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Effect of the Natural Gas Industry on Economic Growth of Nigeria

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Abstract

This research work sought to explore the effect of natural gas industry on economic growth of Nigeria. The peculiar aim of this study includes to: (i) ascertain the effect of natural gas production on the economic growth of Nigeria and (ii) verify the effect of natural gas flaring on the economic growth of Nigeria. The hypotheses were stated in line with the objectives. The study adopted ex-post facto research design and statistical technique- multiple linear regression models. Panel data for twenty-three years (1999- 2021) were collected from the Nigerian National Petroleum Corporation annual statistical bulletin. The Augmented Dickey-Fuller test was employed, and other diagnostic tests conducted. The findings from the regression analysis examining the impact of natural gas production, natural gas flaring and other relevant factors on economic growth in Nigeria reveal several significant insights. Firstly, the regression coefficients indicate that natural gas production has a strong positive effect on economic growth, while natural gas flaring has a detrimental impact. The positive coefficient associated with natural gas production implies that an increase in natural gas production is associated with higher levels of economic growth. Conversely, the negative coefficient linked to natural gas flaring indicates that higher levels of flaring are associated with reduced economic growth. It suggests that policies aimed at promoting increased natural gas production could contribute positively to Nigeria's economic growth agenda. Measures to reduce flaring and promote cleaner energy technologies not only contribute to environmental sustainability but also have the potential to enhance economic productivity and resilience. However, it recommended needful coordinated efforts from government, industry, and civil society to implement effective policies, invest in infrastructure and technology, and promote responsible resource management practices.

Keywords: Natural Gas Industry; Natural Gas Production; Gas Flaring; Economic Growth; Sustainability

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Background of the Study

Natural gas is one of the major natural resources that Nigeria is privileged to have, and its products are globally needed and demanded virtually by every sector in Nigeria and by many other foreign countries for their plants/industries, companies and also as source of power; energy for generating electricity and heat. Natural gas is fossil fuel that contains many different compounds, formed deep underground, from accumulated decayed organic material, after a very long period of time. It is the mixture of gases of different compositions, which exist in natural reservoir beneath the earth's surface, under specific atmospheric condition.

Natural gas also known as fossil fuels or fossil gases are non-renewable energy sources, obtained from natural underground reservoir. These fuels originated from dead plants and animals buried millions of years ago. Natural gas is an energy source often used in the manufacture of plastics and other commercially essential organic chemicals as a heating fuel, cooking gas, fuel for automobiles, fuel for electricity generation, and petrochemical feedstock. Hydrocarbon gases (methane, ethane, propane, butane, pentane and heavier hydrocarbons), non-hydrocarbon gases (carbon dioxide, hydrogen sulfide, nitrogen and water vapour) and occasionally mercury are the components of natural gas. During the discovery of crude oil, natural gas is not directly searched for, and it is only as an 'accident' that it is discovered either alone or with crude oil. Before it can be used, natural gas needs processing. Natural gas in Nigeria has the potential to boost the economy and the well-being of its people. It can be used to generate electricity, to power companies and lighten houses (Kiakia Gas Company, 2021). Nigeria mostly relies on fossil fuel-derived fuel sources for power generation (U.S. Energy Information Administration, 2023).

The consistent release of natural gas and other gases by both legal and illegal (burn refineries through flare stack and venting into the atmosphere in Nigeria and some other countries has been an unresolved challenge till now. Legal refineries often apply standard operating procedures (SOP). Their process is being controlled and supervised, while the illegal refineries do not take standard operating procedure (SOP) to control their processes. They constantly release pollutants into the environment and the soot from their emissions are visibly circulated all over the environment and the safety of the habitants are greatly at stake. It has a disastrous impact on the environment, health and global climatic changes.

Nigerian gas production has been stagnant over the last four years, in part due to a fall in oil prices in 2015- 2016, but primarily due to a slowdown in upstream investment in new fields (especially non-associated gas). Of the gas that is produced, the majority is either exported or used in upstream operations (e.g., fuel, lift, re-injection) or flared. Once natural gas is produced in Nigeria, it is commercialized, used in upstream operations, or flared (United States Agency for International Development, 2019).

