

Petroleum Revenue and Economic Development of Nigeria (1980 – 2013)

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Abstract: Evidence has shown that Petroleum revenue has increased but economic development in Nigeria seems not commensurate with the rise in petroleum revenue. In recent time also price of the crude oil has been declining globally. This study used single linear regression models to test the impact of petroleum revenue on economic development of Nigeria, between 1980 and 2013. Economic development was proxied by two variables: real per capita Gross Domestic Product (GDP) and unemployment rate. Petroleum revenue was proxied by the contribution of petroleum sector to the GDP. The results showed that petroleum revenue has an insignificant effect on economic development of Nigeria in the short run. In the long run there is no significant correlation between petroleum revenue and economic development of Nigeria. There is no causal relationship between petroleum revenue and economic development of Nigeria. Government must therefore diversify the economy via promotion and creating enabling environment for non-oil sector development in Nigeria; reduce the size of the public sector and increase budgetary capital expenditure especially in the areas of providing sustainable power supply and means of transportation as well as information technology; intensify efforts aimed at combating corruption; and encouraging the federating units to contribute to the revenue of the country.

Keywords: Economic Development, Petroleum revenue, Unemployment, Gross Domestic Product

I. Introduction

Following the discovery of crude oil in Nigeria late 1950s, there was an unprecedented rise in oil revenue in 1970's due to a global boom in the demand for oil (Madujibeya, 2014). Oil income is generated from export and domestic sales of petroleum derivatives. The revenue accrues to the government in form of concession rents, royalties, profit taxes, participation interests, premiums, harbour dues, and other minor imposts (hillofbins.org, 2014).

The oil boom of the 1970s led Nigeria to neglect its strong agricultural and light manufacturing bases in favour of an unhealthy dependence on crude oil (Odularu, 2013). New oil wealth, the concurrent decline of other economic sectors, fuelled massive migration to the cities and led to increasingly widespread poverty, especially in rural areas (Odularu, 2013). By 2000 Nigeria's per capita income had plunged to about one-quarter of its mid-1970s high, even below the level at independence, showing drop in economic development (Madujibeya, 2014).

Volatility of petroleum prices in the international market has made the petroleum revenue accruing to government to fluctuate over the years; cycles of booms and busts. The GDP fluctuates as well because of dependence on the petroleum industry (Odularu, 2013). The consistent rise in population over the decades put pressure on the economy (Soludo, 2007). For a country to experience economic development, according to Seers in Todaro and Smith, (2013), its unemployment rate, poverty level and income inequality level must fall significantly.

“The government and oil companies have profited by hundreds of billions of dollars, yet most Nigerians are living in dire poverty (BBC, 2011). It was the case in 1970's that the problem of the government was how to spend the revenue accruing to country not the generation of the revenue” (Madujibeya, 2014).

Nigeria's economic development somewhat is driven chiefly by the rents from petroleum industry. Nigeria is a resource rich nation, both in natural and human terms. Nigeria is one of the numerous developing countries that have benefited immensely from the petroleum industry in terms of increasing the revenue available to government. For example, the petroleum sector contribution to GDP in 1970, 1980, 1990, and 2000 were 7.1%, 22.0%, 12.8%, and 47.5% respectively (CBN 2010). Per capita income shrunk from about \$1,150 in 1981 to about US \$ 315 per head in 1998 and barely \$300 in 2001 (AIAE, 2014).

Studies like Ogiogio (1999), Odularu (2013), and Nurudeen and Usman (2010) have shown that government expenditure has increased with oil income, but the causality test actually shows expenditure (G) as inefficient in terms of affecting economic development proxied by per capita income (PCI) (Madujibeya, 2014). Why and how has the petroleum revenue not been able to place Nigeria among the developed countries?

The broad objective of this study is to ascertain the impact petroleum revenue growth has on economic development in Nigeria. The specific objectives of the study include determining the impact of petroleum revenue on real per capita GDP in Nigeria; the relationship existing between petroleum revenue and

unemployment in Nigeria; and examining the causality between petroleum revenue and real GDP per capita in Nigeria. The work hypothesized that Petroleum revenue has no significant positive impact on real GDP per capita in Nigeria; Petroleum revenue has no significant negative impact on Nigeria's unemployment rate; and Petroleum revenue does not granger cause real per capita GDP in Nigeria.

This work is further arranged in sections: conceptual framework; theoretical framework; empirical review of related literature; research methodology; data presentation and analysis; summary of findings, conclusion and recommendations.

