Impact of FDI on Gas Supply: Implications on Economic Growth in Nigeria

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Abstract

This study aims to examine the effect of gas supply and foreign direct investment on economic growth in Nigeria over the period 1981 to 2014. The paper employs the VAR model and the multivariate granger causality to assess the impact of the volatility of gas supply and foreign direct investment (FDI) on economic growth and to determine the causal relationship between the variables. The results of the study show that FDI and gas supply have a positive and significant effect on economic growth in Nigeria. The results also show a bidirectional causality that runs from gas supply to economic growth. The findings clearly suggest that economic growth must be inclusive for the grassroots sectors to feel the impact of gas supply and FDI in Nigeria.

Key words*: Gas Supply; FDI; Economic Growth; VAR*

1. Introduction

The systemization of the relationship between energy, foreign direct investment and by extension economic growth is an emerging discourse in energy economics literature. On that basis, mainstream economists generally think of capital, labour and land as the primary factors of production and goods such as energy and technology transfer made possible by foreign direct investment as intermediate inputs (Chontannwat and Pierse, 2008). Similarly, in the growth theory, the traditional growth theorists focused on only primary inputs especially on capital and labour with a much lesser and somewhat indirect treatment of the role of energy and foreign direct investment in the growth process (Edoumiekumo and Opukri, 2013). Therefore, under a theoretical anchorage, the role of energy and foreign direct investment is not given an explicit explanation in the standard growth theories. While availability of energy supply is a powerful condition for promoting and sustaining economic growth, foreign direct investment in energy sector has been positively linked to economic growth (Elliot, Sun and Chen, 2013).

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Some studies have investigated these issues using both foreign direct investment and economic growth (Adejumobi and Adebiyi, 2016; Omodero and Ekwe, 2014) or energy consumption and economic growth (Oke, 2016); there is no empirical work that examines all these variables within the same model. To fill this void, there is a need for a study like this that will incorporate and analyze the effect of energy supply and associated foreign direct investment on economic growth. In addition, from 1980s to date, the dynamic global economic environment has given a lead way in a renewed interest in the relative benefits of foreign direct investment as way by which less developed countries (LDCs) can attain reasonable rate of economic growth (Ghali and El- Sakka, 2004). Furthermore, the emphasis on foreign direct investment by policy makers as the best way to ensure growth rather than the provision of aids that comes from developed countries ignited interest for the study (Emeka, Frederick and Peter,2012).

The need to reduce vulnerability and dependence on crude oil market may account for the increased investment in gas market. For instance, investment in gas industry in European and other developed market increased by 20 percent in the last 15 years, while in Africa investment in the gas industry –mainly driven by FDI - has increased by 35 percent (World Bank, 2015). In Nigeria FDI seems to be one of the main sources of investment in gas market possibly due to low level of capital available in the region, high level of capital needed to start and maintain the industry. Foreign direct investment in Nigeria is mostly carried out by multinational companies in partnership with other foreign countries. In recent years, the flow of FDI in the gas market has been fluctuating due to increase interest in renewable energy sources, discovery and production of unconventional gas especially in the US and other major gas consuming nations. According to International Energy Agency [IEA] (2015) report, 80 percent of gas consumption in the US is now produced in the US. This trend may affect US future investments abroad which eventually will affect investment in the energy sector in Nigeria. This therefore underscores the need to investigate the specific case of the relationship between foreign direct investment, energy and economic growth in Nigeria.

This study investigates the effect of gas supply and foreign direct investment in the sector and the Nigerian economic growth. To achieve this objective, this paper is structured into five sections. Section one is the introduction. The section contains the background information about the key question and focus of the paper. It also, describes the objective and motivation for the paper. Section two deals with the theoretical underpinning of this study and relevant literatures on gas supply, foreign direct investment and economic growth nexus. Section three describes the methodology as well as anticipated impact of the findings. Section four is the presentation and discussion of the results while section five gives the conclusions and policy implications of the paper.

