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Energy Utilization and Pollution in Nigeria: A Case of Carbon Emission

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Abstract
The study examined the impact of energy use on carbon emission in Nigeria from 1990-2019. The variables used in the study which were Carbon Emission, Oil Consumption (OP), Gas Fuel (GF) and Fossil Fuel Consumption (FFC). The variables were subjected to unit root test and they were all stationary at first difference I(1). Since the variables were not all stationary at level co-integration test was used to determine the long-run relationship between the variables. The variables were found to be co-integrated. The Structural Vector Error Correction Mechanism (SVECM) was employed. From the results, the study found that energy consumption has positive and significant relationship with Carbon Emission in Nigeria. In the light of the findings derived from this study, the recommendations made include: The government should strive to achieve optimum energy mix for the country. This will mean reducing carbon emitting energy sources and increasing energy generation from sources that are environmental friendly.
Keywords: Energy Utilization, Pollution, Carbon Emission, Nigeria

1.0 Introduction

Utilization of energy, especially combustion of fossil fuels, is an imperious source of environmental pollution and industrial progression (Greiner, 2005). Energy consumption projections are required for estimates of future industrial productions and future requirements for pollution control to maintain quality environment. Energy is a critical factor for economic growth of any country. Energy commodities facilitate economic development by increasing industrial productivity and income as well as creating employment (Martins, 2005). The aim of an efficient energy market is to provide energy commodities to power the industrial, transport, household and service sectors of the economy. Hence, energy remains the lubricant of sustainable economic growth. However, the consumption of energy resources and materials leads to environmental degradation in terms of carbon emission and environmental depletion through mining, exploration and utilization (Asafu-Adjaye, 2000).

The extraction and processing of fossil fuels, in addition to their use, have profound impacts on the environment. The large oil spills which leaked over 4.9 million barrels of crude oil into the Gulf of Mexico and the several oil spills in Nigeria have focused attention on the potential disasters associated with fossil fuel exploitation to cause contamination of the natural environment (Adenikinju, 2016). The alarms over the environmental impacts of using fossil fuels are dated back in the early twentieth century. As reported in Payne (2009), a coal engineer, was one of the first to sound alarm over increasing Carbon dioxide (CO_2) levels in the Earth's atmosphere. He warned that using fossil fuels would contribute to global warming. It was his empirical results that prompted the recent efforts to understand and address climate changes (Payne, 2009).

Nigeria is endowed with abundant supply of oil, natural gas and coal. Nigeria estimated to have proven reserve of approximately 35 billion barrels of oil, about 2.7 billion tonnes of coal and 187 trillion barrels standard cubic feet of natural gas according to the Draft National Energy Master Plan, (2013). Thus Oil and gas related operations are the most obvious industrial activities in the country. Oil and gas resources account for over 95% of the country's export earnings and 82% of the government's total revenue in 2016. However, the continuous exploitation of these fossil fuels does not occur without adverse impact on the environment. Gas flaring and Oil spillage during exploration, transportation, usage and vandalism have resulted to land degradation, aquatic pollution and air pollution. Thus, for environmental sustainability, stakeholders ought to rise to the challenge to address these problems. Government has to effectively play its regulatory roles; investors should adhere to international best practices in energy exploitation while engineering and scientific bodies should ensure that they adopt modern technologies in the confine of their professional ethics.

Environmental problems being witnessed globally continues to raise concerns for experts and policy makers globally in meeting sustainable development targets. These problems vary from either the emission of damaging pollutants to the overuse of natural resources (Soytas and Sari, 2006). Carbon emission growth rate for Nigeria stood at 5.5 percent in 2019, Total emission for Nigeria stood at 0.11 Giga tons of CO_2 in 2019 relating to its population, per capita emission of CO_2 for Nigeria in 2019 was 0.57T (World Development Index , 2019). Carbon emission have been increasing in Nigeria over time, the country was ranked third most emitting country in West Africa only behind Ghana and Benin (Energy Information Administration, 2019). With total emission of The increase in CO2 emissions is a serious threat to the environment of Nigeria (Hossain, 2014). This has given rise to research on the nexus between CO2 emissions and energy consumption. The trend of Global CO_2 emissions from fossil fuels have increased from 1990 to 2019 (World Economic Outlook, 2019). Thus, the major objective of this study is to examine the impact of fuel consumption on environmental pollution in Nigeria. The period under consideration is 1990-2019. The study will employ the use of annual time series data on energy consumption and environmental pollution variables. The scope of 1990-2019 was selected in order to cover a substantial period of the Nigerian economy. Also the scope cannot be extended backward from 1990 due to data constraints in terms of carbon emission figures.

