The Effect of CO_2 Emissions on Quality of Life in Anglophone Countries in West Africa

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Abstract

West African countries faced severe ecological hazards that affect the quality of life of the countries. An estimated seven million folks annually die from emission-related diseases in this region. Several health-harmful emission pollutants conjointly injury the climate and reducing emission pollution would save lives and facilitate slow the pace of near-term global climate change. The study used number of environmental factors that have a promising impact on Anglophone Countries in West Africa's quality of life. The period covered in the research work was from 1990 to 2018 using panel quantile regression. The result obtained showed that the CO_2 emission that can affect the quality of life of Anglophone countries in West Africa are CO_2 emissions from gaseous fuel consumption, CO_2 emissions from liquid fuel consumption, CO_2 emissions from residential buildings and commercial and public services, CO2 emissions from solid fuel consumption, CO_2 emissions from transport. Other control variables that have influence on quality of life were health expenditure, mortality rate and fertility rate. Therefore, the policy makers should implement policies (like energy conservation policies) that will control emission from gaseous fuel consumption, emissions from liquid fuel consumption, emissions from residential buildings and commercial and public services, emissions from solid fuel consumption and emissions from transport. Also, health sector has to be properly cater for by spending more on health and this can only increase the health outcomes and also the quality of life among the countries.

Keywords: Quality of life, CO_2 emission, panel data analysis, panel quantile regression
JEL Classification: C33, I18, O55, Q53

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1. Introduction

A healthy atmosphere may be a necessity for sound and effective health policies and for an occasional carbon economy. Developed countries emphasised the requirement for safety nets and health infrastructure to pronounced environmental hazards. Developing countries try arduous to achieve a healthy atmosphere and pay a lot of million dollars on the impediment of pollution and environmental health hazards. Africa having no exceptions leave from this whole method because of insufficient finance, inadequate restrictive and institutional capability in most of the Africans countries (Zaman *et al.*, 2016). An estimated seven million folks annually die from emission-related diseases. These embrace stroke and cardiopathy, disease and cancers. Several health-harmful emission pollutants conjointly injury the climate and reducing emission pollution would save lives and facilitate slow the pace of near-term global climate change. The increasing deterioration in environmental quality across the planet is conveyance out a heavy challenge to healthy living beside the increasing threat of worldwide warming (Balan, 2016). In Africa, pollution is inflicting additional premature deaths than unsafe water or childhood deficiency disease and will be converted into a health and climate crisis. Pollution killed 712,000 folks annually untimely compared with 542,000 from unsafe water, 275,000 from deficiency disease, and 391,000 from unsafe sanitation (Dhrifi, 2018).

Also, West African countries over the years have tried to develop their economies by shifting step by step from associate degree farming economy to associate degree industrialized one. This can be not shocking since industrialization has been historically thought of because the backbone for economic development. The rise in economic development has diode to warming with carbonic acid gas (carbon dioxide) because the main gas at the middle of the talk (Adu and Denkyirah, 2018). Advanced economies make the most to set-up their industries in developing countries to interact in environmentally hostile activities because of the weak environmental laws and policies within the sub-region, rendering West Africa a 'pollution haven' since there national lack finance to set up their own industries and its affected the standard of leaving (quality of life) of their national greatly (Odusanya *et al.*, 2014). From a health and development perspective, making certain universal access to trendy energy services in health facilities in developing countries is a vital demand for rising health and well-being. However, proof concerning energy access in health care facilities in developing regions is lacking (Zaman *et al.*, 2016).

Although, there are numerous research work that has been done in this area (Assadzadeh *et al.*, 2014; Odusanya *et al.*, 2014; Jerumeh *et al.*, 2015; Balan, 2016; Zaman *et al.*, 2016; Dhrifi, 2018; Adu and Denkyirah, 2018; Zaidi and Saidi, 2018; Matthew *et al.*, 2018; Munawer, 2018 & Nkalu and Edeme, 2019). This study identifies some gaps in the literature based on the past studies in this area. Firstly, past studies solely thought of aggregated data on CO_2 emission except for few work like Balan, (2016) that break the emission into CO_2 emission from the consumption of coal, from the consumption of natural gas and from the consumption of petroleum. These aren't the sole emission that may be thought of and this can be one amongst the known gaps that this study is ready to full by considering CO_2 emissions from electricity and heat production, from gaseous fuel consumption, from liquid fuel consumption, from manufacturing industries and construction, from other sectors, excluding residential buildings and commercial and public services, from residential buildings and commercial and public services, from solid fuel consumption and from transport. Also, this study distinguished itself from the previous studies with respect to the adoption of panel quantile regression that has become a vital and well-liked research tool to check the conditional-response distribution in regression. The overall path for etymologizing quantile regression relies on the quality linear model and quantile regression is achieved by extending the median case to all or any alternative capricious quantiles.