Statement of the Problem

Sustainability in the gas industry through increased installation and use of sustainable, effective, low cost and cleaner technologies to drastically reduce the environmental, health and social problems is a global vision. As a result of Industrial Revolution, science and technology continued to be the global motivational aid for natural gas industries and other companies at large. Over the years, natural gas production has always been in progress and the demand is consistently increasing, whereas satisfaction has not been fully met. This is tagged to inadequate facility at the gas industries which also contribute to gas flaring.

There is perceived frustrated pronounced problems from the emission releases by natural gas industries in Nigeria and other parts of the world. The disastrous impacts of emission from gas flares have been a lingering issue over the years and the targeted year(s) for gas flare eradication have not been met despite the disastrous effects of the emissions- thereby affecting the economy of Nigeria. The inventions and use of modern sophisticated machines have continued to increase in gas sector, but the flares and vents from their productions have not been reduced to barest minimal due to inadequate storage system and processing facilities. Flared gases which could have been re-injected into the underground reservoir for future production has been impossible due to insufficient facilities. Natural gas vents are worse than gas flares, and the volume vented have not been checkmated by the authority in charge. Flaring and venting have worsened environmental problems- increased pollution, depletion of the ozone layer, acid rain and global warming. Appropriate technology moves pari passu with sustainable development. The safeties of lives and climate have not been given full protection and appropriate consideration, and this can compromise the ability of future generation meeting their own needs.

Objectives of the Study

The general objective of the study was to evaluate the effect of the natural gas industry on economic growth of Nigeria.

The specific objectives were to:

i) ascertain the effect of natural gas production on the economic growth of Nigeria.
ii) verify the effect of natural gas flaring on the economic growth of Nigeria.

Literature Review

Conceptual Review

Natural gas (also called fossil gas/fuels) are energy resources derived from altered remains of living organisms buried by sediments and exposed to elevated pressures and temperatures for millions of years. They are defined non-renewable because of the long time it takes to create them. There are three basic forms of fossil fuels: petroleum (or, crude) natural gas, and coal (Gerali, 2021). Natural gas is produced from onshore and offshore natural gas and oil wells and from coalbeds (U.S. Energy Information Administration, 2023).

Natural gas industry incorporates exploration, production, processing, utilisation, storage, transportation, and distributions/ marketing of natural gas and natural gas liquids.

Natural gas production are series of industrial processes involved in purifying raw natural gas by removing impurities such as carbon dioxide, hydrogen sulfide, mercury, water, and hydrocarbons; to produce pipeline quality dry natural gas (PHMSA: Stakeholder Communications, 2018) for pipeline distribution and final use (Speight, 2015).

Flaring of gas is a standard practice for gas pressure control, and facility safety measure in most process plants such as refineries, oil production platforms and petrochemicals. In this system, the excess gas collected by various units is burnt-off in a flare stack (Tofighi and Abedian, 2016). Gas flaring is a form of waste of natural resource and it carries along huge economic impacts (Ojijiagwo, Oduoza and Emekwuru, 2016).

Economic growth is an increase in the volume of economic goods and services produced in an economy over a particular period of time, compared with the previous period. Economic growth is the process of increasing the sizes of national economies, the macro- economic indications, especially the GDP per capita, in an ascendant but not necessarily linear direction, with positive effects on the economic-social sector (Haller, 2012).

Theoretical Review

Schumpeterian Endogenous Growth Model of Industrial Innovation

The study utilized Schumpeterian endogenous growth model of industrial innovation theory. Schumpeterian growth theory has operationalized Schumpeter's notion of "creative destruction", the process by which new innovations replace older technologies (Aghion & Howitt, 1992).

This work is anchored on Schumpeterian endogenous growth theory of Industrial Innovation, because of the need for greener-nation and sustainable economic growth of Nigeria through environmental sustainability for both the present and future generation. Natural gas which is cleaner fossil fuel is gradually replacing coal, crude oil and other higher carbon emission products. The invention of natural gas makes oil and coal obsolete. Natural gas production created job opportunities for many people and has been the principal destroyer of the planet.

