



ENVIRONMENT, POVERTY AND LIFE EXPECTANCY IN NIGERIA

Maclean Jebbin FELIX

Faculty of Social Science, Department of Economics
Ignatius Ajuru University of Education, Nigeria
jebbinmacleanfelix@yahoo.co.uk

ABSTRACT

The poor has been adjourned to be the cause and victim of environmental degradation, with its attendant consequences. Given this assertion, this paper investigates the relationship among environment, poverty and life expectancy in Nigeria. The data for the study were gotten from Central Bank Statistical Bulletin and World Bank data bank. The vector autoregression (VAR) econometric technique is adopted in the study given that the cointegration result shows the absence of cointegration. The result from the data analysed established that poverty affect life expectancy at birth negatively, which implies the higher the level of poverty, the decline in life expectancy at birth occurs and all things being equal. Poverty also has a positive and significant effect on the environment implying the higher the level of poverty, the higher the level of environmental degradation all things being equal. The paper therefore, concludes that poverty is a major determinant of life expectancy at birth and environmental degradation in Nigeria. To overcome this problem, the paper recommends the inclusion of skill acquisition and environmental literacy in our education curriculum.

Keywords: Environment, Poverty, Life Expectancy, Nigeria.

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INTRODUCTION

The Nigeria economy is ranked the 27th largest economy in the world in terms of nominal Gross Domestic Product (GDP) which is mostly generated from the sales of fossil-fuel deposited by nature and the 22nd largest in terms of purchasing power parity (PPP) it is the most populous country in the Africa continent. Nigeria has an estimated population of 190,632,261 million people, estimated \$375.8 billion gross domestic product, and per capita income of \$1968.56 (World Bank, 2017), yet its poverty rate has been on the increase to the extent she is classified as the poverty headquarter of the world. Data from the world poverty clock has it that over 86.9 million Nigeria lives below the National poverty line of \$1.25 dollar per day irrespective of the

massive income accruable from the sales of natural resource deposit in the country, meaning that about 46.7% of Nigeria population are extremely poor (World Bank, 2017). The environment is highly degraded in the quest to meet the basic necessity of life. Poverty has been adjoined to be both the cause and victim of environmental degradation. The quest to meet the basic need of man and greed from the capitalistic class has cause more damage to the Nigeria economy as well as those of other developing countries with massive population like; Ghana, South African, Burkina Faso, Benin Republic, DR. Congo, Bangladesh, etc.

The increase in population of developing countries a product of improvement in health care management which was made possible through technological innovation comes with massive negative impact on the environment. The combined influence of poverty and environmental degradation in the form of air pollution, nitrous pollution, water pollution, etc. may reduce the life expectancy of human as well as animal species. Elementary science has it that life expectancy of an individual (life span) is a function of his health status and the quality of environment he/she lives. The quality and level of attention we give to issue of poverty and environment determines the quality of our lives and the span of time we shall live on earth. Life expectancy in Nigeria has been hovering within 53 years and 52 years since 2013 till date without any improvement yet we are the 6th exporter of crude oil in the world.

In the developed countries such as Australia, life expectancy has been within 82 years (2012-2018) and 81 years (2006–2011), United Kingdom (UK) 81 years (2015 – 2018) and 80 years (2011 –2014) while United State of America has been 78 years (2009–2018) and 77 years (2005–2010) World D Bank Report (2017). Previous studies such Matthew et al. (2018); Amadi and Akpakabowei (2019) have investigated the relationship between greenhouse gas emissions (environment) and health outcomes in Nigeria. They use infant mortality and life expectancy at birth as a proxy for health outcomes and adopted the autoregressive distributed lag model econometric technique. However, there is no study known to the researchers in Nigeria that has examined the relationship among environment, poverty and life expectancy in Nigeria.

In the view of the above, this paper investigates the relationship among environment, poverty and life expectancy in Nigeria from 1996 to 2018. Other parts of this paper is organized as thus: section 2 discusses relevant literature, conceptually, theoretically and empirically. While section three presents the methodology for the research, and section discussion of result and conclusion.

LITERATURE REVIEW

Poverty

Poverty is multi-dimensional and has no terrestrial frontier. It is characterized by nonexistence of purchasing power, disclosure to risk, malnutrition, high mortality rate, low life expectancy, insufficient access to social and economic services and few opportunities for income generation (Morenike, 2008). In the same vein, Oluwemimo (2007) stated that poverty includes exposure to contaminated environments, being at risk of criminal victimization, diseases and health risk in urban centers.

Environment

This means the free gift of nature living and non-living that help to sustain man existence on earth. The term environment is furthestmost time applied to earth or some parts of earth created by God under the control or influence of human. Meaning that the environment incorporates the interaction of all living species, climate and non-living things.

Life Expectancy

This means the expected average life span of an individual calculated on the bases of his year of birth, the current age, and other demographic factors like gender, population, weather etc. It measures the number of year expected of citizens of a country.