2.0 Literature Review and Theoretical Framework

Several empirical studies have analyzed different forms through which the energy sector affects the environment. Ebohon (2016) examined the impact of energy consumption on economic growth in developing countries from 1960 – 1984. The study employed regression and granger causality test to carry out the analysis. The study discovered that complementary relationship exist between energy consumption and economic growth. The study further observed that causality between energy consumption and economic growth is not instantaneous but the causality between economic growth and energy is instantaneous. As such the study concluded that economic growth influences energy consumption.

Menyah and Worlde- Rufael (2010) examined energy consumption, pollutant emissions and economic growth in South Africa covering the period 1965- 2006. The study employed Bound Test cointegration Analysis and granger causality. The study found a short and long run relationships exist between pollutant emission and economic growth.

The study also found a unidirectional causality running from carbon emission to economic growth, from energy consumption to economic growth and from energy consumption to CO2 emission. The conclusion was that South Africa has to sacrifice economic growth or reduce its energy consumption per unit of output or both to reduce pollutant emission.

In a similar study Mohammed (2012) investigated energy consumption carbon emission and economic growth nexus in Bangladesh for the period 1972-2006. The methodology used was Johansen Bivariate cointegration method, ARDL, dynamic causal analysis. The results showed that CO2 granger cause both economic growth in the short and long run. Result also indicated that unidirectional causality exist from energy consumption to economic growth both in the short and long run, while in the short run bidirectional relationship exist between energy consumption and economic growth. The study concluded that carbon emission influences economic growth.

Furthermore, Mahadevan and Asafu-Adjaye (2007) studied the dynamic modeling of causal relationship between energy consumption, CO2 emission and economic growth in India with the data covering 1971 to 2006. The methodology used is granger causality. The study confirmed the existence of bidirectional granger causality between energy consumption and CO2 emissions in the long run. The study concluded that India could pursue energy conservation and emission reduction with efficiency improvement policies without impending economic growth.

In the same vein, Soytas, Sari and Ewing (2007) examined the relationship between energy consumption, economic growth and carbon emissions in Turkey. The investigation employed the long run granger causality perspective in a multivariate framework. They uncovered that carbon emissions seems to granger cause energy consumption, but the reverse is not true. The study concluded that the lack of long run causal link between income and emissions implying that to reduced carbon emissions, Turkey does not have to forgo economic growth.

Similar study of Saibu and Jaiyesola (2013) on the energy consumption carbon emission and economic growth in Nigeria: implication for energy policy and climate protection in Nigeria. The study adopted a dynamic methodology of the form of granger causality and dynamic regression model which came up with the findings that there is causal relationship between oil production, carbon emission from gas flaring and economic growth in Nigeria. The study concluded that carbon emission contributed an impediment to sustainable economic growth in Nigeria.

Payne (2009) studied the relationship between energy consumption and economic growth, on group of common wealth member countries using panel cointegration and panel causality test. The study discovered that both energy consumption and economic growth cause carbon dioxide emission in the short run. The study concluded that in the long run there appears to be a bidirectional causality running between energy consumption and carbon emission.

Tsani (2010) worked on the energy consumption and economic growth: a causality analysis in Greece. The study employed the Toda and Yamamoto (1995) granger causality test. The investigation revealed presence of unidirectional causal relationship running from total energy consumption to real GDP at disaggregated level. The study concluded that energy consumption affect economic growth.

Wesseh and Zoumara (2012) analysed the causal relationship between energy consumption and economic growth in Liberia using parametric and non-parametric granger causality approach. The study found the evidence of distinct bidirectional granger causality between energy consumption and economic growth. The study concluded that energy consumption influences economic growth.

In the African context, Wolde-Rufael (2015) examined energy demand and economic growth in African covering the period between 1971 and 2011 in 19 African countries. The methodology used was the bound test approach. The study found the evidence of a long run relationship for only 8 of the 19 countries and causality for 12 countries. The study also discovered that, the past value of energy consumption have a predictive ability in determining the present value of economic growth. The study concluded that there were feedback income African countries while there was a lack of causal relationship for others.