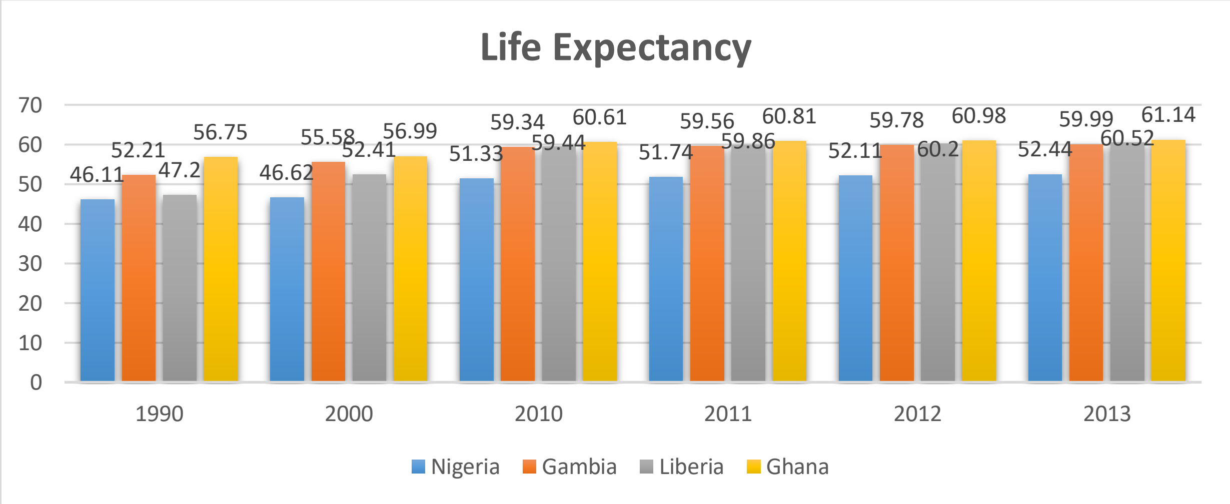
The rest of this paper is organized in four sections. Section two reviews the theoretical underpinning and literature review. Section three is devoted to the estimation technique, data source and variables measurement. Section four presents the discussion of results and Section five concludes the study.

2. Literature Review

2.1 Conceptual Review

Figure 1 depicted the life expectancy in Anglophone countries in West Africa as an indicator of the quality of life. Life expectancy is used to measure the quality of life in a country. It is an estimate of an individual's life span derived from averaging the age of all individuals who die in a particular year (Chen and Ching 2000). According to Worldometers data (2019), Nigeria population was 200,963,599, Ghana population was 30,417,856, Liberia population was 4,937,374 and Gambia population was 2,347,706. It could be observed that despite the fact that Nigeria population can swallow all the population of over countries within the Anglophone countries in West Africa three times but it has the lowest life expectancy indicating that population increase without improvement in living standard is detriment to health of the citizen as well as their average number of years that they will live up to. The highest life expectancy in Nigeria was recorded in 2013 as 52.44 meaning that an average Nigerian live up to 52.44 years on average. Ghana has the highest life expectancy throughout the years followed by Liberia and Gambia. People in Ghana can live up to 61.14 years and Liberia people can live up to 60.52 years while Gambia people can live up to 59.99 years.

Figure 1: Stylist Fact about Life Expectancy in Anglophone Countries in West Africa



Source: Authors' compilation using Word Bank WDI data set, 2017.