Empirical Review

Prior studies have been conducted on the relationship between the natural gas industry and economic growth in Nigeria and across countries. Some of which were reviewed in this section.

Eze, Okoli and Onugha (2021) studied the impact of gas production on economic growth in Nigeria, from 1985-2020. Secondary data were collected based on the model used in the research work, through the use of Ordinary Least Squares (OLS) as estimation technique. As required of time series data Augmented Dickey Fuller (ADF) for stationarity test, that is unit root test was conducted on the data and the variables were stationary at level form I(0), after which Johansen co-integration test was conducted and the variables were co-integrated showing evidence of long-run relationship between the dependent and independent variables. Level form I(0) stationarity indicates short run instability, as a result the study analysis is based on long run analysis. The result obtained from empirical analysis shows that there exist 47% goodness of fit between the dependent and independent variables.

Songur, Muratoglu, and Muratoglu (2016) studied natural gas production and economic growth in Eurasian countries: evidence from a panel ARDL Model. In this study, aiming to contribute to filling this void, we analyzed the relationship between natural gas production and GDP per capita in five Eurasian countries (Azerbaijan, Russian Federation, Kazakhstan, Turkmenistan and Uzbekistan) in the period 1993-2013 using Westerlund's Durbin Hausman cointegration model a panel autoregressive distributed lag model. Empirical results indicate that natural gas production and GDP per capita are cointegrated and there is a long run relationship between them. Energy production plays a significant role in these five economies. Therefore, it would be safe to suggest these countries to follow policies which would increase their natural gas production such as increased infrastructure investments. Considering the aging infrastructure and their negative effects which have already been existing for some time, the need to renew the infrastructure of natural gas production and distribution seems to be vital. Moreover, new pipeline investments would contribute to enhance the economic growth particularly for Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan.

Ekpu and Obadina (2020) carried out a study on power production using natural gas in Nigeria: trends, challenges and way forward. This research work analysed the gas production and consumption rate data from 1980 to 2018. In addition, the volume of export and demand from 2011 to 2015 was investigated. The variations/fluctuations observed in the production and consumption of gas in Nigeria is attributed to challenges such as insecurity, corruption, pipeline vandalisation, and so many other vices identified in this work. In addition, it was observed that as gas is being exported from Nigeria to other countries, the local demand for the product increased as well. This work showed that the amount of gas flared from 2001 to 2018 reduced from 64.48% to 18.71%. It has become clear that the gas produced in Nigeria is not fully utilised for power production in Nigeria because most of the gas produced are exported. This leaves the Nigerian power sector with reduced amount of gas to produce electricity. Therefore, understanding the trends, challenges, and the way-forward of power production using natural gas in Nigeria is very significant.

Oluwasoye and Ogbonna (2016) studied the environmental risk of gas flaring in Nigeria: lessons from Chevron Nigeria and Ilaje Crisis. This research adopted the experimental procedures using secondary data for the period 2007- 2012. The research reveals the health and safety implications of gas flaring in Nigeria and lessons for different stakeholders. The hydrocarbon compounds such as benzene, naphthalene, styrene, toluene, and xylene found in the flaring of associated gas affect health and safety of the local people in Nigeria. For example, we found that breathing particulate-matter which are linked to gas flaring result into aggravated asthma, increase in respiratory symptoms like coughing and difficult breathing, chronic bronchitis, decreased lung function, and premature death; and also found that health issues such as pneumonia and cases of leukaemia are linked to gas flaring. The results also show that carbon dioxide emissions in the Niger Delta region of Nigeria ranked among the highest in the world. Our findings bear vital implication for gas flaring elimination projects in Nigeria and reveal shortcomings in the current oil and gas industry practice in which it is cheaper to flare gas than to eliminate it.

Elehinafe, Nwizu, Odunlami and Ibukun (2022) reviewed natural gas flaring in Nigeria, its effects and potential alternatives using data spanning from 2013–2018. The secondary data gathered were analysed using Seismic surveys. The study results showed that Nigeria stands to gain a great deal from utilizing natural gas properly in terms of revenue and increased job opportunities, thus it is imperative that the flaring of natural gas should be stopped. Several alternatives have been proposed, such as; using flared gas to produce electricity and as a petrochemical feedstock, liquefying of flare gas and reinjecting it into the earth as a secondary oil recovery technique. Nigeria is a

country blessed with vast oil and natural gas resources, due to inadequate management of resources most of the natural gas is flared. One of the most pressing challenges today is global warming. Gas flaring has been known to deliver carbon dioxide and other ozone depleting substances which cause unnatural weather change.