Similar study in Africa, Eggoh (2011) analysed energy consumption and economic growth in Africa countries covering 21 African countries for the period 1970 to 2006. Using panel analysis, the study observed that there is long run equilibrium relationship between GDP, energy consumption. The study concluded that decreasing energy consumption decrease growth and vice versa.

Galeotti (2015), examine the determinant of environmental pollution in Eastern Europe. The study employed threshold auto-regressive model and environmental indicators ranging from CO_2, sulphur oxide (SO_2) to deforestation. The study obtained an inverted-U shape relationship between CO_2 emissions and income per capita. The study concluded that the turning point at which the delinking occurs i.e. when growth in income will lead to improved environmental quality is inconclusive.

Shafik and Joseph (2015) evaluated climate change and sustainable development in Sub-Saharan Africa, using panel cointegration method. The study observed a strong positive relationship between climate change and economic growth. It was therefore concluded that countries should consider integrating climate variability issues in their national planning and development processes.

In a similar study, Usenobomg (2016) examined the relationship between economic growth and environmental degradation in Nigeria. Using robust least square method of analysis, the result indicated an N-shape relationship between economic growth and environmental degradation. The study concluded that courageous policy measures of environmental preservation be adopted irrespective of the country's level of income.

Mitra (2013) analyzed the impact of the quality of institution (proxied by corruption) on environment, employing the input-output approach and computable general equilibrium model. The study discovered that corruption tends to lower environmental quality. The study concluded that there existed a significant relationship between corruption and environment. Still on the energy and environmental issues, Machado (2014) examines the impact of trade openness on the quality of environment in Brazil, employing the input-output approach. The result reveals a positive link between foreign trade and CO_2 emission, implying that trade openness contributes positively to environmental deterioration in the country. The study concluded that there existed a significant relationship between trade and environment.

2.1 Theoretical Framework

The study is based on the environmental Kuznets curve. The environmental Kuznets curve is a hypothesized relationship between environmental quality and economic development: various indicators of environmental degradation tend to get worse as modern economic growth occurs until average income reaches a certain point over the course of development. Tis can be illustrated by figure 1.

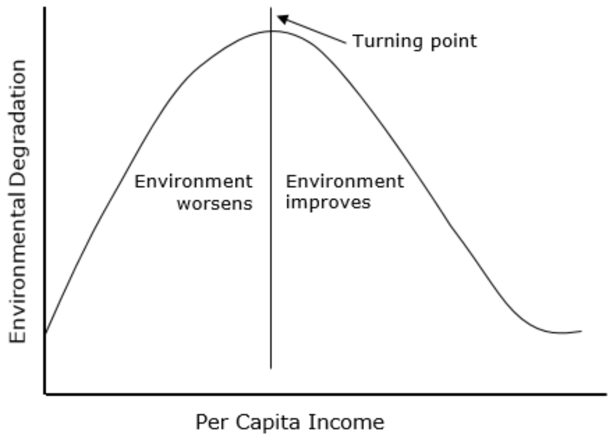

Figure 1: Kuznets Inverted U shaped

From figure 1 overutilization of energy products (inputs) to achieve productivity and growth will lead to increase in per capita income but may also increase environmental degradation in terms of pollution. Thus there is an optimum level (turning point) where energy utilization should be curtailed so as to avoid rapid environmental degradation. The Kuznet Theory have shown that energy consumption economic growth and environmental degradation are intertwined. This forms the theoretical foundation for this study as it clearly shows the linkage between energy consumption (utilization) and environmental degradation.

3.0 Methodology

3.1 Model Specification

In an attempt to justify the effect of energy consumption in the Nigerian economy, important indicators of energy consumption such as Carbon Emission (CE), Oil consumption (OC) Gas Fuel (GF) and Fuel Wood (FW) will be considered in building the model. These variables are classified as the major factors affecting carbon emission in Nigeria according Esso (2010). The model is expressed in functional form as;

CE = f(OC, GF, FFC) ……………………………………………………………1

Where; CE = Carbon Emission; OC = Oil Consumption; GF = Gas Fuel Consumption; FW = Fuel Wood

