

The Relationship between Poverty and Energy Use in Niger State

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Abstract

The paper examined the relationship between poverty and energy use in Niger state, Nigeria using a cross-sectional data randomly collected from 156 respondents in the State across the three senatorial zones. Employing descriptive statistics and Logit regression model, the result obtained revealed the existence of an inverse relationship between poverty and energy use in Niger state and statistically significant, while a proportionate relationship between income level and energy use was established which upheld the energy ladder hypothesis. Availability and affordability of modern energy relative to traditional energy negatively influence the use of modern energy in the state. The study thus recommends the actions of the government towards the reduction of poverty and increasing income level of individuals in the state as well as the enhancement of the availability and affordability of modern energy sources in the state.

Keywords: Poverty, Energy use, Logit model, Niger State

JEL Classifications: I31, I32, P28, Q41, Q42, C25

Introduction

Poverty happens to be among the core issue in the world today which calls for a lasting solution. In concept, poverty in term of materialism refers to the inability to access basic needs such as food, water, shelter, education, etc. which is usually due to low income to offset this basic needs (Hussein & Filho, 2012 in Sakanko & David, 2018). Accordingly, energy made the provision of these basic needs possible. Energy is a major input in accessing basic needs, this is due to its requirement for cooking of food, boiling of water, warmth of shelter, etc. Thus lack of access to energy can serve as a determinant of the level of poverty in a society. Relative to income level, poor people tend to use biomass (firewood and charcoal) as their source of energy in cooking their food, and this had led to serious harm in the environment thus making it vulnerable to environmental hazards. Although most people especially those in rural areas opt for biomass energy, the attempts to study the relationship between energy use and poverty have been futile (James & Hidiaki, 2007 in Hussein & Filho, 2012), and this can be due to the non-monetary value of collecting biomass energy in rural areas, as it is

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collected freely by women and children from family farms, forests, etc. The choice of the type of energy used by households, firms and government is largely dependent on socioeconomic factor such as the income level of individuals, firms and government. To Oyedepo (2012) in Antai, Udo and Ikpe (2015), there exist not only a proportionate relationship between energy and the reduction of poverty, they are as well related with economic development which comes in term of the availability of accessible and affordable energy for the provision of basic needs. This means that when there is the availability of energy that is affordable and accessible, the basic needs in forms of food, shelter and water will be taken care of, and this will propel the economy towards the attainment of economic development as well as the mitigation of poverty. On the contrary, when energy is not accessible and affordable, the problem of poverty will be significant.

Although Nigeria's economy is the biggest in Africa as it records the highest growth rate, the poverty rate of 33.1% which is relatively high indicate the significance of poverty in the economy as more than half of the total population are likely to live below the poverty line of \$1.90 per day (World 2001). The inconsistency in the supply of modern energy sources such as electricity which is largely used for most of the economic activities in the economy, has led to the use of alternate energy sources which is related to the income level of individuals and firms. Niger state which had the lowest poverty rate of 33.8% based on the data released by NBS in 2012 and being the 25th in the 2015 report of the United Nation's Global Multi-Dimensional poverty index of Nigerian states, shows the increase of poverty in the state within the short period of time. This can be due to the recent inconsistency and cut in in salary payment of civil servants as majority of the state population are in the civil service, decline in economic activities due to the economic crisis, inconsistency in the supply of electricity and the hike in price of petroleum products. All these and other factors have led to the use of energy relative to individual's budget. Most households in the state opt for biomass (charcoal, firewood, animal and crop residual etc.) as an energy source to provide the basic need of food and lighting due to its relative cheapness and accessibility.