THEORETICAL LITERATURE

The Mosley and Chen Framework

Mosley and Chen (1984) set the framework of child survival based on the assumption of all socioeconomic factors of child mortality necessarily operate through a common set of intermediate factors. Mosley and Chen from their work identified clearly the proximate and socioeconomic determinants of infant and child mortality and they categorize fourteen proximate determinants of infant and child mortality into five general groups. Their assumptions stated that; in an optimal setting, over 97 percent of children born can be expected to survive until the fifth birthday. And the proximate determinants through the socioeconomic factors operate to influence the infant and child mortality. In addition, socioeconomic, biological and environmental factors are the driving force behind the reduction in infant and child mortality while the conceptual core of their framework was the idea that all background (socio-economic and cultural) variables have to operate through a limited set of proximate determinants that directly influence the risk of disease and the outcome of disease processes.

As mentioned above Mosley and Chen (1984) categorized a set of proximate determinants into five general groups that directly affect infant and child mortality. The five grouped proximate determinants that directly affect infant and child mortality are:

Maternal Factors: age parity and birth intervals, each of these factors has an impact on infant and child mortality through affecting maternal health. Synergism may also have considered as maternal factors for example, birth interval categories (example short, medium, long) with mothers age categories (example five-year age group).

Environmental Contaminations: hygiene factors, water and sanitations, each factor spread or transmits infectious disease to mothers or children.

Nutrient deficiency (calories, protein and micro nutrient deficiency): the deficiency in nutrient decrease the probability of child survival and also has an impact on the mothers through which it affects the infant and child mortality for instance, nutrition during pregnancy and lactation have an impact on new born children weight and quality of breast milk any deficiency in it will affect the infant negatively.

Injury: this related to physical, burn and poisoning injury. Injuries have an impact on the infant and child mortality and it is more pronounced in the infancy period.

Personal illness control (Immunization, bed net, malaria prophylaxis etc.): this includes both traditional and modern preventative measures to avoid disease during pregnancy and child births and the quality of preventative measures are important. Personal illness control factors influence pregnancy outcome and child survival through its effect on both mothers and children (Mosley & Chen, 1984).

EMPIRICAL LITERATURE

Hester (2009) reviewed the nutritional problems in South Africa, as well as the intergenerational vicious cycle of poverty and malnutrition. He argued for the necessity of including a nutrition intervention component in poverty-alleviation programmes. He concluded that this cycle can be broken by improving the nutritional status of women in their productive years, whereby foetal malnutrition, arrested mental development and physical stunting in children, adolescents and adults can be prevented. The result will be an improvement in human capital, health and productivity with the ultimate aim of escaping poverty as suggested by the seven principles of Solomons (2005).

Ijaiya and Bello (2011), using a multiple regression analysis in their paper, examined the impact of economic growth on poverty reduction in Nigeria by taking into consideration a time subscript and a difference-in-difference estimator that describes poverty reduction as a function of changes in economic growth. The result obtained indicates that the initial level of economic growth is not prone to poverty reduction, while a positive change in economic growth is prone to poverty reduction. To therefore improve and sustain the rate of economic growth in Nigeria from which poverty could be reduced measures, such as, stable macroeconomic policies, huge investment in agriculture, infrastructural development and good governance are suggested.

Adekola (2014), examine the effect of living and environmental condition on infant mortality in a typical Local government area in Nigeria, a case study of the Ibadan North local government area from 2006 to 2010 and perceptions of the people were obtained from Focused Group Discussions (FGDs) with mothers of between 15 and 49 years at 6 purposively selected residential areas. Analysis of the demographic records shows that the local government, whose average total population was 306,795 has at least 1431 infant deaths. There is variation in the number of infant death based on differences in certain housing/environmental characteristics of selected districts, especially sanitation and waste management concerns. The study indicates that inadequate toilet facilities and poor sanitary condition were the bane of high infant mortality there. He contended that infant mortality can be reduced to the barest minimum if good toilet facilities are mandated for each household and good waste management approach is adopted.

Babanyara and Usman (2010) surveyed the linkages between population growth and environmental problems in Nigeria. Issues related to urban poverty, urbanization, deforestation, desertification, water pollution, solid waste management, flooding, erosion, sanitation and health were also highlighted. The study established that an inverse relationship exists between population growth and environmental degradation.

Lanrewaju (2012) surveys the housing quality in Nigeria cities and the impacts of urbanization on environmental degeneration of urban built environment. The paper finds that the poor housing quality has serious adverse effects on environment and the health of city residents.

Strategies for improving the built environment for sustainable living are suggested. The paper concluded that it is imperative to check and prevent further decay for harmonious living and sustainable developments.