2.1 Theoretical Framework

For the purpose of this study, we employed the Solow growth model and Romer's endogenous growth model. According to Solow (1957) economic growth is engendered by the growth rate of inputs such as technology, capital, labour or by bringing in a vector of additional variables in the estimating equations such as energy supply, foreign direct investment or institutional dummies. This growth accounting process can be derived from the equation as below:

$$Y=A\omega(K,L,\Omega) \quad (1)$$

where Y, K, L and A are output, capital, labour and the efficiency of product respectively and Ω is a vector of auxiliary variables such as FDI and Energy supply. The Solow model assumes all the independent variables are exogenous, thus neglecting the possibility of independent variables being endogenous. Romer (1986) however, modified the Solow growth model to the endogenous growth models and also introduced the impact of technological change into the production process. For this reason, economic models of endogenous growth models have been employed to investigate the impact of foreign direct investment on economic growth through the flow of technology (Barro 1990, Barrel and Pain 1997). This is because, foreign direct investment can accelerate and promote economic growth by strengthening human capital and create dynamic comparative advantages that leads to technological progress (Georgescu-Roegen 1971; Costanza, 1980; Grossman and Helpman, 1991). It is this feedback mechanism from the endogenous technological progress that leads to increase productivity and thus, promote economic growth in the long-run (Romer 1999).

2.2 Literature Review

Many studies have examined the nexus between gas supply and economic growth (Alimi, 2014; Aghalino, 2009; Maxwell and Zhu, 2008). Maxwell and Zhu (2008) for instance, studied the relationship between natural gas prices and consumption in US. Using Granger causality and VAR model, they found that given the rate of investment in the gas industry, the study projected a rise in the consumption of gas from 2.5 percent to 12.4 percent by 2030 with Liquefied Natural Gas (LNG) constituting the major source of gas consumption in the US. The study pointed out that investment in the US gas industry has increased due to fall in production cost and the increase in the price of gas. Such investment has not only increased the consumption of gas in developed nations but also have environmental advantage to the exporting nation (Alimi, 2014).

Investments in the gas industry have series of advantages especially in the producing nations; chief among them is the increase in revenue and reduce waste of associated gas which are usually flared. In Nigeria for example, gas flaring as been a major problem since the beginning of crude oil exploration in 1958. Although Nigeria is ranked among the top 10 countries with the largest natural gas

reserves, 75 percent of her natural gas is flared as at 2000 (Energy Commission of Nigeria [ECN], 2006). However, with the increase in Foreign Direct Investment (FDI), most of the natural gas that was before now being flared is now being converted to LNG. The gas industry in Nigeria is increasingly becoming important in sustaining and powering the electricity industry (Okoro and Chikuni, 2007). For instance electricity generation through gas turbine now supply more than 70 percent of Nigerian electricity (ECN, 2014). Three reasons account for the increase use of gas as source of electricity generation: (1) hydro generated electricity is subject to seasonal fluctuation; (2) the cost of producing and transporting gas has become cheaper due to improve technology; and (3) gas is one of the cleanest fossil fuel with little environmental hazard among other fossil energy.

According to Odularu and Okonkwo (2009) energy consumption positively affects economic growth in Nigeria. Using data from 1970 to 2005 and cointegration technique to examine the impact of crude oil, electricity and coal on economic growth, they found that apart from coal, the other sources of energy had a positive impact on economic growth in Nigeria. The study subsumed the impact of gas and hydro into electricity, thus making it difficult to distinct the separate impact of gas and hydro on economic growth. With the increasing growth and use of gas in electricity and other sectors in Nigeria, it is important to analyze the role of gas to the Nigerian economy. This study bridges the gap in previous studies by looking at the distinctive contribution of gas to economic growth in Nigeria.