It has been revealed that the use of biomass as energy source due to increase in poverty rate have a negative effect not only on the health of the user but also on the environment such as erosion, high level of indoor air pollution and an increase morbidity and all-cause mortality both in adults and children (see Fullerton et al., 2008; Bruce et al., 2000; Hong, 1995; Ezzati & Kammen, 2002 in Desalu et al., 2012). About 1.5 to 2 million of death cases worldwide are as a result of indoor air pollution, report however had it that almost half of the world's population uses biomass (or solid fuel) as the domestic source of energy, while in the case of Nigeria, 70% of the population uses biomass (Desalu et al., 2012). Thus, the choice of the use of energy ranging from renewable energy sources such as biomass (fuelwood, firewood, charcoal, animal and crop residuals), wind, water, geothermal and solar energy, to non-renewable energy sources such as fossil fuels (natural gas, coal and nuclear) depend on the income level, while its availability and affordability determines the standard of living of people. The more income of people increase, the more likely they are to move from the use of unclean energy sources (solid fuel/biomass) to a more clean energy source (electricity, solar etc.).

Apart from this section in which the study is been introduced, this study will be structured on five sections, the subsequent section will be dedicated to the review of literatures, the third section will be concerned with methodology employed, while in the fourth section the result obtained will be discussed and conclusion and recommendation will follow in the fifth section.

Literature Review

Poverty

According to World Bank (2001) in Ucha (2010), poverty is a multidimensional phenomenon, which encompasses dimensions such as the lack of empowerment, opportunity and security. Due to the lack of opportunities poor masses remain inactive in the society, as the lack of security and empowerment increase their vulnerability to diseases, crime, violence and the restriction of their choices in almost everything in the society respectively.

Just like other African countries, in Nigeria about 60% of the population live below the poverty line of \$1.90, thus the existence of poverty in Nigeria is highly significant. Although report had it that the case is more severe in the northern part of the county, as shown in the 2012 state ranking in terms of poverty rate by NBS and the 2015 UN report on state's poverty rate in the county, which had most northern states occupying the topmost positions. Though Niger state was said to be the least state with poverty by the NBS report in 2012 (Daniel, 2013), this ground was later disproved by the United Nation's 2015 report which placed Niger state as the 25th in term of poverty rate (Nnamddi, 2017). The significance of poverty ranges from the inability to provide for the basic needs of food, shelter and clothing, education and social amenities (Sakanko & David, 2018). The poor masses are usually faced with health issues due to inability to afford balanced diets, proper treatments for diseases and proper hygiene. Other effects of poverty are the increase in mortality rate among infants, children and women, low life expectancy, etc. In Nigeria, factors such as high population growth rate, unemployment, political instability, corruption, debt burden, crime, war, violence, dependency on oil, faulty educational system and inequality are fingered to be the major causes of poverty. Even with the programmes put in place by the different government, such as Operation Feed the Nation (OFN) of 1976, Green Revolution of 1979 and Family Support Programme, Family Economic Advancement Programme of 1993 and NAPEP of 1993 among others (Adibe, 2012 in Wikipedia, 2017) have failed to address the problem of poverty in Nigeria.

Energy Use

According to U.S. Energy Information Administration (2013), the type of energy consuming devices and climate determines the use of energy in homes. Accordingly, due to the advancement in technology and growth of the US economy, the use of energy in homes have doubled in the last 3 decades due to increase in the use of appliances such as refrigerator, television sets, computer, microwaves, dishwasher, clothes washers etc.

In Minna, Niger state capital, wood fuel (and charcoal) is one of the cheapest energy source used in households due to its availability and accessibility. This habit of energy use is also retained by rural migrants to Minna, as alternative energy source such as electricity, kerosene, solar, nuclear etc. are non-consistence, non-available and expensive to acquire (Abd'razack et al., 2012). In the study of Warwick and Doig (2004) in Abd'razack et al. (2012), the use of solid fuels such as wood fuel amount to 33% of the total domestic use in urban households in Indian. The hike in fuel price and increase in electricity bill have led to the low income earners and the poor masses to use solid unclean energy source such as wood fuel, charcoal, animal and plant residuals, etc. To Parisot (1986) in Abd'razack et al. (2012), both in urban and rural areas, solid energy such as wood fuel is the energy source of poor masses, as such, due to high incidence of poverty, the demand is usually high. In the study of Emagbetere, Odia and Oreko (2016), factors such as income level as represented by the energy ladder model, culture, social desirability and security of supply affects the energy used in households, although the choice of the use of energy in households varies across locations.