Stephen and Bidemi (2018) examined the implication of poverty on health status in Nigeria. The essentiality of the study was as a result of current growing rate of poverty that has greater implication on both life expectancy and infant mortality rates. Thus, the objectives of the study were to examine the impact of poverty on life expectancy in Nigeria and as well examine the impact of poverty on infant mortality rate in Nigeria using data spanning from 1980-2016. To achieve the stated objectives, secondary data on Nigeria from World Bank data bank were collected on poverty gap, life expectancy and infant mortality rate. The study applied the ADF unit root test on variables such as Poverty gap (PVG), life expectancy rate (LER) and infant mortality rate (IMR), co-integration and granger causality tests were used to analyse the collected data. The ADF unit root test of the series showed that the variables were stationary at first difference. Again, the results of Engle Granger co-integration test result showed that there is a long-run relationship amongst the variables. Also, Pairwise Granger causality test result showed that poverty affects both life expectancy and infant mortality rate. The paper concluded that there is high rate of poverty in the Nigerian economy and this variably will have a negative effect on the health status which will in the long run affect economic growth. Based on the findings, the study recommended that Nigerian government should implement welfare programmes and increase fiscal expenditures to create employment that will check the growing rate of poverty. Also, emphasis should be placed on the capital expenditure on health sector, in this will stimulate the rapid development of the sector.

Thorpe and Joski (2018) examined the association of social service spending, environmental quality and health behaviours on health outcomes. The study found that the determinants of health are exercise, air pollution, smoking, per pupil educational spending, and several types of social service spending were associated with improvements in health outcomes. These health outcomes included age-adjusted mortality, chronic disease prevalence, days of poor health, and obesity rates. The study recommends increase investments in social services, improved environmental quality, and good health behaviours as to improve the health outcome of communities.

METHODS

Research Methodology involves detailed empirical procedures such as, source of data, techniques, model specification, definition of variables and method of data analysis.

Source of Data

Data spanning from 1986-2018 is sourced from the Central Bank of Nigeria (CBN), World Bank annual reports, National Bureau of statistics and the internet on variables such as: Poverty rate less than \$1.25 per day (PTY\$1_25), Public expenditure on Health (PEH), Out of pocket expenditure on Health (OPH), Carbon dioxide emission (CO₂) Nitrous emission (NEM) and life expectancy.

Techniques

The work is basically descriptive and analytical secondary data covering the periods above was used in investigating the joint interactions of poverty and environmental degradation on life

expectancy in Nigeria. Descriptive statistic and correlation matrix will be used to measure the responsive of the variables in the model as well as their correlations. Furthermore, ordinary least square (OLS) techniques-based Vector Auto-Regression estimate will be estimated to generate the individual contributions to the errors before proceeding to impulse response and variance decompositions of the forecast error variances. Firstly, augmented dickey fuller (ADF) unit root test will be used to verify the stationarity of the time series data used in the study before proceeding to Johansen cointegration test. EViews 10 will be used to facilitate the research work.

Model Specification

This research work adopted a modified version of Eneji et al. (2013) model. life expectancy is used as the dependent variable and other variables such as poverty rate, nitrous emission rate, and CO2 emission, were used as the independent variables while out of pocket expenses on health and public expenditure on health serve as the control variables. The functional form of Eneji et al. (2013) model is given as: $L = f(TR, AP, GCF,$

GMLCO2) (1)

Whereas the functional form of the study model is giving in the following equation form:

$LER_t = f(Pty_{1.25}, Co2, NEM, OPH, PEH) \dots\dots\dots (2)$

The VAR equation as used is specified as:

$LER_t = \beta_{01} + \sum^k \alpha_{1i} LER_{t-1} + \sum^k \alpha_{2i} PTY_{1.25_{t-1}} + \sum^k \alpha_{3i} Co2_{t-1} + \sum^k \alpha_{4i} NEM_{t-1} + \sum^k \alpha_{5i} LnOPH_{t-1} + \sum^k \alpha_{6i} LnPEH_{t-1} + \epsilon_t \dots\dots\dots 3)$

Where;

LER = Life expectancy.

PTY_1.25 = poverty rate below \$1.25 dollar per day.

CO₂ = Carbon dioxide emission from residential building and commercial services (% of Total combustion).

NEM = Nitrous emission (thousand metric tone of CO₂ equivalent).

OPH = Out of pocket expenditure on health

PEH = Public expenditure on health.

α 's and β_s = unknown parameters of the variables.

f = functional notation.

Table 1: Descriptive Statistics

	LER	PTY\$1_25	CO2	NEM	LOG(OPH)	LOG(PEH)
Mean	47.03949	59.99545	68082.58	22756.21	4.270535	1.841301
Median	45.58000	61.40000	68154.86	19770.31	4.287991	2.722610
Maximum	55.04000	68.51000	106068.0	46431.49	4.392348	5.551874
Minimum	44.50000	48.11000	21539.96	11470.06	4.102313	-3.218876
Std. Dev.	3.224007	6.402634	24782.60	9947.018	0.077813	2.993812
Skewness	1.364392	-0.499348	0.028606	0.918236	-0.467664	-0.292181
Kurtosis	3.457189	1.950235	1.603098	2.548254	2.233643	1.585214