2.2 Theoretical Underpinnings

The quality of life implications of carbon dioxide emission is better understood using the externality theory. The externality theory is applicable whenever the wellbeing of a consumer or production possibilities curve of a firm is/are directly plagued or affected by the actions of another agent in the economy. A consumer or firm might in some circumstances be directly plagued by the actions of different agents within the economy; that is, there is also external effects from the activities of different consumers or firms (Kemiki *et al.*, 2014). As an example, a spread of external costs is related to carbon dioxide emission with associate overall impact on the standard of leaving (quality of life) of the folks and therefore the value of close properties. Externality is one amongst two types: straightforward bilateral externality, that is, that the simplest attainable externality, and many-sided externalities. Straightforward bilateral externality is the one that involves solely two agents within the economy, wherever one amongst the agents engages in associate activity that directly affects the other. In most cases, externalities are generated and felt by various parties. This is often significantly true of these externalities, like air pollution caused by automobile use, or congestion, that area unit wide thought of to be necessary policy issues (Jerumeh *et al.*, 2015).

2.3 Empirical Review

Numerous studies have been conducted on the link between greenhouse gas emission and quality of life. Balan (2016) tests for the presence of the relation among life expectancy at birth, carbon dioxide emissions in terms of the supply of consumption, total health expenditures and education for sample of twenty five EU member countries (Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Poland, Portugal, Romania, Slovenia, Slovakia, Spain, Sweden, and United Kingdom) covering the period of 1995 to 2013. This study utilised panel data analysis and the result showed that there exists a bidirectional causal relationship between life expectancy and all the other explanatory variables, except for carbon dioxide emissions consumption from coal. Similarly, there was a bidirectional causal relationship between health expenditures and different variables, aside from dioxide emissions from the consumption of coal. Moreover, the study ascertained that there exist causal relationships among health, education and environmental quality that area unit proxied by dioxide emissions in terms of consumption coal, gas, and oil. It equally showed that environmental quality may be thought of as a constraint for economic process, the causes of education and also the quality of human life in EU-25 member countries.

Also, Assadzadeh *et al.*, (2014) examined the role of environmental quality and life expectancy in determinative per capita health expenditures of the Organization for Petroleum Exporting Countries (OPEC) for the period covering 2000 and 2010. The result revealed that a rise in greenhouse gas emissions will increase health expenditures, whereas an increase in life expectancy at birth decreases health expenditures within the short-term. Sulemana *et al.*, (2016) examined people’s perceptions concerning native environmental quality (poor water, poor air, and poor sanitation/sewer) and international environmental quality (global warming, loss of animal and plant species, and pollution of water bodies) area unit correlate with their well-being in an exceedingly cross-country sample using data from the World Values Survey. The study finds a correlational statistics between perceptions concerning the poorness of native environmental quality and subjective well-being for each developed and African countries. However, in

developed countries, there a correlational statistics between perceptions concerning the poorness of worldwide environmental quality and subjective well-being.
Based on the studies in Africa, Dhrifi, (2018) examined the consequences of environmental degradation, institutional quality, and different economic variables on health using panel data from forty five (45) African countries over the period of 1995 to 2015. The empirical analysis was administrated using the generalized method of moments (GMM) method to unravel the matter of endogenous variables. Findings revealed that there was a negative relationship between environmental degradation and health on one hand, and a positive relationship between institutional quality and health on the opposite hand. Moreover, the direct and negative effects of environmental degradation on health could also be bated by the indirect and positive effects through the institution's quality and economic science variables.

Also, Zaidi and Saidi, (2018) examined the nexus between health expenditure (HE), environmental pollution (CO_2 emissions; Nitrous oxide emissions) and economic growth process in Sub-Saharan Africa countries using annual information over the period of 1990 and 2015. The study applied the estimation methodology autogressive distributed lag (ARDL) to model the long-term and short run relationship. Besides, the study used the vector error correction model (VECM) method to check the direction of relation. Firstly, the results of the ARDL check indicated that economic growth process encompasses a positive impact on the HE whereas greenhouse gas emissions and nitrous oxide emissions have negatives impacts on the HE within the long-term. The results showed that a 1% increase in per capita GDP can cause a 0.332% increase within the health expenditure, however a rise in greenhouse gas emissions and NOE of 1% decrease the HE by 0.066% and 0.577% respectively. On the opposite hand, the results of the VECM showed that there's a unidirectional relationship going from the HE to GDP per capita. On the contrary, a two-way relation relationship between greenhouse gas emissions and GDP per capita and additionally between the HE and greenhouse gas emissions is found.