Relationship between Poverty and Energy Use

There exist a multiple relationship between energy use and poverty. On one hand, poverty hampers the ability of households to purchase or access energy for the satisfaction of cooking, lighting and heating needs. This will cause households to increase their energy expenditure or use alternative energy sources that are cheap, although dangerous to one's health. On the other hand, the absence of insufficient access to modern energy source can increase poverty situations. For instance, due to unavailability of modern energy source, much time which would have been invested in other activities will be wasted in the collecting of traditional energy sources such as solid energy sources. As such, the use of traditional energy sources due to the unavailability of modern energy sources and health issues associated with traditional energy use will further intensify poverty as one's ability will be reduced (Dubois, 2014).

In developing economies, as the income of poor households increase, they tend to afford modern appliances which necessitate the demand and use of modern and clean energy sources. Basically, the availability, affordability and cultural preference of energy source determine the transition of traditional energy source to a modern and clean energy sources. Even when households can afford modern energy source, if it is not in place or available, the transition from the traditional energy sources to modern energy source would not be possible. Also the cost of acquiring modern energy sources is usually expensive relative to traditional energy sources which are perceived to be free in some cases. Based on cultural preference, even with the availability of modern energy source and households can afford it, most household would prefer to use the traditional energy source for certain activities. For instance in India, even in wealthy homes, biomass stove is been use to prepare traditional bread (World Energy Outlook, 2002).

The link between poverty (level of income) and the choice of energy use can be broadly analyzed using the energy ladder and energy stacking hypotheses of energy use transition. The former asserts that due to changes in the income of households, the use of traditional energy such as wood fuel, charcoal, plant

residuals, etc. is discontinued towards the use of modern 'clean' energy such as kerosene, electricity, gas, etc. (Hosier & Dowd, 1987; Van der Kroon et al., 2013 in Choumert Choumert, Motel & Roux, 2017). The energy ladder hypothesis is of the view that households discontinue the use of 'unclean' tradition energy to 'clean' energy sources as a result of increase in income level. Consequently, to Masera et al., (2000) and Ruiz-Mercado and Masera (2015) in Choumert et al. (2017), energy stacking hypothesis is an alternative hypothesis to energy ladder hypothesis for the better understanding of energy transition of households. The hypothesis asserts that rise in household income level will result to the shift to the use of modern energy sources such as electricity, which will take place in term of simultaneous use of both traditional and modern energy sources. For instance poor households tend to use traditional energy such as biomass, thus an increase in income will necessitate the use of modern energy such as electricity, although the use of traditional energy will not be discontinued for some activities. Generally, increase in income do not necessarily means discontinue of use of 'unclean' energy source, location can also influence the choice of the use of energy source.

According to Emagbetere et al. (2016), the price of energy usually influence the choice of the energy in Nigeria households. Fawehinmi and Oyerinde (2002) in Emagbetere et al. (2016) discovered that increase in the price of modern energy in Nigeria relative to the level of poverty in the country have led to the use of fuelwood for cooking in households. Studies have shown that the affordability and availability of energy are the major determinants of the choice of energy use in households alongside the income and poverty status of individuals.

Empirical Literature

Emagbetere et al. (2016) using a cross-sectional data obtained from 225 households in Ikeja, Lagos State, Nigeria, assessed the Household Energy Utilized For Cooking In Ikeja, Lagos State, Nigeria. Using descriptive and inferential statistics such as chi-square test, linear-by-linear relationship test, likelihood ratio and the Pearson Correlation test, the result obtained revealed that although households prefer the use of clean energy source, the prices of the energy source affects the choice. As such, those with high level of income uses cleaner energy source such as gas and electricity while those with middle or low income uses unclean energy sources due to its low price and availability. The result from the Chi-square test, likelihood ration test, the linear-by-linear association test and the Pearson correlation test shows that there exist a proportionate relationship between income and the type of energy used and preferred as increase in income will necessitate the shift from an unclean energy source to a cleaner energy source.