Sambo, Garba, Zarma and Gaji (2009) studied electricity generation and the present challenges in the Nigerian power sector with the aim of ascertaining the optimum choice of energy source that is less capital intensive and more efficient for the electricity industry. Although other primary source fuel for the electricity industry such as coal, oil and hydro are still in large supply, the study pointed out that Nigeria has an estimated 176 trillion cubic feet of proven natural gas that could transform the country's electricity industry into one of the largest in Africa or at least make the country self reliant in power generation. For the nation to achieve an expected growth of 119,200 mega watt of electricity output by 2030, the study estimated an annual investment rate of at least 7 percent of the country's GDP in the electricity industry. Such investment will not only increase energy supply in the nation but also ensure energy security. As pointed out by Yergin (2006), ensuring energy security should be a top priority of any government. This is particular true especially with nations who can produce gas, because the prices and supply of gas seems to be more reliable over the past 10 years IEA (2015). The fluctuating oil prices and the political turmoil associated with the crude oil market as made it increasing necessary to shift attention to gas. Thus, countries with abundant reserves must take advantage of the rising demand and investment in the gas market.

In Nigeria, apart from the environment and health gain, investment in gas exploration and utilization will boost income and trade for the nation. ECN(2014) observed that some of the difficulties experienced in the gas global market such as high cost of transportation, inadequate gas infrastructure and transmission equipment, non-existing gas market especially among developing nations, absence of formal gas policy and tax regime are gradually been addressed. The Nigeria government for instance, has reformed its gas policy geared at making the gas industry attractive to foreign investors. In 2006, Nigeria with other gas producing nations formed the Gas Exporting Countries Forum (GECF) with the aim of creating a stable world market for gas. Nigeria also front the West African pipeline project geared at accelerating gas utilization in Nigeria and other neighboring African countries.

Lise, Hoobs and Oostvoorn (2012) studied natural gas corridors among EU countries and their main suppliers with the aim of ascertaining investment decisions in the face of threats and imperfect competitive market between EU members and surrounding countries. Using the dynamic GASTLE model the study simulate the likely investment decisions between EU and other gas exporting countries. The study found that investment in pipelines and other gas infrastructures in countries like Russia are mainly motivated by politics-which is basically based on the need to ensure the security of gas supply. On the other hand, gas trade between EU and countries of North Africa and Turkey are mostly motivated by economic gains. The study also observed that trade between EU and other countries that are not on EU borders-like Algeria- has increased due to improvement in technology that have made it easy to transport gas in form of LNG. The changing pattern of the EU and global gas market has changed the pattern of the market and reduced the monopoly that exists in the EU regional gas market. In a similar study, Boussena and Locattelli (2011) observed that the dwindling relationship and political tension between EU and Russia has lead to reduced future investment and calling off of long term contract between them.

Cabalu (2010) studied the indicators of security of natural gas supply in Asia. The aim of the study is to examine the vulnerability of seven gas importing countries in Asia using four indicators and gas supply security index (GSSI). The study found that the level of vulnerability differs across the countries. Among the seven countries considered Singapore is the most vulnerable with a GSSI of 0.775 while India is the least vulnerable with GSSI of 0.302. The study noted that countries that are less import dependant on gas are less vulnerable to risk and insecurity that may occur from the shock in international market. Earlier studies such as de Jong, Maters, Scheapers and Seebregts (2007) and Gnansounon (2008) indicated that energy security is one of the drivers in gas investments in European and most Western countries. Costantini, Gracceva, Markandya and Vicini (2007) studied different scenario in security of energy supply. They categories the security of gas into two groups: physical and economic dependence and vulnerability. In relation

to EU countries, there is high risk of physical dependent and vulnerability when the volume of gas and net import is higher than a given Shannon-Weiner diversity index. A country is economically dependent and vulnerable if the proportion of gas consumption per dollar of GDP is higher than the given percentage of its GDP.