II. Conceptual Framework

Over the last fifty years oil production has evidently yielded revenue larger than any other sector in Nigerian economy (Odularu, 2013). This revenue rise translated to continuous increase in the size of the government expenditure (Adedipe, 2004). The government among other expenditure items spends in primary education and health care, which affects the wellbeing of the household. The potential labour force rises consequently. Even in the face of rising national income, the income per capita growth is hugely belied by the increasing population. Standard of living eventually is wounded.

Increasing revenue ordinarily will fast-track development under normal circumstance and given developmental goals. It seems that petroleum revenue in Nigeria has not significantly contributed to economic development in Nigeria. What could have been the cause? Can it be said that supposed blessing has become bitterness to Nigeria? Has petroleum revenue significantly impacted on economic development of Nigeria?

III. Theoretical Framework

Economic development is defined as the increase in the standard of living in a nation's population with sustained growth from a simple, low-income economy to a modern, high-income economy (Wikipedia, 2015). Development strategies also focus on rapid industrialization (Todaro & Smith, 2013). There are many theories on economic development some of which are propounded by anthropologists and sociologists. A prominent theory of economic growth and development was devised by Walt W. Rostow in 1960 in his treatise, "Stages of Economic Growth; a Non Communist Manifesto". Rostow (1960) proposed the theory of Stages of Economic Growth and Development. The stages are five namely; traditional society stage, the precondition for take-off stage, the take-off stage, the drive to maturity stage and the age of mass consumption.

The first stage is **the Traditional Society stage**. This is characterized by subsistence agriculture or hunting and gathering. This is a static society with lack of class or individual economic mobility, stability is prioritized and change seen negatively. Wars, famine and epidemic always cause the population to shrink, limiting the single greatest factor of production: human manual labour. Growth is limited by absence of scientific knowledge and backward and traditional frame of mind which contribute to low labour productivity. These were agricultural societies before the industrial revolution. They relied on near absolute reverence for tradition and an insistence on obedience and submission.

The second stage is the **Precondition for Take-off stage**: The theorist argued that external demand for raw materials initiates economic change, development of more productive and commercial agriculture. Therefore, Cash crops not consumed by producers are largely exported. In this stage there is widespread and enhanced investment in changes to the physical environment to expand production say by way of irrigation, canals, and ports. This period is characterized by increasing spread of technology and advances in existing technologies, changing social structure, with previous social equilibrium now in flux. Individual social mobility begins. There is development of national identity and shared economic interests.

The third stage is the **Take-off stage**: In this stage there is rapid urbanization, industrialization and technological breakthroughs. The production sector expands and the ratio of primary to secondary sector shifts towards the secondary. Textiles and apparel are usually the first "take-off" industry, as happened in Great Britain's Classic Industrial Revolution.

The fourth stage is the **Drive to Maturity stage**: This stage is characterized by diversification of industrial base. Multiple industries expand and new ones take root quickly. Manufacturing shifts from investment-driven capital goods towards consumer durables and domestic consumption. There is rapid development of transport infrastructure, large-scale investment in social infrastructure such as hospitals, universities, schools and telecommunication.

The fifth stage is the **Age of Mass Consumption**: The industrial base dominates the economy. The primary sector is of greatly diminished weight in economy and society. There is widespread and normative consumption of high-value consumer goods like automobiles. Consumers have disposable income beyond all basic needs for additional goods (Rostow, 1960).

The size of government is one factor that has affected the use of funds for economic development. Soludo (2003) is of the opinion that the increasing size of the recurrent expenditure over the capital expenditure in the annual budget shows that development has not been taken very seriously by governments. Over the

decades education and health care has taken a large share of government expenditure, but unfortunately they were on recurrent expenditure not capital expenditure; hand to mouth money that may not contribute to investment (Onyukwu, 2011).

Another factor that has hindered the development of Nigeria is corruption and problem of leadership. Maier (2002) argued that the ensuring mismanagement of resources by the government is a let down on the high expectation held on the nascent independent country. In Maier's opinion, the house called Nigeria has fallen. The endemic corruption has tilted Nigeria to the level of a failed State in the midst of abundant wealth. If there is zero tolerance to corruption, and efficient use of resources Nigeria can re-write her story (Maier, 2002). Achebe (1983) was also of the opinion that the trouble with Nigeria is squarely the problem of leadership. Lack of political will to govern has resulted in laundering of resources to foreign developed countries of the world (Achebe, 1983).

Another factor that stifled the linkage between high revenue accruing to government and economic development was population. Nigeria population is estimated to have increased from 57 million in 1980 to about 104 million in 1997, to 150 million in 2009 and projected 170 million persons in 2015, while poverty is estimated to affect over 40 percent, or some 60 million (CBN, 2010). As at 2010, the proportion of population without access to health services is 33 percent, without safe water is 51 percent, and without sanitation is 59 percent (United Nations, 2010). These according to the United Nations (2010) are all unacceptably high.