Antai et al. (2015) using a 31 years Nigerian time series data studied the relationship between energy consumption and economic growth in Nigeria economy employing a Vector Autoregressive (VAR) methodology and Granger-Causality test. The result obtained revealed that energy granger cause income and there exist a proportionate and significant relationship between income and energy.

Bamiro and Ogunjobi (2015) using a cross-sectional data obtained with the use of questionnaire from 150 households using stratified random sampling technique, examined the Determinants of Household Energy Consumption in Ogun State, Nigeria. Employing descriptive statistics for the analysis of household characteristics of the respondents and the multinomial logit and Tobit model for the analysis of fuel choice. The result obtained revealed among other things that the choice of solid energy to non-solid energy source is due to its relative cheapness compared to the prices of non-solid/modern energy sources. As such, the study as well revealed that due to high cost of electricity, the choice of solid energy is preferred.

Kayode et al. (2015) using a cross-sectional data obtained through questionnaire from 501 households in Ibadan Nigeria studied the analysis of household energy consumption in Nigeria. Employing the ordinal regression model to evaluate the determinants of energy choice, the result obtained refuted the energy ladder hypothesis of energy transition, as increase in income of respondents do not cause the switch or the abandon of traditional energy source for the use of modern energy, instead education is revealed to be the major determinant of the switch to modern source of energy use.

Ogwumike, Ozughalu and Abiona (2014) using the 2004 Nigeria Living Standard Survey (NLSS) data form the National Bureau of Statistics (NBS) studied household energy use and its determinants in Nigeria. Employing descriptive statistics and multinomial logit model, the result obtained revealed that the percentage of household that use biomass as their major fuel decreases as their expenditure/income increases and this confirms the energy ladder model.

Hussein and Filho (2012) studied the analysis of energy as a precondition for the improvement of living conditions and poverty reduction in sub-Saharan Africa. They asserted that for the improvement of the standard of living of people, modern sources of energy are required, as this will improve the performance of the economy as well as the provision of employment. In economies that export energy, such as oil producing countries, the revenue obtained from the export will help in the elimination of poverty and improve the living standards of the people. Among other things, the study find out that the availability of modern energy sources will improve the welfare of people in terms of good health, potential to earn more income, shelter, etc.

Desalu et al. (2012) using a cross-sectional data obtained from 670 households analyzed the pattern and determinants of household sources of energy for cooking in rural and urban areas of Ekiti state, Nigeria. Employing a semi-structured questionnaire, the result obtained revealed that majority of rural dwellers employ a single source of energy for cooking while urban dwellers make use of multiple energy source. Unclean and solid fuels such as wood fuel, charcoal, and kerosene are used in rural areas. Both in rural and urban areas, the major determinant of the use of solid and unclean fuel is usually associated with low income of households (poverty), the use of electricity, gas and other clean source of energy is associated with households with high level of income.

Methodology

The data used for this study were primarily sourced from Niger state Nigeria which is the study location. The state is situated in the north central geo-political zone of Nigeria. Based on the nature of the research, cross-sectional data were used to collect primary data with the use of a structured questionnaire. Based on the 2006 census, Niger state has an estimated population of 3,954,772, due to the large population size, using Slovin formula a sample size of 154 was obtained. Thus the stratified sampling technique was used to collect the data. The state was partitioned into strata based on the 3 senatorial districts (Zone A, B and C) then 52 individuals were randomly selected in each zones to answer the questionnaire