Furthermore, Zaman *et al.*, (2016) examined the environmental factors touching health indicators in Sub-Saharan Africa countries. The study utilised variety of environmental factors together with dioxide emissions, energy use, fuel energy consumption, land used below cereal production, house final consumption expenditures and water sanitation facility that have a promising impact on African’s health. The study thought of four health variables together with external resources for health, health expenditures per capita, life expectancy at birth and out-of-pocket expenditures for seven elite Sub-Saharan African countries specifically: Botswana, Cameroon, Kenya, Nigeria, Senegal and Sudan for panel data estimations, throughout 1995–2013. The results confirmed that environmental factors have an effect on the African’s health i.e., dioxide emissions increase the health expenditures per capita, whereas it decreases the external resource of health during a region. Fossil fuel energy consumption will increase the external resources of health and life expectancy whereas it decreases the owed expenditures of the African countries. Life expectancy considerably decreases the external resource of health. Finally, inadequate water sanitation will increase aid expenditures whereas it decreases the external resources of health and life expectancy in Sub-Saharan African countries.

In the same manner, Issaoui *et al.*, (2015) studied the consequences of dioxide emission on economic growth, urbanization, energy consumption, life expectancy and welfare of Middle East and North African (MENA) countries which has Democratic and Popular Republic of Algeria, Bahrain, Egypt, Emirates Arabs, Jordan, Saudi Arabs, Morocco, Qatar, Tunisia, and Yemen between 1999 and 2010. The study adopted the Fully Modified Ordinary Least Squares (FMOLS) and dynamic ordinary least squares (DOLS) in investigation each the short and long effects of the study objectives. However, the result shows that life expectancy is influenced negatively by the dioxide emissions in each the short and end of the day of all the MENA countries. The result equally revealed that dioxide emissions square measure completely influenced by energy consumption per capita and statistically significant. The result conjointly noted that income per capita affects dioxide emission negatively in the long run as a results of the activities of the nonpolluting sector and economic methods of the MENA countries.

Also, Nkalu and Edeme, (2019) investigated the extent to that environmental hazards have an effect on the life expectancy in Africa exploitation using Nigeria statistic data spanning from 1960 to 2017. The study adopted a generalized autoregressive conditional heteroscedasticity (GARCH) model in estimating the entire variety of fifty eight (years) observations to confirm robustness within the estimation results. The estimation results showed that environmental hazards in terms of dioxide (CO_2) emission from solid fuel consumption scale back life expectancy (LEX) by one month and three weeks with a statistically vital result. Also, income, as proxied by GDP, extends LEX by one year six months with the statistically insignificant result, whereas population growth (POPG) equally extends LEX by five years five months because of a rise in human resource/manpower which reinforces agricultural productivity in Africa. Supporting the empirical findings, there is a requirement for the African Union (AU) to adopt a policy regulation for the excessive dioxide emission from solid fuel consumption to ameliorate the negative consequences it exerts on the period of the African population. Conjointly among alternative policy recommendations, the economies in Africa ought to increase fund allocations to the science and technology sector to drive the economies from solid fuel consumption to a lot of substantial electricity/digital-driven technology and hybrid-energy economical mechanisms.

In the same vein, Jerumeh *et al.*, (2015) estimated the impact of commercial pollution on public health in Nigeria exploitation statistic knowledge sourced from World Development Indicators (WDI) knowledge from 1971-2011. The study used the 'theory of externality'. Within the same vein, the study utilised the VECM technique. The VECM shows a negative relationship between life expectancy (a proxy for public health) and dioxide emission (industrial pollution) each within the short and long-run. The coefficient of error correction term (-0.0802) of the model was significant and negative which implies that the system corrects its previous period disequilibrium at a speed of roughly 8% annually. The impulse response analysis revealed that after the first quarter, a one standard deviation shock in carbon emission has a negative and significant impact on life expectancy, thereby validating the negative relationship between life expectancy and carbon dioxide emission in Nigeria.

Furthermore, Matthew et al. (2018) used time-series data from 1985 to 2016 to look at the long-term impact of emissions of greenhouse emission (GHG) on health outcomes in Nigeria using the auto-regressive distribution lag (ARDL) economic science approach to co-integration. The ARDL estimations deduced that activities of humans cause harmful impact to health, as changes in atmospheric GHG concentrations can have an effect on the number of energy hold on within the atmosphere, conjointly it had been determined that human activities increase GHG to the atmosphere, this is often through combustion of fossil fuels and dioxide, and there square measure

2 major sources of GHG emissions (GHGE). When the quantity of carbon dioxide increases in the air, more heat is stored in the atmosphere; and this comes upon human beings thereby causing a great harmful effect to human health. The result from ARDL econometric approach to cointegration shows that 1% increase in GHGE reduces life expectancy by 0.0422% which is used as a proxy for health outcome, if this happens, invariably, mortality rate will be 146.6. The results also shows that 1% increase in government health care expenditure increases life expectancy approximately by 18.10%.

