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Impact of electricity supply on unemployment in Nigeria (1986-2020)

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Abstract

The role of power in driving the socio-economic progress of any economy cannot be overemphasised. It is a vital tool for enhancing productivity and by extension unemployment reduction. This study examined the impact of electricity supply on unemployment in Nigeria. It focused on how the epileptic power situation inhibits industrialization and at the same time fuels unemployment in the country. To this end, annual time series data were collected for a period of 36 years from 1986-2020; and were analysed using the Ordinary Least Squares (OLS) technique. Findings from the study revealed a strong positive linear correlation between unemployment reduction and electricity supply, while it established a negative correlation between unemployment reduction and government policy. This suggest that reduction in unemployment is a function of both adequate and reliable power supply particularly to the industrial sector of the country. It therefore, recommends that the government invest more in the power sector of the country through improved budgetary allocation.

Key words: Electricity, Unemployment, Social effect, Nigeria.

1. Introduction

Unemployment is seen to be liable for a high level of poverty, inequality, increasing rate of criminality, and general low level of living in the country and thus, it has become a world-wide phenomenon demanding for increased attention, though the impact is more astounding in developing economies (Ayinde et al., 2007). Unfortunately, one of the utmost problems facing Nigeria is unemployment (Torruam and Abur, 2014; Njoku; Ihugba, 2011).

Feridun and Akindele (2006) also identified unemployment as one of the major challenges confronting the Nigeria economy. The social impacts of unemployment are less impact in economies that are able to support unemployed class with subsidies and social security allowances.

Carlyle (2010) argued that a man willing to work and unable to find work, is perhaps

the saddest sight that fortune's disparity exhibits under the sun, which might be an elucidation for the high occurrences of crime such as robberies, kidnappings, prostitutions and other vices among employed persons in the underdeveloped and also the developing economies like Nigeria.

In the words of Awogbenle and Iwuamadi, (2010), challenges of unemployment have

become serious in many developing economies' especially the sub-Saharan Africa and it is regarded as a pressing problem in Nigeria. Unemployment generates well-being loss in terms of lower output. This repeatedly will result into low growth in the economy over time if it persists (Obadan & Odusola, 2001).

Power supply also has indirect role to play and they have been seen as intermediate inputs. While power is generated, they contributed to increase in the manufacturing capacity utilization. Instead of this translating to the growth in employment opportunities, unemployment rate was on the increase (Obadan & Odusola, 2001). From the viewpoints of ecological-economics, energy (one form of which is electricity) is a necessary input in economic production process as much as do the classical determinants of growth (that is, conventional inputs like labour and capital) known by the proponents of the neoclassical theories. Energy which is important to all human activities indeed is vital to social and economic growth and development. Energy is only one of the many vital inputs for production, conversion, processing and commercialisation in all sectors. It is generally accepted that energy, including electricity, plays a significant role in the economic development of a country as it enhances the productivity of the nation when inputs such as capital and labour are considered.

In addition, the increased consumption is an indication of increase in economic activities, and by inference, an improvement in economic development of energy signifies that a country has high economic ranking. Energy demand is important as it affects the economy which in turn affects people's lives (i.e. their income, health, happiness), and their ability to meet basic needs such as the need for infrastructure, education and so on (Obadan & Odusola, 2001).

In Nigeria, reduced electricity supply is perhaps the greatest infrastructural challenge facing the nation. Some sectors of the economy experiences power failure or voltage fluctuations about seven times per week, each lasting for about two hours, without the benefit of prior caution (Adenikinju, 2005). This imposes a huge charge on most businesses giving rise to joblessness and unemployment, low output, damaged equipment and restart costs. For the nation, this has seriously undermined the GDP of the nation.

Also, Nigeria has now been seen as one of the developing nations with the highest number of tremendously people living in poverty (report by Brookings Institution, 2018). According to Brooking report, Nigerians in extreme poverty rises by six people per minute. The report revealed that as at end of May 2018, Nigeria had about 87 million people living in extreme poverty while India that used to be the nation with highest number of people living with poverty number has 73 million people living in extreme poverty (Vanguard News June 25th, 2018).