Model Specification

In-line with the objective of this study, the functional relationship between poverty and energy use can be represented as thus;

$$ENU = f(POV) \quad (1)$$

Where ENU is energy use and POV is poverty status. The study as well follows the energy ladder hypothesis which asserts that changes in income of households will result to switch from the use of biomass, traditional or unclean energy to a more sophisticated modern and clean energy sources. Thus, the energy ladder model can be represented as;

$$ENU = f(INC) \quad (2)$$

Where INC denotes income level of households, which is assumed to influences the use of traditional energy source. Combining **Eqn. (1)** and **(2)** we obtain;

$$ENU = f(POV, INC) \quad (3)$$

From literatures, apart from poverty status and income level, factors such as the availability of one energy source relative to the other sources and affordability of the energy sources also influence the decision of energy used. Therefore **Eqn. (3)** transforms to;

$$ENU = f(POV, INC, AVAIL, AFFORD) \quad (4)$$

The response variables for this study is the energy used taking the value one (1) if modern sophisticated energy sources is been used and zero (0) if traditional solid/unclean energy is used. The explanatory variables include poverty status measured using the \$1.90 poverty line, taking the value one if daily expenditure is less than \$1.90 and zero if otherwise; income level measured by the income of respondents; the availability of alternative energy sources; and the affordability of energy sources.

$$P_r(ENU_i = \frac{1}{0}) = \lambda_0 + \lambda_1 POV_i + \lambda_2 INC_i + \lambda_3 AVAIL_i + \lambda_4 AFFORD_i + \mu_i \quad (5)$$

Where $P_r(ENU_i = \frac{1}{0})$ is the probability of using a modern clean and sophisticated energy source; λ_0 is the intercept, $\lambda_1 - \lambda_4$ are the coefficient of the explanatory variables in the model; POV_i is poverty status; INC_i is income level; $AVAIL_i$ the availability of modern energy source; $AFFORD_i$ the affordability of modern energy sources and μ_i is the error term.

Discussion of Results

Descriptive Statistics

The result of the study is made up of 156 observations which were collected equally and randomly from each of the three senatorial zones of the state, with the type of energy used been the response variable in the model. From **Table 1**, majority of the respondents uses traditional energy sources such as firewood, charcoal, animal dung, sawdust, plant residual, etc. as 83 out of 156 of the respondents uses it. Only 73 out of the 156 respondents uses modern energy sources such as electricity, gas, solar, nuclear, kerosene etc. The mean value being 0.47 shows that most of the respondents engage in the use of traditional energy source due to the proximity of the mean value to 1 rather than 0 since the traditional energy to modern energy source variable is taking the value 0 or 1. The heavy use of traditional energy source is likely due to the poverty status as about 85 out of the 156 respondents do not expend \$1.90 daily which is used to measure poverty status of the respondents. Only 71 out of 156 respondents expend up to or even above \$1.90 daily. Although some of the respondents that expend more than \$1.90 a day also uses traditional energy sources while some of those below the poverty threshold also uses the modern energy source.

Unlike availability which is the major reason for the use of either traditional or modern energy source, affordability of traditional energy sources relative to modern energy sources poses as a major constraint to the use of modern energy. Out of 156 observations, 81 of the respondents used the energy source due to its affordability compared to other sources of energy, only 75 of the respondents uses the energy due to other reasons not affiliated to its affordability compared to other energy source. The income distribution of the respondents can also be a reason for the choice of energy they used as most of the respondent fall between the income distributions of 19,000 to 45,000 as shown by the mean value of 1.99 which is closer to 2 than 1 since the variable is groped on a 1 – 6 categories. Only 1 of the respondents earn in-between 66,000 – 100,000 and only 3 out of 156 respondents earn 100,000 and above. It thus shows that most of the respondents live below the poverty line and earn low income which is the likely reason for the energy used due to its affordability and not availability. This is also confirmed under the variable of income been the likely reason for the use of energy, as 90 out of 156 respondents uses the energy due to their current income status, while 66 out of the 156 observations uses the energy not because of their current income level. Accordingly, lack of electricity might be a likely reason for the use of traditional energy source as majority of the respondents gets light in-between 5 – 10 hours daily, in some cases they experience total blackout. Only 4 out of 156 respondents enjoy 24 hours light among the respondents randomly sampled. Similarly, majority of the respondents were of the view that there exist no perceived effect both on health and environment from the

energy they uses, their knowledge on likely effect from energy used can be backed up based on the fact that majority of respondent have a minimum of secondary education.