Also, Egbichi *et al.*, (2018) utilised a symmetrical ARDL model in crucial the impact of energy consumption on the expansion in African country from 1986 to 2016. The result from the symmetrical ARDL highlighted that because of constant fluctuations within the electricity offer, growth in African country has not recorded any significant improvement. The findings of the study equally observed that gas consumption in Nigeria has impacted completely on the economy because of activates of gas flaring and alternative environmental pollutants in some major oil-producing states within the Niger-Delta region. On the contrary, the result indicated that crude oil consumption contributes completely to the expansion of the Nigerian economy contrary to gas consumption.

Furthermore, Apergis *et al.*, (2018) employed panel methodological approaches to explore the link between 26 per capita carbon dioxide (CO2) emissions, per capita real gross domestic product (GDP), 27 renewable energy consumption, and health expenditures as health indicator for a panel of 42 28 sub-Saharan Africa countries, spanning the period 1995-2011. Empirical results supported a 29 long-term relationship between variables. In the short-run, Granger causality revealed the 30 presence of unidirectional causalities running from real GDP to CO2 emissions, to renewable 31 energy consumption, and to heath expenditures, and bidirectional causality between 32 renewable energy consumption and CO2 emissions. In the long-run, there was a unidirectional 33 causality running from renewable energy consumption to health expenditures, and 34 bidirectional causality between health expenditures and CO2 emissions. The long-run 35 elasticity estimates document that both renewable energy consumption and health 36 expenditures contribute to the reduction of carbon emissions, while real GDP leads to the 37 increase of emissions.

Moreover, Lu *et al.*, (2017) investigated the comprehensive dynamic relationship between environmental quality, economic development and public health in China for the first time. To control for potential endogeneity, the study utilized a carefully designed simultaneous equation model (SEM) that is composed of three equations that describe the relationships among economic development, environmental quality and public health. Using panel data from 30 Chinese provinces for the period from 2002 to 2014, the model verified the negative effect of environmental pollution on public health. Moreover, economic and social factors may also affect public health. For instance, real GDP per capita has a significant negative impact on perinatal mortality rates, and education and medical conditions also contribute significantly to promoting economic growth and improving the level of public health.

Additionally, Wang *et al.*, (2019) examine the dynamic linkages among CO_2 emissions, health expenditures, and economic growth in the presence of gross fixed capital formation and per capita trade by using auto regressive distributive lag (ARDL) model for Pakistan covering annual data from the year 1995–2017. Our empirical results show that there is significant long run as well as short-term causal relationship between health expenditure, CO_2 emissions, and economic growth in Pakistan. Bidirectional relationship of Granger causality is found between health expenditures and CO_2 emissions, and further between health expenditures and economic growth. Short-run unidirectional causality is running from carbon emissions to health-related expenditures. The bidirectional causal relationship is also investigated between carbon emissions and growth as well as gross fixed capital formation and growth. Then, policy recommendations towards controlling pollution, particularly CO_2 emissions and health expenditures without compromising economic growth are suggested.

Lastly, Halimaton *et al.*, (2013) examined the relationship between CO2 on quality of life and on economic growth in Asean 8. Pollution may directly decrease output and quality of life by decreasing productivity of man-made capital and labor. The income levels per capita gross domestic product per capita were measured from the year 1965 to 2010. The study formulates a three equation simultaneous model for empirical research. For panel data, the Hausman specification test is the classical test of whether the fixed or random effects model should be used. In the pollution indicator emissions CO2 in Asean 8, the Environmental Kuznets Curve relationship was found.

3. Estimation Technique, Data Source and Variables Measurement

This study makes use of quantile regression technique that was introduced in the seminal paper by Koenker and Bassett (1978). Whereas the method of least squares results in estimates of the conditional mean of the response variable given certain values of the predictor variables, quantile regression aims at estimating either the conditional median or other quantiles of the response variable and it is use when the conditions of linear regression are not applicable. Quantile regression is desired if conditional quantile functions are of interest. One advantage of quantile regression, relative to the ordinary least squares regression, is that the quantile regression estimates are more robust against outliers in the response measurements. However, the main attraction of quantile regression goes beyond that. Different measures of central tendency and statistical dispersion can be useful to obtain a more comprehensive analysis of the relationship between variables.