The extant literatures on the subject matter are not without controversy. For instance studies like Kraft and Kraft (1978), Stern (1993), Belleoumi (2009), Ghosh (2010), Oztuk and Acaravi (2010) have it that energy is a necessary condition for economic growth. To them increased economic growth means more energy consumption and more efficient energy use breeds higher rate of economic growth. Studies validating this path of argument include Nayan, Kadir, Ahmad and Abdullah (2013), Omri and Kahouli (2014), Zaman, Khan, Ahmad and Rusten (2012) and Dritsaki and Dritsaki (2014) among others who in their findings revealed a positive correlation between economic growth and energy consumption. On the other hand, studies like Bento (2011) among others followed a different path, suggesting that reliance on energy for continued economic growth can be a serious limiting factor for the growth process. Supporting this line of arguments are Elliot, Sim and Chen (2013), Sbia, Shahbaz, Hamdi (2014), Lee (2013) who in their various studies found a negative impact of energy consumption on economic growth. They therefore, conclude that economic growth is not explained by excessive energy consumption. Furthermore, some energy economists have suggested and supported the "neutrality hypothesis" which asserts that energy is neutral to economic growth. To them, the cost of energy is a very insignificant proportion of gross domestic product (GDP) and therefore, it is not likely to have a pronounced impact on economic growth (Ghali and El-Sakka 2004).

The role of foreign direct investment (FDI) in promoting economic growth is well documented in basic principles of economics yet empirical evidence on the nexus between foreign direct investment and economic growth is ambiguous. For instance previous studies on foreign direct investment such as Singer (1950), Boss, Sanders and Sechi (1974), Saltz (1992), posit that the host countries of foreign direct investment obtains very few benefits as most of the benefits are moved to the multinational company's country. To these researchers, although the foreign direct investment has the tendency of raising the level of investments and productivities of investments, it lowers the rate of economic growth owing to factor price alterations or misallocation of resources. Also, the repatriations of profits back to multinational company home country may exceed the level of new investment in the host countries. Summing up, Alfaro, Chanda, Kalemi-Ozcam and Sayek (2002) investigated the impact of foreign direct investment on economic growth for the third world country. Using correlation matrix, found a negative correlation between the level of foreign direct investment and economic growth during the study period of 1970-1980. Their findings collaborate those of

Zhang (2001), Lim (2001) that the rate of growth of the host country of foreign direct investment will decline in cases of huge foreign direct investment in flow. Also, that huge amount of foreign direct investment might result in monopolization and transfer pricing leading to under-utilization of labour causing a lag in domestic consumption demand culminating ultimately to stagnated growth process. On the contrary, Barrell and Pain (1999), Carkovic and Levine (2002), Bosworth and Collins (1999), Brooks and Sumulong (2003), Crespo and Fonture (2007) studies suggest that foreign direct investment have numerous positive effects on the economy of the host country. These benefits arise from productive gains, technology transfers, managerial skills as well as technical- know- how that has direct bearing with the rate of economic growth. Therefore, similar to energy and economic growth nexus, investigating the relationship between foreign direct investment and economic growth has far-reaching policy implications. If foreign direct investment has a significant positive impact on economic growth, then host countries ought to support and encourage foreign direct investment flow in the form of tax incentives, infrastructure subsidies, import duties exemptions and other numerous measures acting as bait to foreign direct investment inflow. If negative impact of foreign direct investment on economic growth exists, then host countries should take defensive actions to daunt and limit such capital flow.

Owing to the fact that many studies on the nexus between energy and economic growth have been various and contradictory, it is clear that the relationship between economic growth (GDP) and energy is not only an obscured field but are based on rather weak and fairly often contentious research formulations. This therefore, creates a void or gap giving rise to the need to construct and test four testable causal link hypotheses. First, the one running from energy to GDP, second, from GDP to energy, third, feedback link between energy and GDP and finally that of neutrality (that is no causal link between energy and GDP). This gap is worth filling for at least three reasons. First whether or not a causal link exists between energy and GDP is very crucial in deciding energy policies, second, if there exists a causal link, then energy conservation policies could result into losses income and job cuts and finally no causal link will automatically supports energy conservation promotion policies.

1. Methodology

Data used for this analysis were collected from World Bank Indicator [WDI] (2015). The variables used for this analysis are annual data on gas supply (kilotons of oil equivalent per capita), foreign direct investment (constant 2010 US$ per capita), GDP (constant 2010 US$ per capita). The data for GDP, gas supply and foreign direct investment covered the period 1981-2014.