Table 1: Descriptive Statistics

Variables	Observation = 156	Mean± SD	Min	Max
Energy Use				
Traditional	83	0.47 ±0.50	0	1
Modern	73			
Poverty Status				
Poor	85	0.55 ±0.50	0	1
Not Poor	71			
Income				
≤ 18k	59			
19 – 45k	55			
46 – 55k	34	1.99 ± 1.04	1	5
56 – 65k	4			
66 – 100k	1			
Above 100k	3			
Availability				
Yes	78	0.50 ±0.50	0	1
No	78			
Affordability				
Yes	81	0.52 ±0.50	0	1
No	75			
Zone				
A	52	2±0.82	1	3
B	52			
C	52			
Education				
Yes	87	0.56 ±0.50	0	1
No	69			
Electricity		2.25 ±1.06	0	5

< 5hrs	43			
5 – 10hrs	57			
10 – 15hrs	34			
15 – 20hrs	18			
24hrs	4			
Effect on Health				
Yes	71	0.46±0.50	0	1
No	85			
Income Reason				
Yes	90	0.58 ±0.50	0	1
No	66			

Source: Authors Computation (2017)

Result of Logistics (Logit) Regression Model

The Logit regression model result in **Table 2** follows the model specified in **Eqn. 5**. Pseudo R² which is analogous to the conventional R² shows the goodness of fit of the model, its small value shows that other factors not captured in our model influence the choice of energy used but it does not have any effect on the model. Thus, the Pseudo R² is inconsequential because dependent variable in logistic regression is not a continuous. Log-likelihood ratio and _hatsq both shows the correctness of out model

In-line with the objective of this study, the relationship between poverty and energy use is negative. As shown by the coefficient of poverty, a unit change in the probability of being poor will likely lead to about 0.63 change in the log of the odds. This result concurs with the findings of Adb'razack *et al.* (2012), Ogwumike *et al.* (2014), Okwanya *et al.* (2015) and Antai *et al.* (2015) that asserts that the probability of being poor reduces the chances of using modern sources of energy either due to the inability to afford the modern energy sources which are usually expensive compared to the traditional energy source which are relatively cheap or even free to some extent. The use of traditional energy sources is common among poor individuals in Nigeria due to the exorbitant charges from the use of electricity and the unnecessary expensive from the use of gas, kerosene or solar which usually require a pre-expenses such as the purchase of kerosene stove, gas cylinder etc. before the actual expenses. The marginal effect thus shows that the probability of been poor will reduce the use of modern energy sources by 16%.

Accordingly, the coefficient of income in our model confirms the energy ladder hypothesis which asserts that increase in income will cause a shift from the use of traditional energy to a more modern and sophisticated energy sources. Income in our model has a positive and significant relationship with energy use. A unit

changes in income level will likely result to 0.22 unit changes in the log-odds of energy use. This result refutes assertions of Kayode et al. (2015) that energy hypothesis is not realistic in Nigeria. This result accordingly upheld the findings of Emagbetere et al. (2016), Desalu et al. (2012), Lee (2013) and Nlom and Karimore (2014). When income increases the use of traditional energy source will reduce thus leading to increase in the use of modern of energy sources as in the findings of Couture et al. (2012) and Laureti and Secondi (2012). Going by the marginal effect of income, the use of modern energy source will be increase by 0.54% as a result of increase in income level.