Jarque-Bera	12.43985	2.886674	3.990659	7.302445	2.375982	3.807538
Probability	0.001989	0.236138	0.135969	0.025959	0.304833	0.149006
Sum	1834.540	1979.850	3336046.	1115054.	166.5509	71.81074
Sum Sq. Dev.	394.9804	1311.799	2.95E+10	4.75E+09	0.230083	340.5907
Observations	39	33	49	49	39	39

The average of the distribution as shown by the mean values for LER, PTYL.25, CO2, NEM, Log (OPH) and Log (PEH) are; 47.03945, 59.99545, 68082.58, 22756.21, 4.2705, 1.841301 while the median which is the measure of centre of the distribution which is less sensitive to the outliers relative to the mean are; 45.58000, 61.40000, 68154.86, 19770.31, 4.287991, 2.722610 respectively.

The maximum and minimum value in the distribution includes; 55.04000, 68.51000, 106068.0, 46431.49, 4.392348, 5.551874 and 44.5000, 48.11000, 21539.96, 11470.06, 4102313, -3218876 respectively.

Skewness values indicates that PTY \$1.25, Log (OPH) and Log (PEH) has long-left tails given the negative values of their coefficients while LER, CO2, NEM has long-right tails given the positivity of their coefficients.

Kurtosis which measures the peakedness of the distribution indicates that LER is peaked (leptokurtic) while others are flat relative to normal. The normality test conducted by Jarque – Bera statistic and its associated probability, indicates that all series are normally distributed except the coefficient of LER and NEM whose probability values are less than 0.05 after 39 observations.

Table 2: Co-integration Output

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.631814	89.78091	95.75366	0.1200
At most 1	0.536625	58.80671	69.81889	0.2739
At most 2	0.421375	34.96095	47.85613	0.4501
At most 3	0.297555	18.00082	29.79707	0.5660
At most 4	0.202833	7.052000	15.49471	0.5716
At most 5	0.000793	0.024581	3.841466	0.8753
Trace test indicates no cointegration 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		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.631814	30.97420	40.07757	0.3622
At most 1	0.536625	23.84576	33.87687	0.4669
At most 2	0.421375	16.96013	27.58434	0.5834
At most 3	0.297555	10.94882	21.13162	0.6524
At most 4	0.202833	7.027419	14.26460	0.4859
At most 5	0.000793	0.024581	3.841466	0.8753
Max-eigenvalue test indicates no cointegration at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

A close look at the cointegration output indicates the absence of cointegrating relation among the variables in the model given the fact that the values of both trace statistic and the Max-Eigen values are less than the critical values at 5% level of significance. Thus, the need to perform VAR.

Table 3: Vector Autoregression Estimates

Vector Autoregression Estimates						
	LER		CO2	NEM	LOG(OPH)	LOG(PEH)
LER(-1)	0.874388 (0.11347) [7.70604]	(0.34837) [- 2.11380]	1086.640 (1384.26) [0.78500]	248.3898 (512.487) [0.48468]	0.017993 (0.00602) [2.98930]	0.090255 (0.11557) [0.78094]
PTY\$1_25(-1)	-0.115389 (0.13393) [-0.86152]	0.821043 (0.10417) [7.88184]	508.0688 (413.924) [1.22744]	-64.93957 (153.244) [-0.42376]	-0.003821 (0.00180) [-2.12284]	0.042703 (0.03456) [1.23566]
CO2(-1)	1.80E-06 (9.1E-06) [0.19892]	6.15E-05 (2.8E-05) [2.21054]	0.746047 (0.11064) [6.74329]	0.038706 (0.04096) [0.94498]	-3.73E-07 (4.8E-07) [-0.77490]	1.08E-06 (9.2E-06) [0.11714]
NEM(-1)	6.67E-06 (3.4E-05) [0.19392]	-7.35E-05 (0.00011) [-0.69573]	-0.269127 (0.41983) [-0.64104]	0.685174 (0.15543) [4.40821]	-2.89E-06 (1.8E-06) [-1.58438]	3.48E-05 (3.5E-05) [0.99251]
LOG(OPH(-1))	3.155900 (3.47544) [0.90806]	-1.922344 (10.6702) [-0.18016]	-29952.40 (42399.0) [-0.70644]	6855.202 (15697.1) [0.43672]	0.172819 (0.18436) [0.93740]	-3.042273 (3.53988) [-0.85943]
LOG(PEH(-1))	0.265556 (0.16047) [1.65487]	0.829969 (0.49267) [1.68463]	1041.393 (1957.67) [0.53196]	724.0474 (724.774) [0.99900]	-0.008501 (0.00851) [-0.99868]	0.612367 (0.16345) [3.74662]
C	-7.223052 (13.3240) [-0.54211]	21.79585 (40.9071) [0.53281]	69577.49 (162548.) [0.42804]	-32409.37 (60179.0) [-0.53855]	3.019667 (0.70679) [4.27235]	6.322205 (13.5711) [0.46586]
R-squared	0.952285	0.844460	0.886425	0.873961	0.672107	0.907885
Adj. R-squared	0.940834	159.7877	0.859167	0.843712	0.593413	0.885777
Sum sq. resid	16.95183	2.528143	2.52E+09	3.46E+08	0.047701	17.58634
S.E. equation	0.823452	29.05085	10045.80	3719.188	0.043681	0.838721
F-statistic	83.15802	-71.13579	32.51992	28.89187	8.540726	41.06650
Log likelihood	-35.24027	4.883487	-336.3334	-304.5366	58.73046	-35.82822
Akaike AIC	2.640017	5.204117	21.45834	19.47104	-3.233154	2.676763
Schwarz SC	2.960647	60.18500	21.77897	19.79167	-2.912524	2.997393
Mean dependent	47.51125	6.410324	74514.60	27345.49	4.248972	2.756471
S.D. dependent	3.385334		26769.04	9407.726	0.068504	2.481652
Determinant resid covariance (dof adj.)		5.98E+12				
Determinant resid covariance		1.36E+12				
Log likelihood		-719.4509				
Akaike information criterion		47.59068				
Schwarz criterion		49.51446				

