing that poverty causes the high rate of HIV prevalence in Nigeria. However, HIV prevalence has shown to be statistically significant in causing increase rate of poverty. A research by Stuurta et al. (2007) investigating the question of whether the HIV epidemic is transitioning from an early phase in which wealth was a primary driver, to one in which poverty is increasingly implicated. The paper found that, it is true that poor individuals and households are likely to be hit harder by the downstream impacts of AIDS; their chances of being exposed to HIV in the first place are not necessarily greater than wealthier individuals or households. The paper further showed the critical influence of certain contextual factors such as location, gender, age asymmetries and the mobility of individuals on the social ecology of HIV transmission. According to Mukail et al. (2011), the mode of transmission of HIV in Nigeria can be divided into three based on the report of different scholars: Heterosexual sex account for about 80% to 95% of HIV infection in Nigeria. Second are Blood transfusions: Blood transfusion through unsafe blood account is the major cause of HIV in Nigeria. Then, Mother to child transmission: it is estimated that twenty- two thousand children are living with HIV in Nigeria. This analysis shows that poor health system and social ecology are the major causes of HIV than poverty.

The prevalence of most killer, but preventable diseases like Malaria, Diarrhea, and HIV etc in African countries is associated with inadequate healthcare system and high rate of corruption in the region. A number of scholars have identified unsafe medical treatment, poor training of personnel, absence of new equipments and resources to sterilize equipments in developing countries as a major source of new HIV infection (Gisselquist et al., 2002 & 2004; Reid, 2009). Reid (2009) puts that up to 34-47% of new HIV infections in sub-Saharan Africa may be attributed to unsafe medical injections. It is also reported that in Africa, 250-500 people daily get infected with HIV as a result of unsafe blood transfusion (Dhingar 2006). The case of Nigeria is actually worrisome as the federal budgetary component of health expenditure has been decreasing over the years (Galadanci et al., 2010), thus, resulting in increased number of HIV/AIDS, Malaria, Cholera, Tuberculosis and other infectious diseases patients over the years.

Corruption has today become a bottle neck to macro-economic development in Africa; resources that could be used for economic development are diverted, on purpose, by some few individuals for their own personal benefits. According to a United Nations estimate, in 1991 alone, more than \$200billion in capital was taken away from Africa by the ruling elites- amounting to more than half of Africa's foreign debt of \$300billion (George, 2002). The cost of corruption does not stop at loss of

revenue alone, but it rather distort the economy, creating inefficiency and loss of confidence on the economy that is corrupt, resulting to fall in investment which further restricts development (Lawal, 2007). Corruption in Nigeria, as it presently manifests, can be appropriately termed endemic or systemic, for the country has persistently remained in the bottom line in the ranking of most corrupt nations since 1998, recording a highest score of only 2.7 in 2008 (Transparency International, 2010).

HIV/AIDS is believed to possess the major development challenges today. The impact of AIDS on economic development is extremely severe and wide ranging, affecting areas of Life-expectancy, skills structure, trauma, organisations (carry cost of medications and other employee related liabilities), employment, production (most especially subsistence agriculture), changes in population distribution among others (UNDP, 2010; UN, 2004). A study in rural South Africa suggested that households in which an adult had died from AIDS were four times more likely to break up than those in which no deaths had occurred, for AIDS tend to strip families of their assets and income earners, which further impoverishing the poor, and put them below the poverty line (Hosegood et al., 2004). Individuals with HIV/AIDS epidemic in most countries are losing their jobs because they are constantly sick, while even the healthy ones are sacked because they caring for the sick ones. In most of these countries, the income burden of people is increasing by day due to HIV/AIDS prevalence, which further threatens the economic well being of the society. For instance, In Botswana it is estimated that, on average, every income earner is likely to acquire an additional dependent over the next ten years due to the AIDS epidemic (UNAIDS 2006). Coping with HIV/AIDS also entails additional cost for healthcare, reduction in spending on other basic necessities (like clothing, electricity) and food insecurity. As in other sub-Saharan African countries, it is generally found that the death of a male family member reduced the production of 'cash crops'- sources of income to the family, while the death of a female reduced the production of grain and other food crops needed as food security in the households (UNAIDS, 2006).

## Conclusion

The Johansen co-integration analysis and the Granger test were applied to estimate the direction and impact of the variables on one another. The purpose is to eventually identify the connections between poverty and HIV prevalence in the Nigeria over the period 1990–2009. Before conducting the co-integration test, ADF and PP unit root were performed and the reported t-statistics indicated that the series are stationary at first differencing. The co-integration result confirmed the existence of a long-run relationship between the variables.

The result however established no direct causal linkage between poverty and HIV despite the existence of long-run relationship. This suggests that, poverty is not the driving force to the increased rate of HIV prevalence in the country. This result corresponds with the opinion of Young (2005); Mbirimtengerenji (2007); Ahmad (2011) and opines with their opinion and those of Gisselquist et al. (2002 & 2004); Reid (2009) that; poor education, polygamy, inadequate and dilapidated health care system has contributed higher to the increasing rate of HIV prevalence than poverty. However, HIV is a deriving factor to the increase rate of poverty. The study therefore, suggests that proper measures should be taken to improve the state of the health care system in the country. In the case of polygamy, since it is religiously inclined and cannot be condemned, the relevant authorities such as community and religious leaders should continue to educate their wards on the importance of HIV screening prior to marriage contracts, this would assist in reducing the rate of spread.

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