We adopted four techniques so as to, answer our research questions, capture the hypotheses and achieve the objectives for which our study is poised to achieve. First, in order to capture if the volatility in foreign direct investment in energy

sector and energy supply crisis is responsible for Nigeria poor economic growth performance, VAR model was used. Also, the impulse response charts were used to identify the source of shocks and their impact on economic growth. The efficiency of the model was also tested using the stability test. To capture the nature of the relationship between foreign direct investment in energy sector, energy supply and economic growth, multivariate granger causality test, multivariate co integration model and error correction model were used.

Estimation Techniques

VAR Model Specification

$$\Delta GDP_t = \alpha_0 + \alpha_1 GDP_{t-1} + \grave{\alpha}2\Delta FDI_{t-j} + U_t \quad (2)$$

$$\Delta FDI_t = \text{[illegible]}_0 + \text{[illegible]}_1 GDP_{t-1} + \text{[illegible]}_2 \Delta FDI_{t-j} + U_t \quad (3)$$

$$\Delta GDP_t = \lambda_0 + \lambda_1 GDP_{t-1} + \sum\text{[illegible]}_{\text{[illegible]}=1}^{j} \lambda_{GDP\ t-j} + \sum\text{[illegible]}_{\text{[illegible]}=1}^{2} \lambda \Delta FDI + \sum\text{[illegible]}_{\text{[illegible]}=1}^{3} \lambda\ \Delta ES_{t-j} + \mu_t \quad (4)$$

Where ES is Energy supply, Δ stands for first difference, and t-j is the maximum lag length.

Model 3 is intended to find out the influence of foreign direct investment on economic growth. Mode 4 investigated the influence of energy sector on economic growth. This is so because energy supply may have a significant influence on economic growth. Model 4 test simultaneity among energy supply, foreign direct investment and economic growth.

Granger Causality Model Specification

$$GDPt = \sum^{k=1} \alpha i\ GDP_{t-1} + \sum^{k=1} \beta jFDIt\text{-}j + u_t \quad (5)$$

$$FDI_t = \sum^{j=1} FDI_{t-1} + \sum^{j=1} \delta jGDP_{t-j} + u_t \quad (6)$$

$$GDPt = \sum^{k=1} \alpha i\ GDP_{t-1} + \sum^{k=1} \beta jESt\text{-}j + ut \quad (7)$$

$$ESt = \sum_{j=1}^{m} ES_{t-1} + \sum_{j=1}^{m} \delta jGDP_{t-j} + ut \quad (8)$$

$$ESt = \sum^{j=1} ES_{t-1} + \sum^{j=1} \delta jFDI_{t-j} + ut \quad (9)$$

$$FDIt = \sum^{j=1} FDI_{t-1} + \sum^{j=1} \delta jES_{t-j} + ut \quad (10)$$

Equation 7 postulates that economic growth is related to past values of itself as well as foreign direct investment and equation 8 postulates a similar behavior for foreign direct investment. Equation 9 posits that current economic growth is related to past values of itself as well as energy supply proxied by gas supply. Equation 10 posits similar behavior for energy supply proxied by gas supply.

2. Presentation and Discussion of Results

Unit Root Test

In empirical studies involving time series variables, it is important to check each variable for unit root or stationarity. This is to avoid obtaining spurious results which can occur when stationary variable are used in traditional regression analysis. In this study Augmented Dick Fuller (ADF) unit root test was adopted. This is because ADF unit root test controls for higher order serial correlation by adding lagged difference terms on the right side of the regression and also, it is widely used. Therefore, the ADF test was conducted on the variables in order to determine the stationarity of the variables and those found to be non-stationary were differenced to get rid of the stochastic trend, a phenomenon associated with time series data. Table 1 present the summaries of the unit test results for the series in levels, first and second differences.