The outcome of vector autoregression estimate indicate that life expectancy has strong endogenous significant influence on itself. The past realization of LER (-1) strongly influence itself by contributing 87% to the present value of LER. Other variables that have influence on life expectancy are out of pocket expenditure on health (OPH) and poverty (PTY\$1.25), given their t-statistic value of 2.98902 and -2.11380 respectively. Meaning that other variables such CO₂ emission, nitrous emission and public expenditure on health are not significant to cause changes on life expectancy. The higher the poverty level the decline in life expectancy all things being equal.

The past realizations of poverty (PTY \$1.25) strongly influence itself given that its t-statistic value is above 2 (7.88184). Meaning that it is significant to cause variation on itself. In the same manner, only out of pocket expenditure on health (OPH) is significant to cause poverty by emitting – 0.003821 shocks. However, OPH has negative significant impact on poverty. Other variables in the model are not significant to cause poverty.

The past realizations of CO₂ emission have positive significant impact/influence on itself given that its t-statistic value is more than 2 (6.74329), the only significant variable that influence CO₂ emission is poverty but with positive shocks indicating that increase in poverty increases CO₂ emission. Other variables are not significant given the values of their t-statistic less than the threshold 2.

The past realization of nitrous emission weakly influence itself and very significant given that the t-statistic value is more than the threshold of 2. (4.40821) and other variables in the model are not significant to cause variation on nitrous emission (NEM). The past realizations of out-of-pocket expenditures on health has very weak influence on itself and not significant given the t-statistic value less than the threshold 2. (0.93740).

The past realizations of public expenditure on health has weak significant influence on itself given the t-statistic value of 3.74662 is above the threshold of 2. Other variables in the model are not significant to cause variation in PEH.

Variance Decomposition Result

For easy interpretation of the variance decomposition result, the forecast period has been divided into short-run and long-run. The short-run takes the period of year one to year two (1-2) while the long-run takes year 3 to years 4 (3-4) respectively.

The Variance Decompositions for Life Expectancy (LER)

Table 4: LER

	S.E.	LER	PTY\$1_25	CO2	NEM	LOG(OPH)	LOG(PEH)
1	0.823452	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	1.137642	95.72434	0.019704	0.093496	0.016485	0.664794	3.481182
3	1.391776	82.31228	0.119739	0.320463	0.105407	0.595747	6.646365
4	1.613404	79.32848	0.125784	0.662091	0.335410	0.473085	9.175153

In the short run year one, LER has strong endogenous influence on itself by contributing 100% forecast error variance while it contributes 95% forecast error variance in the second year of the short run, while other variables contributed only 4.3% forecast error variance to the dependent variable. LER maintained strong influence even in the long period by contributing 82% and 79%

forecast error variance in the third and fourth years respectively. Other variables contributed 17.7% and 20.1% respectively in the long-run but carbon dioxide emission has more influence among other variables from the short period to the long period by contributing 12%, and 13% in the third, and fourth years.

Variance Decomposition of Poverty

Table 5: Variance Decomposition of Poverty

Period	S.E.	LER	PTY\$1_25	CO2	NEM	LOG(OPH)	LOG(PEH)
1	2.972027	1.563810	98.43619	0.000000	0.000000	0.000000	0.000000
2	4.553213	2.148454	95.62793	0.213288	0.003470	1.039263	0.967595
3	5.404790	2.360217	93.01687	0.561330	0.048141	1.540627	2.472818
4	5.851283	2.342909	90.73568	1.090030	0.214876	1.956295	3.660214

Poverty (PTY \$1.25) has strong endogenous influence on itself in both short and long-run. PTY \$1.25 emitted 99% and 93% forecast error variance on itself in the short run and 86%, 81% in the long run. The main influence on poverty in both short and long – run are CO2 emission and public expenditure on health through the emission of 1.6%, 4.4%, 7.4% and 3.7%, 7.3%, 9.6% in year two, three and four respectively. Cumulatively, other variables in the model only contributed 0.4%, 6.5%, 3.7% and 9% in both short and long – run. Meaning that they have weak exogenous influence on poverty.