Apart from the relationship between poverty and energy which form the basis of this study, the relationship between income and energy use is also important to verify the plausibility of energy ladder model. As such the availability and affordability of energy used also determines the choice of energy used. The coefficients of availability and affordability of energy are negatively related with energy use. A unit change in the availability and affordability of modern energy sources in relation to an alternative traditional energy sources will likely lead to 0.90 and 0.22 unit changes in the log of odds. Basically, when modern energy sources are easily accessible and affordable, the use of traditional energy will decline. Conversely, when the prices of modern energy sources are high and not available, their use will decline giving rise to the use of traditional unclean energy sources such as fuel woods, charcoal, etc. The inverse relationship between the availability of modern energy sources in relation to alternative traditional energy sources do not corroborates with the findings of Danlami *et al* (2015) and Mensah and Adu (2013) that when the access to Liquefied Petroleum Gas (LPG), electricity, solar, etc. increases, it will enhance the use of cleaner and modern energy sources. The inverse relationship is likely to be due to the inconsistency in the supply of electricity in the sample area. Theoretically, changes in the availability of modern energy source should increase the use of modern energy to traditional energy sources against what is suggested from the result obtained. Consequently the negative relationship is theoretically plausible, as such it supports the findings of Bamiro and Ogunjobi (2015), Mensah and Adu (2013) and Emagbetere *et al.* (2016) that increase in the prices of modern clean energy sources will lead to decline in the use of modern energy source to the favour of traditional energy sources use. It is a common practice of consumers irrespective of income level to go for commodities that their income can afford. When the income cannot afford a basket of goods, the alternative basket of goods will be opt for. The marginal effect for both the availability and affordability of modern energy sources relative to traditional unclean energy sources denotes that the choice of modern energy source relative to traditional energy sources will decline by 22% and 0.55% respectively as a result of changes in the accessibility and prices of modern clean energy sources.

Table 2: Logit Regression Result

Dependent Variable: ENU

Variable	Coefficient	z-statistics	Prob. (z-stat)	dy/dx (Marginal Effect)

Constant	0.3390445	0.74	0.459	-
POV	-0.629059	-1.87	0.062**	-0.1555189
INC	0.2154786	1.32	0.186**	0.053612
AVAIL	-0.8948649	-2.67	0.008*	-0.2190555
AFFORD	-0.2226013	-0.66	0.511	-0.055344
Pseudo R ² = 0.0692, Log LR X ² = 12.76, Prob. >X ² = 0.0125, _hat = 0.86(2.82), _hatsq = -0.81(-1.72)				

Source: Authors Computation

* (**) – 1% (10%) level of significance

Conclusion

The paper examined the relationship between poverty and energy use in Niger state, Nigeria using a cross-sectional data randomly collected from 156 respondents in the State across the three senatorial zones. Descriptive statistics was employed to capture the characteristics of the respondents and the logit regression model to empirically ascertain the relationship between the pair. The result obtain thus shows that poverty and energy use in Niger state have an inverse relationship, changes in the probability of being poor will likely result to increase in the use of traditional energy. Accordingly, the proportionate relationship between income levels and energy use confirms the plausibility of energy ladder in Nigeria, thus increase in income will increase the possibility of using a clean and modern energy. Findings from this study also establish the existence of inverse relationship between energy use, and the availability and affordability of modern energy relative to traditional energy source.

Recommendations

The following recommendations are drawn from this study;

Effort should be made by the state government to mitigate poverty in the state so as to increase the use of modern sophisticated energy sources. When poverty is effectively combated, the use of modern energy will be enhanced, thus leading to efficiency energy use.

Since income level is an increase function of modern energy use, the minimum wage should be review by way of increasing the earning of individuals in the state, as this will aid the increase in the use of modern clean energy sources.

Subsidies should be channeled in modern energies such as electricity, LPG, solar, etc. so as so attract people to use them.

Finally, modern energy sources should be made available and accessible for use, especially the consistency in the supply of electricity where there are electric installations and installed where they are yet to.

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