Table 1: ADF Unit Root Test Result

ADF Unit Root Tests							
Variables	ADF stat. at level	Critical value at 5%	ADF stat. at 1st diff.	Critical value at 5%	ADF stat. at 2nd diff.	Critical value at 5%	Order of integration
FDI	-3.461	-2.951	-7.999	-2.954	-6.541	-2.968	1(0)
Gas supply	-1.385	-2.951	-9.529	-2.951	-7.371	-2.957	1(1)
GDP	2.5652	2.9484	-2.73	-2.951	-5.897	-2.9540	1(1)

Source: Researcher's computation based on E-view 9.0

The results in table 1 indicate that the ADF unit root only FDI was found to be stationary at level, thus there is no need for differencing. However, gas supply and GDP became stationary at first difference.

Presentation of Estimated VAR Empirical Results in the Gas supply- FDI and GDP Model

VAR estimation results for equations 2- 4 in Gas supply-Foreign Direct Investment and Gross Domestic Product model are reported in Table 2. All estimates in this case are robust to heteroskedasticity or autocorrelation. This model examined the effect of Foreign Direct Investment and Gas supply on Economic growth.

Table 2: Estimated VAR Results of the Gas supply, GDP and FDI

Dependent variable GDP		
Regressors	Lag	Coefficient
GDP	(-1) (-2)	0.625 (2.940)*
FDI	(-1) (-2)	54.813 (0.0644)**
Gas supply	(-1) (-2)	0.2044 (2.2681)*

Notes: Figures in parentheses are standard errors. * and ** represent 5% and 1% level of significance respectively.

The relationship between energy sector, foreign direct investment and economic growth in Nigeria is analyzed using the three variables (gas supply, GDP and FDI in energy sector). Of more interest to this study is the behavior of the coefficient of these variables to economic growth. The two independent variables (FDI and Gas supply) are not only positively correlated with GDP in Nigeria but are statistically significant at one per cent, and five per cent level respectively.

The coefficients of the lagged values of the Gas supply and FDI are also, positive and statistically significant at 5 and 1 percent level of significance. The positive relationship between gas supply and FDI in the sector and by extension economic growth shows clearly that reliable energy supply often leads to economic growth which has the tendency to boost the confidence of foreign investors in the sector. The above revealed that government should try and ensure sustained economic growth as experience has shown that country that attract foreign investors are countries that have relatively stable economic growth. The investment in the gas sector by foreign investors will infused new revenue into the sector that boost gas supply, end the supply crisis in the sector and by implication enhance economic growth. This validates the mainstream theoretical insight behind biophysical economic model and endogenous growth model. First for biophysical economic model has that of all the input in production process, energy is the most important. Second endogenous growth model also has it that foreign direct investment can promote economic growth through the creation of dynamic comparative advantages that leads to technological progress. Therefore, endogenous energy-saving technical change will be necessary to make the economic growth sustainable. This finding also agrees with findings in similar studies on Greece (Lee 2013), Spain (Omri and Kahouli 2014), and Portugal (Dritsaki and Dritsaki 2014) that found a positive relationship between energy, foreign direct investment and economic growth. However, it contradicts the finding of Alfaro, Chanda, Kalemi-Ozcam and Sayek (2002) that the rate of growth of the host country of foreign direct investment will decline in cases of huge foreign direct investment in flow.

GDP response to Gas supply and FDI Shocks

Using the Cholesky two-standard-error shock, this section examines the response of GDP to gas supply and FDI shocks when some perturbations occur in the economy. The essence of this is to find out the impact of unanticipated shocks in

gas supply and FDI on GDP. This analysis is very important particularly in a developing country like Nigeria where gas supply and FDI in gas sector have strong impact on GDP. The graphs of a Cholesky two-standard-error shock show the actual impulse response functions for each of the endogenous variables given that, each asymptotically deviated from the normal path. Figures (1) present the dynamic responses of GDP and FDI on gas sector to a Cholesky two-standard-error shock of gas supply. The effect on gas supply is found to be persistent and positive over a defined period. The impact of FDI on gas supply is significantly positive over a period of up to 7 year. A positive FDI in gas sector caused gas supply to increase over time. On impact the effect was delayed for some years but gradually became asymptotic to the steady state over the time horizon. Also, GDP has positive but less impact on gas supply in Nigeria.