Variance Decomposition of CO2

Table 6: Variance Decomposition

Period	S.E.	LER	PTY\$1_25	CO2	NEM	LOG(OPH)	LOG(PEH)
1	1805928.	11.67979	4.262866	84.05734	0.000000	0.000000	0.000000
2	2067909.	11.45402	7.605533	67.19404	0.064289	13.38790	0.294227
3	2187571.	10.27166	7.508174	60.25754	0.118470	17.84711	3.997050
4	2268282.	10.13885	8.999077	57.71046	2.273294	17.02365	3.854677

CO2 emission has strong endogenous influence in both short and long-run. In the short run, CO2 emitted 84% and 67% forecast error variance while other variables in the model only contributed 16% and 34% forecast error variance to CO2 emission meaning that other variables in the model has weak exogenous influence on CO2 emission in Nigeria. In the long-run, CO2 emission contributed 60% and 57% forecast error variance to itself while other variables emitted 40% and 43% forecast error variance respectively. Meaning that other variables in the model has strong exogenous influence on CO2 emission in the long-run.

Variance Decomposition of NEM

Table 7: Variance Decomposition

Period	S.E.	LER	PTY\$1_25	CO2	NEM	LOG(OPH)	LOG(PEH)
1	1877.965	12.12089	0.386496	0.023777	87.46884	0.000000	0.000000
2	2890.749	5.571929	0.467485	40.62829	50.57221	2.086481	0.673605
3	4729.626	3.151943	5.359623	67.83712	21.39722	1.124926	1.129166
4	5454.837	2.403853	10.33309	62.87920	16.84746	2.750075	4.786318

Nitrous emission (NEM) also has strong endogenous influence on itself given the forecast error variance directed in both short and long-run. In the short-run, NEM generated 87% and 51% forecast error variance to itself while other variables cumulatively contributed 13 percent and 49% forecast error variance in the short-run. In the long run, NEM emitted 21% and 17% forecast error variance while other variables in the model contributed 79% and 83% respectively. Variance Decomposition of LOG(PEH).

Variance Decomposition of OPH

Table 8: Variance Decomposition

Period	S.E.	LER	PTY\$1_25	CO2	NEM	LOG(OPH)	LOG(PEH)
1	0.041835	1.200317	8.895337	11.25861	0.309827	78.33591	0.000000
2	0.049555	12.81942	6.714302	13.01531	7.727970	58.27177	1.451221
3	0.055850	22.64586	10.18886	13.71686	6.107463	45.89283	1.448131
4	0.062929	27.07701	12.43843	17.22468	4.866310	36.93727	1.456300

OPH has strong endogenous influence on the first year of the short period accounting for 78% forecast error variance on itself and weak influence on itself on the second year of the short period. OPH emitted 58% forecast error variance in year 2. Other variables in the model cumulatively contributed 22% and 42% forecast error variance respectively. Meaning that other variable has strong exogenous influence on OPH in the second year of the short run. OPH maintains weak influence on itself in the long-run accounting for 45% and 35% forecast error variance. Meaning that other variables in the model have strong exogenous influence on OPH in the long-run by contributing a cumulative 56% and 65% forecast error variance to OPH respectively the major influence of OPH is life expectancy (LER).

Variance Decomposition of PEH

Table 9: Variance Decomposition

Period	S.E.	LER	PTY\$1_25	CO2	NEM	LOG(OPH)	LOG(PEH)
1	0.734312	4.173824	1.957107	5.447894	0.011565	6.630572	81.77904
2	0.774471	4.223754	1.775102	5.694456	1.333750	7.757059	79.21588
3	0.872595	4.537061	3.634525	6.511699	1.456677	8.541460	75.31858
4	0.944718	3.963410	5.626276	10.56595	1.822403	8.193701	69.82826

PEH maintained strong endogenous influence on itself in short run by accounting for 81% and 79% forecast error variance. Other variables in the model cumulatively contributed 19% and 21% forecast error variance to PEH in the short run. In the long-run, PEH emitted strong endogenous influence on itself given the forecast error variance of 75% and 69% other variables in the model have weak influence on PEH by accounting for 25.7% and 31% forecast error variance to PEH in the long run. The mean influence of PEH is NEM.

Impulse Response Result

Impulse response function is basically used to analyse the shocks and innovations and is referred to as the effect of external shocks and innovation in the system.

Impulse Response of LER to LER

Immediately after estimation of the VAR result comes the impulse response to analyse shocks and innovations. Life expectancy shocks effect to life expectancy is positive side throughout the periods although the effect decreases with the passage of time.