VECM model comes to play when it has been established that, there exist a long-run relationship between the variables under consideration. VECM regression equation is given below as thus:

$$\Delta CE_t = \alpha_0 + \rho_1 ECM + \sum_{j=1}^{m} \alpha_{1j} \Delta CE_{t-j} + \sum_{j=1}^{m} \alpha_{2j} \Delta OC_{t-j} + \sum_{j=1}^{m} \alpha_{3j} \Delta FFC_{t-j} + \sum_{j=1}^{m} \alpha_{4j} \Delta GF_{t-j} + U_{1t} \ldots\ldots\ldots\ldots 2$$

$$\Delta GF_t = \beta_0 + \rho_2 ECM + \sum_{j=1}^{m} \beta_{1j} \Delta CE_{t-j} + \sum_{j=1}^{m} \beta_{2j} \Delta OC_{t-j} + \sum_{j=1}^{m} \beta_{3j} \Delta FFC_{t-j} + \sum_{j=1}^{m} \beta_{4j} \Delta GF_{t-j} + U_{1t} \ldots\ldots\ldots\ldots 3$$

$$\Delta FFC_t = \lambda_0 + \rho_3 ECM + \sum_{j=1}^{m} \lambda_{1j} \Delta CE_{t-j} + \sum_{j=1}^{m} \lambda_{2j} \Delta OC_{t-j} + \sum_{j=1}^{m} \lambda_{3j} \Delta FFC_{t-j} + \sum_{j=1}^{m} \lambda_{4j} \Delta GF_{t-j} + U_{1t} \ldots\ldots\ldots\ldots 4$$

$$\Delta OC_t = \gamma_0 + \rho_4 ECM + \sum_{j=1}^{m} \gamma_{1j} \Delta CE_{t-j} + \sum_{j=1}^{m} \gamma_{2j} \Delta OC_{t-j} + \sum_{j=1}^{m} \gamma_{3j} \Delta FFC_{t-j} + \sum_{j=1}^{m} \gamma_{4j} \Delta GF_{t-j} + U_{1t} \ldots\ldots\ldots\ldots 5$$

A negative and significant coefficient of the ECM (i.e. ρin the above equations) indicates that any short-term fluctuations between the independent variables and the dependent variable will give rise to a stable long run relationship between the variables.
In order to properly estimate the parameters in the SVECM, there is need to place some restrictions on the model.

	CE	OC	GF	FFC
	0	0	0	0
CE	1	*	0	0
OC	*	1	0	0
GF	0	0	1	*
FFC	*	0	0	1

The system above is identified with n(n-1)/2 zero restrictions on $A_{o.}$ The non-recursive restrictions above are over-identified. The restrictions placed were based on theory of how the Economics variables relates with one another. The zero (0) elements are restrictions, while the asterisks (*) elements are the matrix estimated elements.

The study used Secondary Data. The Secondary Data was sourced from Energy Information Administration (EAI, 2019) and World Development Index (2019). The data were analysed in their real values without any transformation.

4.0 Discussion of Results

4.1 Summary Statistics

Table 1: Summary Statistics

	CE	FFC	GF	OC
Mean	17822322	82.14793	3550.804	629264.6
Median	8742647.	102.1052	3590.520	666490.0
Maximum	59363850	184.9203	4104.200	932425.3
Minimum	281550.3	8.037800	3113.100	144160.0
Std. Dev.	19282830	63.36155	296.0639	207390.5
Skewness	0.938072	0.051493	-0.154473	-1.059929
Kurtosis	2.553777	1.389053	2.194756	3.816911
Jarque-Bera	4.183908	2.931476	0.836848	5.806287
Probability	0.123446	0.230908	0.658083	0.054851
Sum	4.81E+08	2217.994	95871.70	16990144
Sum Sq. Dev.	9.67E+15	104381.8	2278999.	1.12E+12
Observations	30	30	30	30

Source: Author's Computation E-Views 9.0

The summary statistics illustrate the distribution of the variables including the statistical properties such as the measure of central tendencies and measures of dispersion. All the variables are normal distributed due to high Probability values of Jarque-Bera which are all greater than 0.5.

4.2 Stationarity Result

The Augmented Dickey-Fuller test will be use to test for unit root. All the variables were regressed on trend and intercept to determine if they have trend, it was discovered that the four variables have trend and intercept, hence the unit root test involve trend and intercept. The result is presented:

Table 2: Unit Root Stationarity Result

Variables	ADF Statistics	Critical Value	Stationary Status
CE	-7.460302	-4.26274(1%) -3.55297(5%) -3.20964(10%)	I(1)
FFC	-8.382534	-4.26274(1%) -3.55297 (5%) -3.20964(10%)	I(1)
GF	-6.009893	-4.26274(1%) -3.55297 (5%) -3.20964(10%)	I(1)
OC	-3.860210	-3.5743 (1%) -2.6920 (5%) -1.2856 (10%)	I(1)
The critical values for rejection of hypothesis of unit root were from MacKinnon (1991) as reported in e-views 9.0.			