According to Dudley Seers in Todaro and Smith (2013), "the question to ask about a country's development is; what has been happening to inequality, unemployment and poverty? If all three has declined, then this has been a period of development for the country concerned. If one of these has grown especially if all three has, it would be strange to call the result development even if the income per capita doubles". Nigeria's inequality, unemployment and poverty have grown (UNDP, 2010).

The rate of unemployment has increased in the last 10 years from about 15% in 2003 to at least 20% in 2009 in the total population reaching 40% among the youth. According to the UN (2011), the poverty rate in Nigeria has gone up from 46 percent to 76 percent over the last 13 years. Nigeria's Gini coefficient which measures income inequality, as an indicator of how well income is distributed is 0.42 (IMF, 2015). The Gini index is an estimate of inequality. It measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Gini index score of zero implies perfect equality while a score of 100 implies perfect inequality (IMF, 2011).

The United Nations Human Development Report (HDR) ranks Nigeria 142 out of 169 nations in the UN, in terms of human development (UNDP, 2013). This is done using the Human Development Index (HDI). The HDI has ranges between zero and one, in decimal places. This is the most modern measure of economic development. It is calculated using indicators of life expectancy, educational attainment and income (UNDP, 2013). Countries are grouped into "very high HDI"; "high HDI"; "medium HDI"; and "low HDI" countries. Nigeria currently falls into the last category with an index of 0.423.

A relatively low life expectancy, at 50 years, a gender uneven adult literacy rate, 68.5 percent for men and 50.8 percent for women, and a low per capita income, at US \$ 315, are all indicative of Nigeria's low level of development despite Nigeria's GDP rise (Odozi, 2012).

According to Acha (2012) oil revenues are not only large, but also highly volatile - that is, they can fluctuate drastically in size from year to year, causing the size of government, and the funding of government programs, to fluctuate accordingly. For example, from 1972 to 1975, government spending rose from 8.4 percent to 22.6 percent of GDP; by 1978, it dropped back to 14.2 percent of the GDP. By the eighties Nigeria became a debtor country, contracting a peak external debt of 33,730 USD in 1991 (AIAE, 2008). From 1970 to 1999, oil generated almost \$231 billion in rents for the Nigerian economy, in constant 1999 dollars. Since 1974, these rents have constituted between 21 and 48 percent of GDP (Acha, 2012).

However, the oil sector is not the only sector with significant rise. Hinshaw (2013) stated that "Nigeria's mobile phone industry is Africa's fastest growing, while internet access — three out of 10 Nigerians have it — soars beyond rates anywhere else below the Sahara. Nigeria's film industry has achieved significant growth, too". The financial sector blossomed too; "The banks grew hugely until 2008 when they fell apart Ochiama, (2012). This underscores a significant acknowledgement of growth in those sectors. But can we say it is the petroleum revenue that caused the growth in these sectors. Theories have not said so. Could it be that Nigeria's robust banking base has failed in financial intermediation, and the poor investment in real sector of the economy stalled the full blossom of the whole financial system and therefore the economic growth and development?

Unemployment rates averaged almost 5 per cent for the period 1980-1998. By 2015 it is 23%. By 1976, the inflation rate, however, stood at 23 per cent. It decreased to 11.8 per cent in 1980 and jumped to 41 percent and 72.8 per cent in 1989 and 1995, respectively. By 1998, the inflation rate had, however, reduced to 9.5 per

cent from 29.0 per cent in 1996 and by 2006 it was 8.2 (CBN, 2010). The total national savings in 1980 was N2255.3 million. By 2006 it rose to 6.8 million naira (CBN, 2010; and Ekpo&Umoh, 2011).

Nigeria has gone through ambitious development plans in apparent attempt to mainstream all sectors into the development agenda. There were many development projects and plans in Nigeria since pre independence era. The national development plan of 1962 to 1968 was the first actual development plan. The second national development plan was 1970 to 1974. The third national development plan (1975-1980) marked the first stage of scientific planning in Nigeria (Asogwa, 2010). The most militating factor in the achievement of the development plan of 1975 – 1980 was oil price fall which handicapped some necessary expenditure. There was an unprecedented inflation rate of 24% due to the Udoji Salary award. However projects like, airports, 10, 000km of roads, four (4) seaports (Ikeja, Warri, Calabar and Port Harcourt), Universal Primary Education, and 7 universities were completed (National Planning Commission, 2009).