Life expectancy shock or effect to poverty starts from the zero point and slightly remained at zero till the end. Life expectancy shocks to carbon dioxide emission start from the zero and progressed to the positive part and increase slightly till the end. Life expectancy response to nitrous emission start from zero line but progressed to the positive side after the second year of the short-run and into the long-run period.

Life expectancy shock to out of pocket expenditure on health start from zero in the short-run and increase up to the second year before decreasing after the second year moving close to zero in the long-run. The shock on public expenditure on health started at zero but increase in both short and long-run.

Impulse response of poverty to life expectancy

The second impulse response function is related to poverty on life expectancy. It is viewed that poverty shock affect life expectancy negatively by starting from the negative part in the short-run and remained same throughout the long-run period.

Poverty short run effect on poverty is positive because it starts from the positive side in both short and long-run. It remains same till the end of that policy region.

Poverty shock also effect on carbon dioxide emission started from zero and progressed to the negative side in both short and long-run period. It never moved to the positive side.

Poverty shocks/innovation effect on nitrous emission is disjointedly. The shock start from zero in the short period, decrease to negative part in the second year and start improving finally back to zero in the long-run period.

Poverty shock to out of pocket expenditure on health start at zero in the short period and moved to the negative side in the long run. Finally, poverty shock or innovation to public expenditure on health start at zero in the short period and improved to positive side from the first year of the short period down to the long-run but remained stable from the third year down to the next period of policy effect region.

Impulse Response of Carbon Dioxide Emission

The impulse response of carbon dioxide emission is the third impulse response. The impulse response of carbon dioxide emission to life expectancy in Nigeria start from the positive part in the short run and remain there till the long-run despite the slight fall in the 3rd and 4th years. Meaning that CO₂ has a positive shock to life expectancy in Nigeria.

Carbon dioxide emission shock to poverty start from the negative side in the short run but progressed to the positive part after the first year of the short-run. It emitted positive shock before the second year of the short-run down to the long-run it remained at the positive part till the end of the policy effect region.

Carbon dioxide emission shock to nitrous emission dramatically start from zero and progressed sharply to negative in the short run and remained in the negative side in the long-run.

Carbon dioxide emission shock to out of pocket expenditure on health start dramatically at zero in the short-run, progressed to the negative side before stabilizing at the negative side from the second year of the short-run down to long-run before the end of the policy effect region.

Impulse Response of Nitrous Emission

Impulse response of nitrous emission to life expectancy start with shock from the positive side at the short-run and progressed to the long-run in the positive side till the end of policy effect region. Nitrous emission shock to poverty start from zero and remained stable at zero till the end of policy effect region.

Also, nitrous emission shock to carbon dioxide emission start from the negative side in the short-run but progresses to the positive side after the 1st year of the short-run.

Nitrous emission has a dramatic shock to nitrous emission starting from the positive side in the short-run, decrease along the line but never touches zero.

Nitrous emission shock to out of pocket expenditure on health start at zero, progressed to the positive side before stabilizing at zero in long-run. Finally, nitrous emission to public expenditure on health start at zero in the short-run, processed to the positive side from the 1st year of the short period down to the long period.

Impulse of Response of OPH

Out of pocket expenditure on health has a positive shock in short run and it remains so till the end of the policy circle (region). The 2nd year of the short-run, begins the stabilization process but gained stability by the third year.

Out of pocket expenditure on health started with positive shocks in the short run to poverty but diverted to negative shock immediately after the first year. It continued to decrease in the negative side until the 3rd when it gained stability. It remained in the negative side till the end of the policy region.

In the same manner, out of pocket expenditure on health emitted negative shocks from the short run period down to the long-period to CO₂ although there was some improvement found the zero line at the long-run. Meaning that out of pocket expenditure on health emit negative shocks to CO₂.

Also, out of pocket expenditure on health started with negative innovation to nitrous emission in the short-run and long-run. It remains at the negative side till the end of policy effect. It could also be seen that OPH start with positive shock and innovation on itself in the short-run and start decreasing but remained in the positive side.

OPH start with negative shocks and innovation to PEH in the short-run down to the long-run. It remained there till the end of policy region. Meaning that out of pocket expenditure on health emit negative shocks or innovation on public expenditure on health.

Impulse Response of PEH

Public expenditure on education has positive shock or innovation to life expectancy in the short run and it remains till the end of the policy region. It gained stability before the second year of the short run.

Also, public expenditure on health started with positive shock or innovation to poverty in the short-run and continue to increase till the long-run. Meaning that PEH has continues positive shock on poverty in Nigeria.

In a similar manner, public expenditures on health starts with positive shocks or innovation to CO₂ in the short run. Though it tended toward zero in the long-run but remained at the positive side till the end of policy region.

PEH also started with positive shock or innovation to NEM in the short-run down to the long- run till the end of policy region. It started increasing from the first period of the short-run down to the long-run. However, public expenditure starts with dramatic stride at the negative side in the short-run to out of pocket expenditures on health. It remained at the negative side till the end of policy region.