Source: Author's Computation E-Views 9.0

The four variables (Carbon Emission, Oil Consumption, Gas Fuel and Fosil Fuel Consumption) underwent unit root test using the Augmented Dickey-Fuller (ADF) test. As is the case most times, all the variables were found to be non-stationary at levels but stationary at first difference.

4.3 Co-Integration Test

Table 3: Johansen Co-integration Test Result

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.963619	305.0857	159.5297	0.0000
At most 1 *	0.938099	212.3017	125.6154	0.0000
At most 2 *	0.789378	134.3995	95.75366	0.0000
At most 3 *	0.667567	90.78417	69.81889	0.0005
Trace test indicates 5 cointegrating equations(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				

Source: Author's Computation E-Views 9.0

The table 3 shows the long run relationship existing among the variables of study. The table shows the variables converge in the long run thereby depicting the existence of long run relationship among them. The long run relationship exists at 5% level of significance according to the Trace test statistics and the Eigenvalue. This implies there exists three co-integrating relationship among the variables. Therefore there is long run relationship among the variables.

4.4 VEC Lag Order Selection Criteria

Table 4: VAR lag Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
1	-1268.173	NA	9.16e+19*	60.14759*	61.17154*	60.52519*
2	-1247.165	32.24495	1.15e+20	60.33326	62.38117	61.08846
3	-1233.490	17.80920	2.16e+20	60.86001	63.93187	61.99281
4	-1206.189	29.20563	2.46e+20	60.75299	64.84880	62.26340

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

Source: Author's Computation E-Views 9.0

In order to properly estimate VEC model which is an input in estimating SVEC model, it is necessary to get the optimal lag length using Lag length selection criteria. Lag length selection criteria of VEC starts with the specification of maximum lag of 4. An asterik (*) indicates the selected lag from each column of the criterion statistic. From the result in table 4.4, we considered the first (1) lag length as the optimal lag length for each endogenous variable based on the Schwarz information criterion (SIC). Schwarz information criterion is chosen because it has been shown to have a higher degree of precision when compared to other criterions such as the Akaike information criterion (AIC).

4.5 Vector Error Correction Results

Table 5: VEC Estimates

Vector Error Correction Estimates				
Sample (adjusted): 1990 2019				
Standard errors in ( ) & t-statistics in [ ]				
Error Correction:	D(CE)	D(OC)	D(FW)	D(GF)
CointEq1	-0.000214	-0.006560	-7.14E-06	-0.020418
	(0.00091)	(0.00215)	(2.1E-06)	(0.03091)
	[-5.00979]	[-3.04475]	[-3.38979]	[-0.66056]
D(CE(-1))	0.019506	-0.011663	1.82E-05	-0.083922
	(0.06867)	(0.01659)	(1.6E-05)	(0.23799)
	[3.11565]	[-0.70304]	[1.12459]	[-0.35262]
D(OC(-1))	0.378225	0.031183	0.000188	-0.253693
	(0.17668)	(0.16490)	(0.00016)	(2.36577)
	[3.22558]	[0.18910]	[1.16887]	[-0.10723]
D(FW(-1))	5.475546	77.20749	0.185783	1338.143
	(1.43570)	(141.203)	(0.13808)	(2025.76)
	[5.08138]	[0.54678]	[1.34552]	[0.66056]
D(GF(-1))	0.128499	0.017380	-6.82E-06	0.400043
	(0.02770)	(0.01256)	(1.2E-05)	(0.18018)
	[6.00627]	[1.38381]	[-0.55536]	[2.22024]
C	-0.145185	0.041895	-3.75E-08	0.203728
	(0.15589)	(0.01533)	(1.5E-05)	(0.21996)
	[-0.93134]	[2.73256]	[-0.00250]	[0.92622]
R-squared	0.940330	0.953846	0.981355	0.905956
Adj. R-squared	0.893577	0.849732	0.881079	0.895159
F-statistic	9.301182	9.438147	9.805811	9.858857

Source: Author's Computation E-Views 9.0

Table 5 presents the estimates of VEC model. The decision not to give the practical interpretation of the result above is due to the fact that it serves as an input to the estimation of Structural Vector Error Correction Model (SVEC) which is our main model and will definitely be interpreted.