Madueme (2010) studied the economic analysis of wastages in the Nigerian gas industry. This paper tried to assess empirically the economic cost of gas flared in Nigeria from 1965 to 2008. Time series data was collected through archival sources and analyzed using percentages, T- test and correlation statistics. Results revealed that total gas flared or wasted was statistically different from gas produced and utilised. Trends in gas flaring pre and post the eighties were compared. The economic cost of total gas flared is quite staggering which implies great investment opportunities for the private sector. Hence, more gas intensive modes of production, greater private sector investment are encouraged in the sector and the government should recycle and seek for more trading opportunities for the gas sector.

Usiabulu, Amadi, Adebisi, Ifedili, Ajayi and Pwafureino (2023) carried out a study on gas flaring, and its environmental impact in Ekpan Community, Delta State, Nigeria using descriptive statistical tools such as mean and standard deviation, which were used to analyze the variance and degree of effect of pollutants. It was found that hazardous gases have been released into the environment because of air pollution caused by the combustion of methane and other hazardous flue gases during the manufacturing and processing of hydrocarbons. Industrial flue gas flare-ups cause several problems and are harmful to public health and the environment.

Method of Analysis and Model Specification

The variables were estimated using the multiple linear regression model. This entails estimating the model in order to investigate the effect of natural gas production and natural gas flaring on the economic growth of Nigeria.

The goal of linear estimating approaches is to obtain unique parameter estimates that allow us to interpret the regression coefficient and, as a result, provide a little better fit. The Augmented Dickey-Fuller test will be used to do a unit root test on the variable. The unit root test determines if the time series data used in the model is stationary or non-stationary. This is to determine whether the link between variables is fictitious or illogical. The estimation was conducted using the econometric computer software package (EViews version 13.0.). Given the above the mathematical model is presented in equation (1) below

$$\text{Real GDP} = f(\text{NGP}; \text{NGF}) \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Were

Real GDP = Gross Domestic Product

NGP = Natural gas production

NGF = Natural gas flaring

Equation 1 can be re-written in econometric form as:

$$\text{Real GDP} = \beta_0 + \beta_1(\text{NGP}) + \beta_2(\text{NGF}) + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