Let Y be a real valued random variable with cumulative distribution function $F_Y(y) = P(Y \leq y)$. The τ^{th} quantile of Y is given by

$$Q_Y(\tau) = F_Y^{-1}(\tau) = \inf \{y : F_Y(y) \geq \tau\} \quad (1)$$

Where $\tau \in (0,1)$.

Defining the loss function of life expectancy due to CO_2 emission as $\rho_\tau(y) = y(\tau - \prod_{(y \prec 0)})$, where $\prod$ is an indicator function. A specific quantile can be found by minimizing the expected loss of life expectancy due to CO_2 emission $Y - \varepsilon$ with respect to ε:

$$\min_{\varepsilon} E(\rho_\tau(Y - \varepsilon)) = \min_{\varepsilon} \left\{(\tau - 1)\int_{-\infty}^{\varepsilon}(y - \varepsilon)dF_Y(y) + \tau\int_{\varepsilon}^{\infty}(y - \varepsilon)dF_Y(y)\right\} \quad (2)$$

This can be shown by setting the derivative of the expected loss function of life expectancy due to CO2 emission to 0 and letting q_τ be the solution of

$$0=(1-\tau)\int_{-\infty}^{q_\tau} dF_Y(y)-\tau\int_{q_\tau}^{\infty} dF_Y(y)\qquad(3)$$

This equation reduces to

$0=F_Y(q_\tau)-\tau,$ and then to $F_Y(q_\tau)=\tau.$

Hence q_τ is τ^{th} quantile of the random variable Y.

The τ sample quantile can be obtained by solving the following minimization problem

$$\hat{q}_\tau=\arg\min_{q\in\Re}\sum_{i=1}^{n}\rho_\tau(y_i-q)\qquad(4)$$

$\hat{q}_\tau=\arg\min_{q\in\Re}\left[(\tau-1)\sum_{y_i<q}(y_i-q)+\sum_{y_i\geq q}(y_i-q)\right]$, where the function ρ_τ is the tilted absolute value function. The intuition is the same as for the population quantile.

The data for empirical analysis in this study is extracted from World Development indicators (WDI) and spanned over the period 1990-2018 from West Africa Anglophone countries which are Gambia, Sierra Leone, Liberia, Ghana and the most populous African country Nigeria but Sierra Leone was excluded because data were not available for some variables in Sierra Leone.

Table 1: Variables, Data Sources and Measurement

Variable Name	Identifier	Source of Data	Definition and Measurement
Quality of Life	QL	WDI, 2018	Quality of life measured by life expectancy at birth, total (years)
CO_2 emissions from electricity and heat production	CO2_EHP	WDI, 2018	CO2 emissions from electricity and heat production, total (% of total fuel combustion)
CO_2 emissions from gaseous fuel consumption	CO2_GFC	WDI, 2018	CO2 emissions from gaseous fuel consumption (% of total)
CO_2 emissions from liquid fuel consumption	CO2_LFC	WDI, 2018	CO2 emissions from liquid fuel consumption (% of total)
CO_2 emissions from manufacturing industries and construction	CO2_MIC	WDI, 2018	CO2 emissions from manufacturing industries and construction (% of total fuel combustion)
CO_2 emissions from other sectors, excluding residential buildings and commercial and public services	CO2_OTHER	WDI, 2018	CO2 emissions from other sectors, excluding residential buildings and commercial and public services (% of total fuel combustion)
CO_2 emissions from residential buildings and commercial and public services	CO2_RBCPS	WDI, 2018	CO2 emissions from residential buildings and commercial and public services (% of total fuel combustion)
CO_2 emissions from solid fuel consumption	CO2_SFC	WDI, 2018	CO2 emissions from solid fuel consumption (% of total)
CO_2 emissions from transport	CO2_TRANS	WDI, 2018	CO2 emissions from transport (% of total fuel combustion)
Health expenditure	HE	WDI, 2018	Health expenditure, total (% of GDP)
Mortality rate	MR	WDI, 2018	Death rate, crude (per 1000 people)
Fertility rate	FR	WDI, 2018	Fertility rate, total (births per woman)
Population growth	PG	WDI, 2018	Population growth (annual %)
GDP per capita growth	GDPPCG	WDI, 2018	GDP per capita growth (annual %)

Source: Authors' compilation using Word Bank WDI data set, 2018.