Table 6: SVEC Result
Dependent Variable: **CE**

Independent Variables	Coefficient	Standard Error	t-Statistic	Pr Value
Constant	3.189041	6.390491	0.518391	0.6714
OC	0.003094	0.001813	4.293012	0.0046
GF	4.903911	0.893011	5.784901	0.0011
FFC	0.019028	0.008831	5.809311	0.0009
Wald Test	9.950493	F Statistic	25.94028	(00000)

Source: Author's Computation E-Views 9.0

4.6 Interpretation of Results

The result in Table 6 indicated a unit increase in the Oil Consumption (OC) on the average holding other independent variables constant will lead to 0.003094 unit increase in Carbon Emission. This shows that Oil Consumption has a positive impact on Carbon Emission. This result fulfils apriori expectation and is consistent with other results on Oil Consumption and carbon emission in Nigeria e.g Payne (2009). In the same vein it is suggested that a unit increase in the Gas Fuel on the average holding other independent variables constant will lead to 4.903911 unit increase in the Carbon Emission. Also, a unit increase in the Fossil Fuel Consumption on the average holding of other independent will lead to 0.019208 increases in carbon emission. The results are all significant at 1 percent level of significance as indicated by their respective probability values which are lower than 0.01.

5.0 Conclusion and Recommendations

From the study carried out, it would be a fallacy to conclude that there is no relationship between energy consumption and Carbon Emission. The evidence from various econometrics analyses from this study revealed that, Energy consumption has statistically significant effect on Carbon Emission in Nigeria. This is evident given the contributions of Energy indicators in the economy. And most importantly, it was deduced that, there exist a significant relationship between Energy Usage and Carbon Emission. The implication of this is that a high carbon source content of Nigeria's energy mix can lead to environmental degradation. At this point, in the light of the findings derived from this study, it is paramount that the following recommendations be made. They include: The government should strive to achieve optimum energy mix for the country. This will mean reducing carbon emitting energy sources and increasing energy generation from sources that are environmental friendly. Since it has been found that Gas Fuel has a significant impact on Carbon Emission, regulating Gas Fuel by the Federal Government in an energy consuming nation like Nigeria will have a positive influence on Carbon Emission. Gas flaring should be reduced to zero. Fossil Fuel Consumption should be regulated to reduce carbon emission. Other source of energy such as solar and hydro-electricity should be encouraged since they do not produce carbon and are environmental friendly.

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Information Asymmetry and Social Transfer Policies in Nigeria

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Abstract
Information asymmetry arises when economic agents are not all equally informed. In the policy-making process, economic agents involved consist of policy-makers and policy-targeted people, which are drawn from government and her citizens, respectively. The success and efficiency of policy efforts to redistribute income through social transfer schemes, in form of improving the lives of the poor and the unemployed, is conditional upon how informed these agents are. The paper uses a theoretical approach hinged on a policy-making framework to analyse why policies intended to bridge the welfare gap between the poor and the rich, as well as the gap between the employed and the unemployed, might be difficult to achieve and its outcome undermined unless all are well informed. This paper specifically predicts, under conditions of information asymmetry, the possible outcome of stipends proposal for the unemployed and the poor and suggests ways to make the intentions of the policy work better, using a better channel designed in a more reliable direction. Finally, we propose that this economy needs to go into a data-based economic environment where essential informational statuses of all are readily available to policy-making agencies for optimal income redistribution policies and efficient social transfer schemes.

Keywords: Information Asymmetry, Income Redistribution, Adverse Selection, Economic Agents, Efficiency

1.0 Introduction

One of the major macroeconomic objectives every economy tries to pursue is to raise welfare of the poor and reduce income inequality among its populace. This extends to bridging the welfare disparity between the employed and the unemployed. Other macroeconomic objectives include but not limited to: economic growth, full employment, price stability, balance of payment stability and exchange rate stability (Lipsey, 1965); (Lipsey & Chrystal, 1989). Developmental economists are of the impression that reducing inequality and poverty and promoting equity are very important macroeconomic objectives particularly in the context of developing economies.

Over the years, Nigerian governments have put one income redistribution policy (in our paper, we mean social transfer scheme henceforth) or the other in place with a view to improving welfare of the unemployed. An unemployed person has a high tendency to be poor as his income is restricted to social transfers from relatives, government, and other economic environments (unearned income). Such social transfers include family support, government unemployment benefits, government employability schemes, graduate internship schemes, scholarships, loans, and so on. During the 2011-2015 regime