$$\beta_1;\ \beta_2 > 0$$

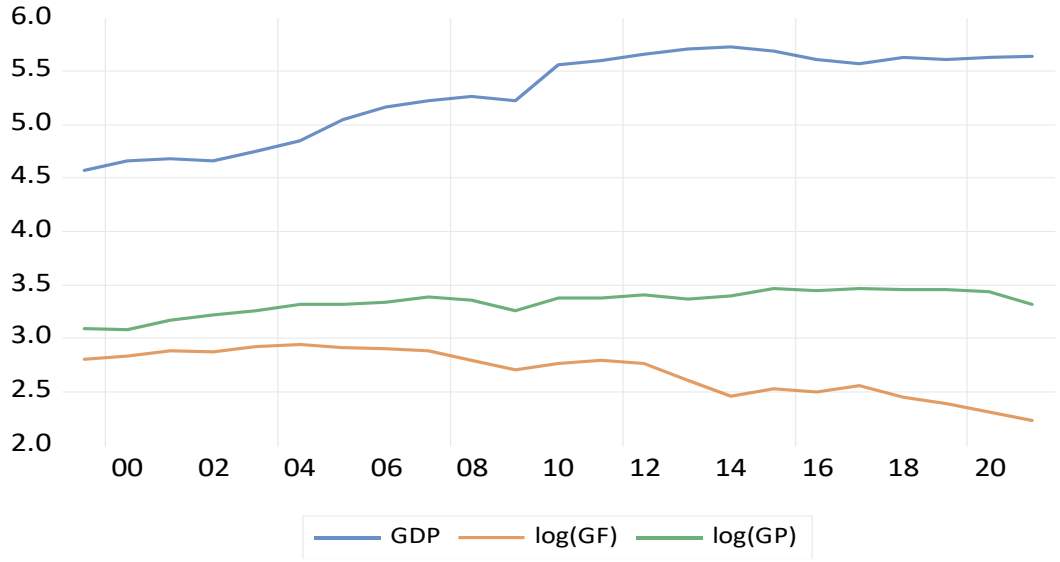

Fig 1: Line plot of the variables

Descriptive Statistics

Table 1 is the descriptive statistics which offered a detailed snapshot of key economic and environmental indicators within the context of natural gas production. First and foremost, the Gross Domestic Product (GDP) mean of 5.293539 provides insight into the average economic output over the given period. With a relatively low standard deviation of 0.410749, GDP values exhibit moderate variability, suggesting that economic performance tends to remain relatively stable around the mean. The negative skewness (-0.573058) indicates a slight leftward skew in the distribution, implying occasional instances of lower GDP values compared to the mean. This suggests that while the economy generally performs around the average, there are occasional periods of below-average performance.

Secondly, the statistics reveal details about Natural Gas Production, with a mean value of 2.687792 representing the average production level. The low standard deviation of 0.216962 suggests that natural gas production remains tightly clustered around the mean, indicating minimal variability in production levels. The negative skewness (-0.607233) suggests a slight leftward skew in the distribution, indicating occasional instances of lower production levels relative to the mean. This information is crucial for understanding the stability and trends in natural gas production, which is a vital component of many economies worldwide.

Lastly, the analysis sheds light on Natural Gas Flaring, with a mean value of 3.338279 representing the average amount of flared natural gas. The low standard deviation of 0.111971 suggests minimal variability in flaring levels, with values closely clustered around the mean. However, the relatively higher negative skewness (-0.949698) indicates a more pronounced leftward skew in the distribution compared to the other variables. This suggests that while natural gas flaring levels are generally stable around the average, there are occasional instances of significantly lower flaring levels relative to the mean, highlighting the importance of environmental concerns and efficient resource utilization in natural gas production processes.

Table 1: Descriptive Statistics

	GDP	Log_NGP	Log_NGP
Mean	5.293539	2.687792	3.338279
Median	5.563893	2.769872	3.366449
Maximum	5.725272	2.947698	3.466845
Minimum	4.572070	2.232920	3.082793
Std. Dev.	0.410749	0.216962	0.111971
Skewness	-0.573058	-0.607233	-0.949698
Kurtosis	1.746429	2.085090	3.064722
Jarque-Bera	2.764813	2.215654	3.461396
Probability	0.250974	0.330276	0.177161
Sum	121.7514	61.81922	76.78042

Sum Sq. Dev.	3.711723	1.035594	0.275824
Observations	23	23	23

Unit Root Test

Differentiating can be used to eliminate a stochastic tendency that frequently characterizes time series data. As a result, the unit root test examines the stationarity or non-stationarity of the model's series data. This will reveal whether the connection between the economic aspects is made up or unreasonable. The lagged values of the dependent variable are added for this test, producing a serially uncorrelated error term. As a result, the study employed the Augmented Dickey-fuller (ADF) technique to assess and confirm the unit root property of the series as well as the stationarity of the model.

Table 2: ADF Stationarity Test

Variable	ADF		Decision	Order
	First Difference Stage	P-Value		
Gross Domestic Product	-3.940120	0.0072	Not Stationary	I (1)
Natural Gas Production	-4.152997	0.0045	Not Stationary	I (1)
Natural Gas Flaring	-3.730922	0.0113	Not Stationary	I (1)

According to table 2 which is the results of the Augmented Dickey-Fuller (ADF) unit root tests after taking the first difference for Gross Domestic Product (GDP), Natural Gas Production, and Natural Gas Flaring indicate the stationarity of these time series variables. For GDP, the ADF statistic of -3.940120 with a probability value of 0.0072 suggests strong evidence against the presence of a unit root after differencing once. This implies that GDP exhibits stable behavior over time, making it suitable for further analysis in econometric models or forecasting applications. The stationarity of GDP is crucial for policymakers and economists as it ensures that the statistical properties of the economic output series remain constant, facilitating more accurate assessments of economic performance and trends.