Finally, public expenditure on health start with higher optimism at the positive side of the short run on itself and remained there irrespective of the decrease. It never gained stability but remained at the positive side till the end of policy region.

CONCLUSION

The output of the vector autoregressive estimate after 32 adjustment shows that the past realization of life expectancy (LER) contribute 87% output to itself and it is significant given the t-statistic value of (7.70604). the other significant influencer of life expectancy is the coefficient of out of pocket expenditure on health and poverty given their t-statistic value of 2.58502 and -2.11380 respectively. Immediately after the structural VAR output, we employed variance decomposition and the impulse response to check the decree of shocks and innovations generated by the series.

The impulse response output indicates that life expectancy has positive shock or innovation on itself, CO₂, NEM, OPH and PEH respectively, while poverty had positive shock or innovation on itself, CO₂, NEM, OPH. In the same manner, CO₂ had positive shock or innovation to life expectancy, PTY \$1.25, CO₂, and negative shock or innovation on NEM, OPH and PEH, NEM is said to had have positive effect on LER, NEM, PEH and CO₂ and remained indifference on PTY \$1.25, OPH. Also, OPH had positive shock or innovation to LER, OPH and negative shock or innovation to PTY \$1.25, CO₂, NEM & PEH. Finally, PEH emitted positive shock to LER, PTY \$1.25, CO₂, NEM, PEH but a negative shock to OPH.

The variance decomposition which identifies the contributions or unit forecast error contributions of the variables in the model to the dependent variable shows that life expectancy had strong endogenous influence in both short and long-run given the forecast error variance of 100%, 95%, 92%, and 89% respectively against the 0%, 4.3%, 7.8% and 10.7% forecast error variance contributed by other variables in the model. The major influencer of life expectancy is out of pocket expenditure on health, and poverty. While that of environment is influence mainly by the level of poverty.

Recommendations

The paper recommends that skill acquisition be introduced at all level of our educational institution as to reduce the level of poverty. Poverty alleviation programme should be targeted at the poor and not at political party's member and environmental literacy should be included in our curriculum in schools.

REFERENCES

- Adekola, K. (2014). Environmental factors affecting infant mortality in Ibadan, North local government. *African Journal of Social Sciences*, 4(4), 53-67.
- Amadi, S. O. N., & Akpakabowei, T. T. (2019). Environmental quality and life expectancy in Nigeria. *Reiko International Journal of Social and Economic Research*, 14(2), 67-75.
- Babanyara, Y. Y., & Usman, H. A. (2010). An overview of urban poverty and environmental problems in Nigeria. *Urban and Regional Planning Program, 2 Architecture Program, Urban and Regional Planning*. Abubakar Tafawa Balewa University.
- Eneji, M. A., Vonke, D. J., & Onabe, B. J. (2013). Health care expenditure, health status and national productivity in Nigeria (1999-2012). *Journal of Economics and International Finance*. 5, 258-272.
- Hester, E. H., & Vorster, L. (2009). The link between poverty and malnutrition: A South African perspective. *North-West University, South Africa*, 15(1), 1-6.
- Ijaiya, M., & Bello, G. (2011). Economic growth and poverty reduction in Nigeria. *International Journal of Business and Social Science*. 2(15), 147-162.
- Lanrewaju, R. (2012). *Urbanization, housing quality and environmental degeneration in Nigeria*. An unpublished master's dissertation Department of Architecture, Ladoke Akintola University of Technology.
- Matthew, O., Osabohien, R., Fagbeminiyi, F., & Fasins, F. (2018). Greenhouse emissions and health outcomes in Nigeria. Empirical evidence from ARDL technique. *International Journal of Energy Economics and Policy*, 12(4), 234-245.
- Morenike, B. (2008). Causes and effects of urban decay in Nigeria: Case studies of federal ministry of environment, Housing and Urban development intervention in urban renewal. *Paper presented at the 39th Annual Conferences of the Nigeria institute of town planning Yola Nigeria*.
- Mosley, W. H., & Chen, L. C. (1984). An analytical framework for the study of child survival in developing countries. *Population and Development Review*, 10(1), 25-41.
- Muttunga, N. (2007). Environmental determinants of child mortality in Kenya, WIDER Research Paper, No. 2007/83. The United Nations University World Institute for Development Economics Research (UNU-WIDER), Helsinki.
- Oluwemimo, O. (2007). Social system, institutions and structures: Urbanization, poverty and changing quality of life. *Paper presented at the Training Sessions of the Foundation for Environmental Development and Education in Nigeria*.
- Solomon, C. (2005). Airborne particulate matter and human health. *Aerosol Science and Technology*, 39(8), 334-349.

- Stephen, K., & Bidemi, O. J. (2018). Implication of Poverty on Health Status in Nigeria. *International Journal of Research and Innovation in Social Science (IJRISS)*, 11(2), 2454-6186.
- Thorp, K. E., & Josk, P. (2018). Spending, environmental quality, and health behaviours on health outcomes. *Population Health Management*, 21(4), 571-582.