Nigeria rely so much on revenue from oil and gas and pay little attention to other sector like the agriculture, power supply sector, that any crisis in the oil sector do cause major damage to the nation's economy. Creating job prospects through the power sector is crucial for economic growth and development and also poverty reduction. Most developing countries struggle with high unemployment or underemployment. It is on this note that the research seeks to examine the impact of electricity supply on unemployment in Nigeria.

Research Question

In view of the aforementioned problems, this study will attempt to examine the socio-economic effect of unemployment in Nigeria?

Objectives of the Study

The main objective of the study is to examine the impact of electricity supply on unemployment in Nigeria. The specific objective of the study is to examine the socio-economic effect of unemployment in Nigeria.

Research Hypotheses

To achieve objectives of this study, the following research hypotheses were formulated:

H_0: Electricity Power Supply does not have any significant impact on unemployment reduction in Nigeria.

The scope of the study focuses on the impact of electricity supply on unemployment in Nigeria.

2. Literature Review

2.1 Conceptual Review

Unemployment

According to Beggs (2012) unemployment is a situation in which an individual in an economy is looking for a job and can't find one.

Pettinger (2010) sees unemployment as a situation where someone of working age is not able to get a job but would like to be in full time employment. He further explained that If a Mother left work to bring up a child or if someone went into higher education, they are not working but would not be classified as unemployed as they are not actively seeking employment.

The International Labour Organization (ILO) (2012) defines the unemployed in this manner, "the unemployed is a member of the economically active population, who is without work but available for and seeking for work, including people who have lost their jobs and those who have voluntarily left work

Social Effects of Unemployment

Odidi (2012) rightly pointed out that no day passes by without seeing youths in various places searching for jobs through internet vacant jobs and others. Most job vacancies on the daily newspapers and magazines are mere fake which do not exist. They are sometimes with incorrect websites, emails and contact phone numbers. The job desperation by teeming youths in Nigeria transpired into high levels of crime such as pen robbery, cybercrime, prostitution, illegal oil wells and bunkerings, kidnapping, fraudulent activities and others. The population of Nigerian youth are growing astronomically and those graduating from various higher institutions of learning are innumerable. The system has not really provided for unskilled workers. In the developed and advanced countries, unskilled and semi-skilled workers have their stakes in government but in Nigeria only those with University or polytechnic certificate holders are mostly given opportunities to work Connection to the high and mighty or what is popularly known as 'long leg' has become the prerequisite to gain employment into the public sector.

Persistently, high unemployment creates huge costs for individuals and for the economy as a whole. Some of these costs are difficult to value and measure, especially the longer-term social costs.

Loss of income: Unemployment normally results in a loss of income. The majority of the unemployed experience a decline in their living standards and are worse off out

of work. This leads to a decline in spending power and the rise of falling into debt problems. The unemployed for example may find it difficult to keep up with their mortgage repayments.

Negative multiplier effects: The closure of a local factory with the loss of hundreds of jobs can have a large negative multiplier effect on both the local and regional economy. One person's spending is another's income so to lose well-paid jobs can lead to a drop in demand for local services, downward pressure on house prices and 'second-round employment effects' for businesses supplying the factor or plant that closed down.

Loss of national output: Unemployment involves a loss of potential national output (i.e. GDP operating well below potential) and is a waste of scarce resources. If some people choose to leave the labour market permanently because they have lost the motivation to search for work, this can have a negative effect on long run aggregate supply and thereby damage the economy's growth potential. Some economists call this the "hysteresis effect". When unemployment is high there will be an increase in spare capacity - in other words the output gap will become negative and this can have deflationary forces on prices, profits and output.

Fiscal costs: The government loses out because of a fall in tax revenues and higher spending on welfare payments for families with people out of work. The result can be an increase in the budget deficit which then increases the risk that the government will have to raise taxation or scale back plans for public spending on public and merit goods.

Social costs: Rising unemployment is linked to social deprivation. For example, there is a relationship with crime and social dislocation including increased divorce rates, worsening health and lower life expectancy. Regions that suffer from persistently high long-term unemployment see falling real incomes and a widening of inequality of income and wealth.