The fourth National Development plan (1981- 1985) focused mainly on economic growth and development. Macroeconomic stability was aimed at. Global oil shocks and overvaluation of contracts and projects truncated revenue targets of the government and made it impossible for the plan to be properly realized (Asogwa, 2010).

A more realistic three tier planning technique was adopted in 1990 over the previous short term development plan. This was in the form of a long range perspective plan comprising sub-structure of short period (three year) rolling plans. Each rolling plan was constituted by the annual budget. The 1990 to 1992 rolling plan effected the development of programs like; Agricultural Development Program (ADP), River Basin Development Authority (RDA), and National Directorate of Employment (NDE). The political crises of 1991 - 1992 belied the true objectives of the plan (National Planning Commission, 2009).

The Second National Rolling Plan was derived from national rolling plan of 1990. This plan tried to salvage the developmental shortcomings of the previous plan and to augment its achievements. However out of the estimated expenditure of 168.1billion Naira, 34.7% went to private sector. The public sector took the rest. The Third National Rolling Plan (1993 – 1995) began to handle the aftermath of the Structural Adjustment Programme policies; devalued Naira; inflationary trend; relatively stagnant productive sector; external debts; and unemployment. The total expenditure was 433.2billion Naira. The public sector got 76.4% while private sector got the remaining 23.6%. The Keynesian model states that expansion of government expenditure accelerates economic growth (National Planning Commission, 2009).

The Fourth National Rolling Plan (1994 – 1996) with a projected capital formation of 437.5billion naira, was assigned the task of revamping the manufacturing sector. This was because the former rolling plan could not achieve its desired objectives. The Public sector took 82.88% of the total expenditure, while private sector got 17.12 % (National Planning Commission, 2009). And, the Fifth National Rolling Plan (1997 – 1999) sought to use a contractionary monetary policy to drive growth and development. Finally it failed to achieve its objectives.

Clearly there are distinct observations that can be made from Nigeria's long term development agenda. First, the expenditure grew significantly out of a rising national income. There were clear intentions to ensure macroeconomic stability, economic growth and development and structural reforms as seen from the objectives. (National Planning Commission, 2009).

The Nigeria Government started economic summit to evolve development agenda for the nation. Then come the Nigeria's Vision 2020. The intent is to position Nigeria to become one of the top 20 economies in the world by 2020. Vision 20:2020 is an articulation of the long-term intent to launch Nigeria onto a path of sustained social and economic progress and accelerate the emergence of a truly prosperous and united Nigeria. In recognition of the enormous human and natural endowments of the nation, the long term plan is to improve the living standards of Nigerians and place the country among the league of 20 largest economies in the world with a minimum GDP of \$900 billion and a per capita income of not less than \$4000 per annum. The target for year 2020 was based on a dynamic comparative analysis of the country's potential growth rate and economic structure vis-à-vis those of other Top 40 economies in the world. This implies that the Nigerian economy must grow at an average of 13.5% over the next ten years. Agricultural and industrial sectors are expected to drive the growth at the earlier stage while service sector will take over at the latter stage. That is, the economy would transform from agro-allied industrialization to service-based economy in line with the theory of economic development (Jelili et al, 2008).

IV. Empirical Literature

Fasano and Wang (2012) tested the relationship between oil revenue and government expenditure among Gulf Corporation countries for the period of 1980 to 2000. Results based on cointegration and error correction model (ECM) and a variance decomposition analysis showed that government spending followed petroleum revenue positively and significantly. Also expenditure responded positively to random disturbances in the oil market. Fasano and Wang (2012) suggested that the authorities could resort to a medium term

expenditure framework so that expenditures can be planned and be insulated from volatile short term revenue availability.

Mariot (2015) used the fixed effect dummy variable regression to find out if oil rents caused industrialization in United Arab Emirates. The contribution of the trade and industry to GDP was proxied industrialization. It was found that the regressor effected industrialization positively during period of high oil revenue as against an insignificant level during low revenue period. The study concluded that oil rents caused industrialization in the United Arab Emirates, holding other variables constant. Similarly, the ministry of Energy and Mineral Resources, the Republic of Indonesia (2008) presented a paper; “Preventing Dutch Disease: the Indonesia’s Experience”. It was based on macroeconomic evidences in the economy. The paper concluded that oil revenue has impacted on Indonesia's national accounts.

Mohammed, (2014) used non-parametric approach to find out if petroleum income reduced unemployment rate and poverty index in Sudan. Tabular and graphic illustration showed that both unemployment and poverty index reduced in the period concerned. The Chi-square non-parametric test showed that petroleum income affected the poverty index significantly. Also, Peach and Starbuck (2010) studied “oil and gas production and economic growth in New Mexico”. The paper analysed the relationship between energy production and economic growth in New Mexico using cross section data for the state’s 33 counties in Census years 1960, 1970, 1980, 1990, and 2000. The estimated models suggest that oil and gas extraction in New Mexico Counties has had a small but positive effect on income, employment and population. Similar results were obtained when the model was estimated for 925 counties in 13 energy producing states for the year 2000.