Similarly, the ADF results for Natural Gas Production reveal a statistically significant ADF statistic of -4.152997 with a probability value of 0.0045 after the first difference. This indicates that Natural Gas Production also becomes a stationary series after differencing once, indicating stable behavior over time. The stationarity of Natural Gas Production is valuable for energy analysts and policymakers, enabling them to make informed decisions regarding energy policies, resource allocation, and infrastructure investments based on reliable and stable production data.

Moreover, the ADF test results for Natural Gas Flaring show a slightly weaker but still significant evidence against the presence of a unit root after the first difference. With an ADF statistic of -3.730922 and a probability value of 0.0133, the series becomes stationary, albeit with slightly weaker evidence compared to GDP and Natural Gas Production. Nevertheless, the stationarity of Natural Gas Flaring implies stable behavior in the release of natural gas emissions, which is crucial for environmental assessments, policy interventions, and sustainable development initiatives aimed at reducing environmental pollution and mitigating climate change impacts associated with natural gas flaring. Overall, the stationarity of these key economic and environmental variables provides a solid foundation for rigorous analyses and informed decision-making processes across various domains, ranging from macroeconomic policy formulation to environmental management strategies.

Multiple Regression

Multiple linear regression is a statistical method used to analyze the relationship between two or more independent variables (predictors) and a dependent variable (response). Unlike simple linear regression, which involves only one independent variable, multiple linear regression allows for the examination of how multiple predictors collectively influence the outcome variable.

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Table 3: Regression Output

Dependent Variable: Log_NGP
Method: Least Squares
Date: 02/21/24 Time: 14:01
Sample: 1999 2021
Included observations: 23

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG_GF_	-0.687019	0.193777	-3.545419	0.0020
LOG_GP_	2.476751	0.375474	6.596323	0.0000
C	-1.127981	1.595543	-0.706958	0.4877

R-squared	0.851072	Mean dependent var	5.293539
Adjusted R-squared	0.836179	S.D. dependent var	0.410749
S.E. of regression	0.166250	Akaike info criterion	-0.629542
Sum squared resid	0.552780	Schwarz criterion	-0.481435
Log likelihood	10.23974	Hannan-Quinn criter.	-0.592294
F-statistic	57.14645	Durbin-Watson stat	0.478177
Prob(F-statistic)	0.000000		

Table 3 is the regression analysis conducted on the relationship between natural gas flaring, natural gas production, and economic growth in Nigeria reveals insightful findings. Firstly, the negative coefficient of -0.687019 associated with natural gas flaring suggests that for every unit increase in natural gas flaring, economic growth in Nigeria decreases by approximately 0.687019 units. This relationship is statistically significant, as evidenced by the low probability value of 0.0020. This implies that higher levels of natural gas flaring are detrimental to economic growth in Nigeria, likely due to the adverse environmental and health effects associated with flaring practices. These findings underscore the importance of implementing measures to reduce natural gas flaring and promote cleaner and more sustainable energy practices to foster economic development.

Conversely, the positive coefficient of 2.476751 for natural gas production indicates that for every unit increase in natural gas production, economic growth in Nigeria increases by approximately 2.476751 units. This relationship is highly statistically significant, with a probability value of 0.000. The results suggest that increased natural gas production has a significant positive impact on economic growth, potentially through revenue generation, investment opportunities, job creation, and industrial development associated with the exploitation of natural gas resources. These findings highlight the potential of natural gas production to drive economic growth and development in Nigeria, making it a crucial component of the country's energy strategy.

Overall, the regression results provide valuable insights into the dynamics between natural gas flaring, natural gas production, and economic growth in Nigeria. They emphasize the need for policies and strategies that promote sustainable natural gas management practices, minimize flaring, and maximize productive utilization to foster economic growth while mitigating adverse environmental and social impacts. By leveraging the positive relationship between natural gas production and economic growth while addressing the negative effects of flaring, Nigeria can harness its natural gas resources more effectively to support long-term sustainable development and prosperity.