2.2 Theoretical Framework

The deadweight loss theory

The theory postulates that consumer / producer surplus is lost due to restriction imposed on output by external factors (Hayes & Porter-Hudak, 1987). The supply of output by the firm is based on the production function that combines capital, labour, infrastructural services (e.g. electricity) and other inputs. The impact of people living in poverty and unreliable supply of infrastructural services would be an increase in the production cost of the firm either through the higher cost incurred in the substitution of private for public supply of those services or through output losses from shutdown by those who cannot effectively find substitutes because they cannot afford to bear the additional cost burden. The effect of this situation is to shift the supply curve to the left implying that the producer is only willing to supply each previous level of output at higher price. The higher market price of the product reduces both the consumers and producer's surplus. Generally, the inadequate and poor-quality supply of infrastructure, such as electric power etc have a major impediment to industrial production and overall economic growth. Some dimension of the loss to the economy can be engulfed in terms of the deadweight loss (the reduction of consumers and producer's surplus).

2.3 Empirical Review

Omri and Kahouli, (2014) conducted an extensive review of the nexus between economic growth and different types of energy consumption, observed that the results from the studies were generally sensitive to methodology and type of energy considered. He concluded that the mixture and the non-conclusiveness of the results from previous studies are due to the different countries' characteristics, different datasets, and alternative econometric methodology. Apart from the cases of establishing the causality relationship between GDP and energy consumption, other research has identified different variables such as price, temperature, population, rate of urbanisation and education

For instance, Ologundudu (2015) in his study investigated the causal and long-run relationship between electricity supply, industrialization and economic development in Nigeria between 1972 and 2010. The study also revealed a unidirectional relationship without a feedback effect between labour and electricity supply. Similarly, Lionel (2013) in their study examined the relationship between electricity supply and economic development in Nigeria between 1970 and 2009. Their study shows that per capita GDP, lagged electricity supply, technology and capital are the significant variables that influence economic development in Nigeria.

While Ado and Josiah (2015) in their study examined the impact of deficient electric power supply on the operations of small-scale businesses operating in the northeast of Nigeria. Their study shows that the severity of electricity supply outages and the costs imposed by power supply outages on the operation of this class of businesses in the region. They suggested that there is the need for policy attention be focused on revitalizing the electricity sector of Nigeria which will in turn improve the national economy.

Nwankwo and Njogo (2013) in her study examine the effect of electricity supply on economic development and likewise the effect of electricity supply on industrial development. The study shows that the electricity (ELEC), Gross fixed capital formation (GFCF), industrial production (INDU) variables and population have the positive relationship.

Akpokerere and Ighoroje (2013) in their study examined the effect of government expenditure on economic growth in Nigeria using a disaggregated approach between1977 and 2009. Their study shows that Nigerian government total capital expenditure (TCAP), total recurrent expenditures (TREC), government expenditure on education (EDU) and power (POW) have the negative effect on economic growth.

Jesuovie *et al.,* (2014) in their study find out whether the huge expenditure made yearly in the power sector has translated into greater electricity generation. Their study shows that that recurrent expenditure has positive impact on electricity generation on one hand and on the other hand the reverse is the case between the later and capital expenditure in the power sector. They also discovered that a megawatt of electricity generation which is the variable of interest has the significant positive impact on real GDP and negatively impacted on the index of industrial production.

George and Oseni (2012) in a study of the impact of electricity supply on Nigeria's unemployment rate using the ordinary least square technique and data collected from 1970 to 2005 found the epileptic power supply in the manufacturing sector to be the chief reason for unemployment in

the country. It advised government to invest more on power generation and that more priority should be given to the industrial sector relative to the residential centres as they are drivers of growth.

Imandojemu and Joseph (2021) examined the relationship between electricity blackouts and productivity in Nigeria employing the Fully Modified Ordinary Least Squares (FMOLS) to analyse secondary data spanning a period of 23 years. Findings from the study revealed an inverse relationship between productivity and electricity price, blackout and corruption such that an increase in any one of these variables adversely affects productivity; but this wasn't the case for electricity generation and population as they were found to influence productivity positively.