4. Discussion of Results

Both pooled descriptive statistics, OLS and quantile regression estimates were reported below Table 2-3. Descriptive statistic is used to summarize the data, OLS estimates provide a baseline of mean effects and the study compare these to estimates for separate quantiles in the conditional distribution of CO_2 emissions. The study report results for the 10^{th}, 25^{th}, 50^{th}, 75^{th} and 90^{th} quantiles.

Table 2 gives some descriptive statistics of the data. As can be seen, there are some variations in the data among the panel countries. Population has the highest yearly mean of 74613 while CO_2 emissions from solid fuel consumption has the lowest mean. Also, all the variables fall within their mean and human health, CO_2 emissions from liquid fuel consumption, CO_2 emissions from transport and fertility rate are negatively skewed while others are positively skewed. The Kurtosis exceeds 3 in most cases suggesting that series have heavy tails while Kurtosis less than 3 means light tails. This shows that data is not normal which is also proved with the Jarque-Bera test statistic. Therefore, estimation technique based on linear Gaussian models will be biased, hence it more appropriate to use quantile regression technique.

Table 2: Descriptive Statistics

Variables	Mean±SD	Minimum	Maximum	Kurtosis	Skewness	JB
QL	54.096±4.776	46.073	61.142	1.795	-0.334	7.599
CO2_EHP	154.910±248.348	0.833	1030.427	5.473	1.858	79.685
CO2_GFC	18.336±21.587	0.135	75.226	2.538	0.855	12.558
CO2_LFC	68.345±25.588	17.675	100.0	1.557	-0.385	10.710
CO2_MIC	136.119±236.330	4.250	968.088	5.230	1.798	71.639
CO2_OTHER	6.785±15.768	-13.446	143.137	60.111	7.002	13831.2
CO2_RBCPS	8.941±6.941	0.376	26.487	2.205	0.416	5.293
CO2_SFC	1.503±2.395	0.008	15.967	15.849	3.079	812.069
CO2_TRANS	33.638±22.745	0.205	66.791	1.700	-0.447	9.957
HE	5.667±2.692	2.346	14.390	3.079	0.903	13.058
MR	77.252±41.902	12.0	171.20	2.449	0.466	4.693
FR	5.591±0.646	4.209	6.499	2.451	-0.823	12.047
PG	746.136±1353.02	2.254	4293.69	3.369	1.419	32.754
GDPPCG	1.566±13.627	-50.236	91.673	24.242	2.083	1874.24

Source: Authors' compilation
JB refers to the χ^2 statistic from the Jarque-Bera test of normality

From the results of the Bayes estimate of different quantiles for all the countries in Table 3, there are some significant different percentiles in the conditional distribution of CO_2 emissions from gaseous fuel consumption, CO_2 emissions from liquid fuel consumption, CO_2 emissions from residential buildings and commercial and public services, CO_2 emissions from solid fuel consumption, CO2 emissions from transport, health expenditure, mortality rate and fertility rate. Also, CO_2 emissions from gaseous fuel consumption has the expected sign but only significant in 25^{th} quantile and this same trend was observed for health expenditure which has the expected sign and it was only significant at 90^{th} quantile. Other CO_2 emission that was significant with the expected sign are CO_2 emissions from liquid fuel consumption, CO_2 emissions from residential buildings and commercial and public services, CO_2 emissions from solid fuel consumption and CO_2 emissions from transport. Initially, the coefficient of CO_2 emission that was significant with the expected sign are CO_2 emissions from liquid fuel consumption, CO_2 emissions from residential buildings and commercial and public services, CO_2 emissions from solid fuel consumption and CO_2 emissions from transport slightly decreases then turns to slightly increase that is they all fluctuate throughout the quantile. There are highly significant differences across different percentiles in the conditional distribution of CO_2 emission in this study. Furthermore, the increase in all the CO_2 emission across Anglophone countries in West Africa affect their mortality rate which fluctuate throughout the quantile and as a result affect their life expectancy negatively. Fertility rate has a positive and significant effect on life expectancy among the countries and this was in line with the studies of Nkalu and Edeme, (2019); Dhrifi, (2018); Zaidi and Saidi, (2018); Zaman *et al.*, (2016); Matthew *et al.*, (2018); Balan, (2016); Jerumeh *et al.*, (2015) and Issaoui *et al.*, (2015).