Figure (1): Response to Cholesky one S.D innovation

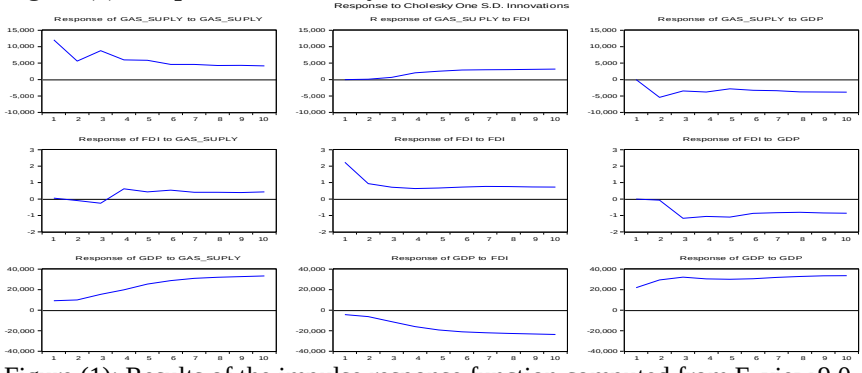

Figure (1): Results of the impulse response function computed from E-view 9.0

Result of the Granger Causality Test and Cointegration Test

We employ the pair wise Granger causality test presented as table 3 to analyze whether the lags of the explanatory variables are significantly different from zero. Each equation contain lagged values of the right hand side variable plus lagged values of other variables under consideration. We use lag length of 2 for the test. The result of the granger causality conducted at lag two is presented as table 3 below:

Table 3 granger causality test results

Null hypothesis	F-Statistics	Prob. values
GDP does not granger cause gas supply	1.446	0.2521
Gas supply does not granger cause GDP	3.183	0.0563
FDI does not granger cause gas supply	0.0341	0.9665
Gas supply does not granger cause FDI	0.1885	0.8292
FDI does not granger cause GDP	0.3091	0.7366
GDP does not granger cause FDI	0.7052	0.5026

Source: Researcher computation based on E-view 9.0

By comparing respective F-statistics with their respective probability values, the results revealed uni-directional causality that runs from GDP to gas supply. That is to say, it shows that it is GDP that is influencing gas supply but not the other way round. Furthermore, there is no causality between FDI and Gas supply and between FDI and GDP. The implication of this is that government needs to ensure sustained economic growth to boost gas supply. This is because if there is inclusive economic growth, this will reduce if not end ethnic militia especially in the oil producing states and invariably attract more foreign investment in the sector. The fact is that every foreign investor needs security of his or her investment. Therefore, ensuring sustained and inclusive economic growth will boost foreign investment in the gas sector which invariably will enhance gas supply.

3. Conclusion and Recommendations

Based on empirical findings a number of conclusions can be drawn. First, to Nigerian government that gas supply are potentially exhaustible, therefore, finiteness and exhaustible of this natural resources make the notion of indefinite economic growth problematic. Secondly, even maintaining the current level of gas output under the present massive corruption makes sustainable economic growth difficult. Third, when there is more than one input both in tradition growth theory and ecological growth theory, there are many alternative paths that economic growth can take. The path taken is determined by the institutional arrangement that exist in the country. This is a lesson that Nigerian government should learn. Fourth, gas supply and use have variety of impacts. This is because gas extraction and processing always involves some forms of environmental disruption both geomorphologic and ecological as well as pollution. The situation that is very prevalent in the Niger-Delta region. So if gas supply is not used to sustain economic growth, how then do we compensate for these environmental disruptions? Finally, countries that usually attract huge foreign direct investment are those countries with good and reliable growth prospects and favourable investment climate. This means that if concise effort is not taken to ensure sound and reliable economic growth, attracting foreign investment in the gas sector may elude Nigeria. On the basis of the findings and conclusions thereof, the study therefore recommended that economic growth should not only be priority but must be made inclusive to erode ethnic militia especially in the gas sector in the Niger-Delta region. If this not done, Nigeria may not be a favourable destination for foreign investors in the gas sector as every investor wants the security of his investment while at the same time aiming at high return on capital invested.

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