Similarly, Iroh, Kalu and Nteegah (2022) utilized annual time series data from 2008 to 2018 and analysed the data using the Fully Modified Ordinary Least Square (FOLS) technique. The results of the study showed an unfavourable relationship between power outages and total factor productivity. Whereas, electricity generation and population established a substantial positive impact on factor productivity, electricity pricing was found to substantially impact negatively on factor productivity. This implies that unstable power supply will lead to low factor productivity and by extension unemployment as factor inputs will be disengaged.

3.Methodology

Model specification

This entails the expression of the relationship between the Electricity Power Supply and Unemployment reduction in Nigeria. That is the mathematical and econometrical expression of the independent and dependent variables with the aprior expected signs of the parameters. The model specified in this survey is gotten from the implicit form of stochastic demand function model used by Frederick (2014) in presenting The Effect of Electric Power Fluctuations on the Profitability of Unemployment Reduction. The essence of using this model is to show the validity of the model specified in this research. In view of this, the economic variables identified in the literature for this study is expressed in a linear functional model below:

The model specified for study is thus as follows:

The functional form of the model;

UEMRDT = f (ESP, GVTPLC)

Where:

UEMRDT = Unemployment reduction

ESP = Power Supply Product

GVTPLC= Government Policy to Unemployment Reduction

μ = an error which cannot capture in the regressive of the model

The relationship of the above variables is therefore expressed in econometric model below with the inclusion of error term denoted as "μ"

$UEMRDT = \beta_o+\beta_1 ESP+\beta_2 GVTPLC +\mu$

Sources of Data and Collection

The data employed in this research work mainly consist of secondary data which are relevant to the study, and was obtained from both published and unpublished sources. The secondary data was gotten from various sources like National Directorate of Employment report and publications (various years), Statistical

Bulletin, World Bank Development indicator, CIA World fact index, Power Holding Company, Newspapers Internet, Text Books, Journals, Magazines, and Seminar Reports etc. These data were gathered for a period of 35 years (1986-2020).

Technique of Estimation

The estimation techniques to be used in this research work are the Ordinary Least Square (OLS). The computational procedure of OLS is fairly simple as compared with the other economic techniques. It is also considered as one of the most commonly employed techniques in estimating linear relationship in econometric methods.

Evaluation of Model

This entails the evaluation of the model by subjecting the model to the various economic criteria to determine the effectiveness of the model. However, the evaluation of the model used in this research is subject to the following:

4.Result

Results of Regression Analysis

Variables	Coefficients	Standard error	T-statistic	Probability
Esp	5.450702	0.4738167	11.50	0.000
Bcrt	-0.0003139	0.2817611	-0.00	0.999

Result of t-test of significance:

VARIABLE	COMPUTED T-VALUE	CRITICAL T-VALUE	CONCLUSION
LogESP	**11.50**	**2.042**	**SS**
logBCRT	**-0.00**	**2.042**	**NSS**

Results of F-test of significance:

F-calculated (f*)	F-tabulated ($f_{0.025}$)	Conclusion
129.30	3.32	Statistically Significant

Results of Heteroscedasticity Test

The white general heteroscedasticity test will be used. Firstly, we obtain X^2cal.

$X^2cal = R^2 * n$

$X^2cal = 0.8899 \times 35 = 31.1465$

$X^2tab = 47.400$

Since $X^2cal < X^2tab$, we accept H_0 and conclude that there is no heteroscedasticity.

Results of Normality Test

The normality test of the residuals will be carried out to ascertain if the residuals of the model follow a normal distribution. The normality test follows chi-square distribution with 2 degree of freedom at 5% level of significance. If the X^2 from the skewness test is greater than the X^2_{tab}, we reject the null hypothesis and conclude that the residuals of the model does not follow a normal distribution and accept null hypothesis if otherwise.

X^2 (skewness) = 0.5750

$X^2(2)_{tab} = 0.68$

The X^2 from the skewness test is less than the X^2_{tab}, we reject the null hypothesis and conclude that the residuals of the model follow a normal distribution.