Diagnostic Test

Diagnostic tests in regression analysis are crucial for evaluating the validity and reliability of the regression model and identifying potential issues that may affect the interpretation of results. These tests help ensure that the assumptions underlying the regression model are met and that the estimated coefficients are accurate and reliable.

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Table 4: Breusch-Godfrey correlation LM Test

Breusch-Godfrey Serial Correlation LM Test: Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	16.22995	Prob. F(2,18)	0.0001
Obs*R-squared	14.79547	Prob. Chi-Square (2)	0.0006

Table 5: Heteroskedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey Null hypothesis: Homoskedasticity			
F-statistic	0.644958	Prob. F(2,20)	0.5353
Obs*R-squared	1.393527	Prob. Chi-Square (2)	0.4982
Scaled explained SS	0.571143	Prob. Chi-Square (2)	0.7516

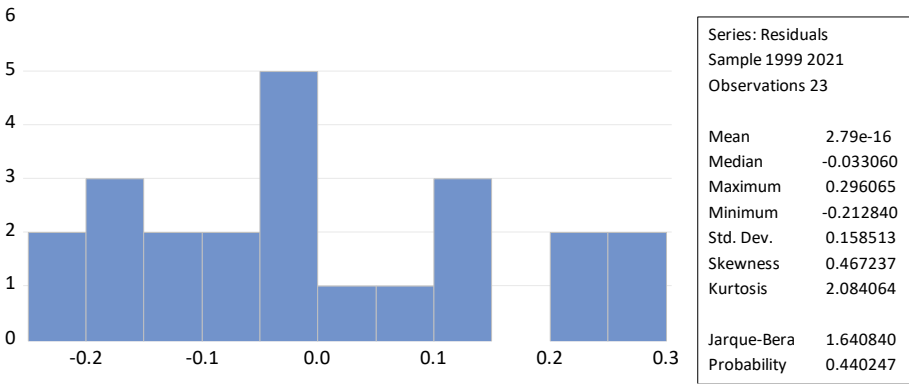

Fig 2: Normality test

Conclusion

This study examines the effect of natural gas production and natural gas flaring on the economic growth of Nigeria.

The findings from the regression analysis examining the effect of natural gas flaring, natural gas production, and other relevant factors on economic growth in Nigeria reveal several significant insights. Firstly, the regression coefficients indicate that natural gas production has a strong positive effect on economic growth, while natural gas flaring has a detrimental impact. These results suggest that the management of Nigeria's natural gas resources plays a crucial role in shaping the country's economic development trajectory.

The positive coefficient associated with natural gas production implies that an increase in natural gas production is associated with higher levels of economic growth. This finding underscores the potential economic benefits of efficiently harnessing Nigeria's natural gas reserves, such as revenue generation, job creation, and industrial development. It suggests that policies aimed at promoting increased natural gas production could contribute positively to Nigeria's economic growth agenda.

Conversely, the negative coefficient linked to natural gas flaring indicates that higher levels of flaring are associated with reduced economic growth. This highlights the adverse consequences of inefficient natural gas management practices, such as environmental degradation, health hazards, and resource wastage, which can hinder economic development efforts. The significance of this relationship underscores the importance of implementing measures to minimize natural gas flaring and promote sustainable energy practices to support long-term economic growth in Nigeria.

Moreover, the results underscore the need for policymakers and stakeholders to address environmental concerns and inefficiencies in Nigeria's natural gas sector. Measures to reduce flaring and promote cleaner energy technologies not only contribute to environmental sustainability but also have the potential to enhance economic productivity and resilience. Additionally, efforts to increase natural gas production should be accompanied by strategies to ensure equitable distribution of benefits, maximize value addition, and promote local content development to foster inclusive and sustainable economic growth.

In conclusion, the regression findings provide valuable insights into the complex relationship between natural gas management practices and economic growth in Nigeria. By leveraging the positive impacts of increased natural gas production while mitigating the adverse effects of flaring, Nigeria can unlock the full potential of its natural gas resources to drive inclusive and sustainable economic development. However, recommend achieving this requires coordinated efforts from government, industry, and civil society to implement effective policies, invest in infrastructure and technology, and promote responsible resource management practices.

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