Table 3: The Bayes Estimate of different Quantiles for All the Countries (τ = Quantile).

Variables	OLS	Quantiles				
		τ = 0.1	τ = 0.25	τ = 0.50	τ = 0.75	τ = 0.90
CO2_EHP	0.029	-0.001	-0.031	-0.017	0.049	0.060
	(1.000)	(-0.027)	(-1.137)	(-0.459)	(1.028)	(0.529)
CO2_GFC	-0.092	-0.093	-0.150	-0.088	-0.110	0.008
	(-1.335)	(-1.039)	(-2.106)**	(-0.924)	(-0.389)	(0.009)
CO2_LFC	-0.253	-0.148	-0.239	-0.266	-0.281	-0.312
	(-8.937)*	(-1.610)	(-7.295)*	(-8.811)*	(-5.494)*	(1.225)
CO2_MIC	-0.029	0.000	0.038	0.023	-0.047	-0.056
	(-0.869)	(0.003)	(1.236)	(0.601)	(-0.906)	(-0.451)
CO2_OTHER	0.013	0.026	0.003	0.002	0.009	-0.003
	(0.575)	(1.524)	(0.261)	(0.131)	(0.514)	(-0.223)
CO2_RBCPS	-0.472	-0.408	-0.792	-0.728	-0.413	-0.512
	(-4.301)*	(-0.962)	(-5.662)*	(-4.223)*	(-2.280)**	(-2.969)*
CO2_SFC	-0.728	-0.576	-0.616	-0.471	-0.383	-1.316
	(-3.216)*	(-1.502)	(-3.644)*	(-2.025)**	(-1.380)	(-0.403)
CO2_TRANS	-0.139	-0.235	-0.097	-0.127	-0.078	-0.152
	(-3.098)*	(-2.828)*	(-2.680)*	(-2.146)**	(-0.458)	(-0.482)
HE	0.166	0.019	0.380	0.377	0.165	0.634
	(0.564)	(0.045)	(1.658)	(1.271)	(0.386)	(1.776)***
MR	-0.234	-0.225	-0.267	-0.258	-0.247	-0.193
	(-8.205)*	(-4.615)*	(-12.097)*	(-6.864)*	(-1.990)**	(-0.749)
FR	9.540	9.224	11.011	10.344	10.328	8.133
	(9.196)*	(7.079)*	(13.423)*	(7.353)*	(2.160)**	(0.698)
PG	-2.060	3.470	-2.370	-2.270	-2.140	-2.690
	(-0.102)	(0.891)	(-1.420)	(-1.150)	(-0.555)	(-0.513)
GDPPCG	0.022	0.030	0.017	0.015	0.002	0.024
	(0.798)	(0.603)	(1.037)	(0.674)	(0.098)	(1.083)
Adjusted R^2	0.499	0.339	0.432	0.393	0.288	0.210

Source: Authors' compilation

The numbers in parentheses are t-statistics computed from heteroskedasticity-robust standard errors. Quantile regression results are based upon 1000 bootstrapping repetitions. The asterisks *; ** and *** denote significance at the 1%; 5% and 10% levels, respectively. OLS means ordinary least squares.

5. Conclusions

An estimated seven million people per year die from emission-related diseases. These include stroke and heart disease, respiratory illness and cancers. Many health-harmful emission pollutants also damage the climate and reducing emission pollution would save lives and help slow the pace of near-term climate change. This study investigated the effect of CO_2 emissions on quality of life in Anglophone Countries in West Africa over the period of 1990 to 2018 using panel quantile regression. The result obtained showed that the CO_2 emission that affect the quality of life in Anglophone countries of West Africa are CO_2 emissions from gaseous fuel consumption, CO_2 emissions from liquid fuel consumption, CO_2 emissions from residential buildings and commercial and public services, CO_2 emissions from solid fuel consumption, CO_2 emissions from transport. Other control variables that have influence on quality of life were health expenditure, mortality rate and fertility rate. Therefore, the policy makers should implement policies (like energy conservation policies) that will control emission from gaseous fuel consumption, emissions from liquid fuel consumption, emissions from residential buildings and commercial and public services, emissions from solid fuel consumption and emissions from transport. Also, health sector has to be properly cater for by spending more on health and this can only increase the health outcomes in a country.

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