Results of Autocorrelation Test:

This test is aimed at ascertaining it auto correlation occurred in the model to achieve this we assume that the values of the random variables (u) are temporarily

independent by employing of Durbin Waston d-statistics (d^*)

Findings

The result of the Ordinary Least Square (OLS) regression depicts a strong positive linear correlation between Unemployment Reduction and Electricity Supply Product. This implies that when there is a positive improvement in the Electricity Supply Product there will also be a positive improvement in Unemployment Reduction. More so, the negative correlation between Unemployment Reduction and Government Policy on Unemployment indicates that policies toward unemployment through Government Policy will result to decrease in unemployment. This finding is in line with the study of Akpokerere and Ighoroje (2013), their study shows that Nigerian government total capital expenditure (TCAP), total recurrent expenditures (TREC), government expenditure on education (EDU) and power (POW) have the negative effect on economic growth. The study of Lionel (2013) also revealed that per capita GDP, lagged electricity supply, technology and capital are the significant variables that influence economic development in Nigeria.

Aside from the strong positive linear relationship, there is also a strong variance of (that is R^2 =0.8899), implying that 89 percent of the changes that occurs in Unemployment Reduction, are caused by Electricity Supply Product and Government Policy on Unemployment.

By implication, only 11 percent of the changes in Unemployment Reduction are attributed to other factors not captured in the model. Thus, the test of goodness fit is proved to be valid.

In addition, the correlation coefficient Electricity Supply Product which is a positive sign supported the a priori theoretical expectation of an expected positive relationship between Unemployment Reduction and Electricity Supply Product. This indicates that the higher the Electricity Supply Product, the higher the Unemployment Reduction rate and vice versa. In view of this, it is clear that when there is an improvement in the power supply, more people will be encouraging to start up a small-scale enterprise because the cost of operation will be very low as a result of improve power supply. Hence, to realize a sustainable increase in employment rate, there is need for the level of power supply in the country to be improved and sustain at a very high level.

Finally, based on the research findings presented above, we therefore reject the null hypothesis denoted by H_0: which state that the reduction in unemployment is not dependent on the quality and availability of adequate electricity supply in Nigeria "and uphold or accept the alternative hypothesis denoted by H_1: concluding that" unemployment reduction is dependent on the quality and availability of adequate Electricity Supply in Nigeria. This is because the availability of adequate power supply will decrease the rate of unemployment in Nigeria thereby reducing their cost of production while improving their productivities, Competitiveness as well as employment in the country.

5.Conclusion and Recommendations

Conclusion

The conclusion of this research work is drawn based on the findings which carefully examined the contribution of Electricity Power Supply to Unemployment Reduction in Nigeria towards the growth and development of the economy.

The major problem of ESP is inadequacy and unreliability which has constrained the reduction in unemployment in terms of growth productivity and competitiveness.

One of the major contributing factors to economic growth via productivity happens to be ESP.

The policy implications that could be drawn from these results go first towards promoting a better-quality electricity service. Therefore, adequate financing of these sectors is important if any meaningful results are to be achieved if not, their performance productivity and profitability is greatly constrained. Hence the rate of unemployment reduction is dependent on the quality and availability of adequate electricity power supply in Nigeria.

Recommendations

Government should increase its funding of the electricity sector to at least 15-25 percent on annual budget. This is also in recognition of the fact that government expenditure are constrained by scarce resources available to its executing budget. But the upward review of funds to the power supply has the capacity of generating a great impact in terms of economic growth. Therefore, priority should also be given to power supply sector.

The government and policy makers should continue to give adequate attention to improving power generation and supply especially to the industrial sector. The installed capacity should be fully utilized while measures should be put in place to minimise the persistent high incidents of wastages between the points of power generation and distribution.

The government should also ensure that the industrial sector enjoys higher proportion of the power supply compared with the totality of the other sectors especially the non-productive (leisure) sector of the economy to reduce drastically the unemployment rate in the country.

Regulatory bodies responsible for the energy sector must set some standards for the generation, distribution and costing of electric power where preference would be given to key sectors of the economy such as SMEs since they are known to provide jobs for a large number of people and contribute significantly to the economic growth of the country.

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