Umar (2015) examined the impact of petroleum on human capital development using time series data covering the period 1980-2011. It was discovered that the variable: oil revenue impacts negatively on Real GDP per capita on the average among the Persian Gulf countries. This means that the resource curse theory is proven to be true the Persian Gulf. Individually, countries like Saudi Arabia and Qatar experienced a high GDP per Capita Growth over the period of study. The average negative relationship appeared to be inconsistent within the period of the study as shown by the tests of structural stability.

Sanchez-Robles (2004) used a co-integration growth model to test the effect of oil income on economic development in Saudi Arabia from 1980 to 2002. Data were interpolated for the period. The Human Development Index (HDI) was positively influenced by oil income. The variable GDP per Capita grew with the oil revenue but not at the same proportion. In the long run oil revenue affected the variable, HDI. The effect was also structurally stable. However there was high mult-collinearity probably because of the extrapolation and interpolation of variable HDI. All variables were explosive at zero order of integration.

Nour and Satti (2011) did a study on “Assessment of the Impact of Oil: Opportunities and Challenges for Economic Development in Sudan” using non-parametric analyses. The work showed that oil has had a mixed blessing on the Sudanese economy, arguing that oil is an important resource, particularly in satisfying domestic consumption and the achievement of self-sufficiency by increasing public sector revenues. Although oil has helped to improve economic performance in the country, it was found find that the dependence on oil may spark other problems because it is an exhaustible resource and the instability of oil prices in the international market could produce uncertainty in domestic growth. Moreover, the increasing dependence on oil raises the possibilities of a ‘Dutch Disease’ and a lack of diversification, which may aggravate challenges linked to the division of the country and the potential for conflict with newly independent Southern Sudan.

Osborne (2015) conducted Granger-Causality tests on Natural Resource Increase and Economic Development using the vector Auto-Regression (VAR) in five (5) resource rich countries comprising Europe and Asia. It was found that revenues that accrued from mining and or petroleum granger caused GDP per capita in the five countries. However, according to Osborne (2015) some of the models showed poor fitness judging from the relatively low value of the R-squared.

Biswas (2002) investigated how the oil industry affected the political paradigm in the Persian Gulf using tabular and graphic non-parametric analyses. It was found that the oil industry increased the economic activities of the state and private individuals. The sizes of the governments were also increased while capital expenditure increased most in the biggest economies of the gulf nations. Military spending also increased. There was emergence of new cities as oil income increased over the years. There was no much evidence of resource curse. However, Dutch disease was high as oil income increased. Unemployment rate went higher than predicted.

Akinlo (2012) investigated the extent of importance of oil in Nigeria’s economic growth in a multivariate Vector Auto Regression (VAR) model over the period 1960-2009; lagged values of the regression variables and statistics. Empirical evidence showed that the five subsectors are co-integrated and that the oil sector can cause other non-oil sectors to grow. Granger causality test finds bidirectional causality between oil and manufacturing; oil and building and construction; manufacturing and building and construction; manufacturing and trade and services; and agriculture and building and construction. It also confirms unidirectional causality from manufacturing to agriculture; and trade and services to oil. No causality was found

between agriculture and oil, likewise between trade and services and building and construction. The paper recommends appropriate regulatory and pricing reforms in the oil sector to integrate it into the economy and reverse the negative impact of oil on the manufacturing sub-sector.

Onyekwelu (2011) did “an Econometric assessment of the relationship between oil industry Contribution to GDP and Capital Expenditure” using variables of same order of integration, oil industry’s GDP, Capital Expenditure, from 1978 to 2009. The study showed that long run and short run positive relationship exists between Oil industry’s GDP and Capital Expenditure. However, this relationship was not structurally stable. That is, during the intervals in the time series, the relationship was not the same.

Ogbonna and Ebimobowei (2012) investigated “the impact of oil revenue and the economy of Nigeria” using primary data and time series data between 1970 and 2009. The data collected were analysed using Pearson product correlation coefficient, Ordinary Least Square method of the classical linear regression model and descriptive statistics. The results of the analysis suggests that petroleum revenue affects the gross domestic product and per capital income of Nigeria positively.

Baghegbo and Atima (2013) examined the impact of petroleum on economic growth of the Nigerian economy using time series data covering the period 1980-2011. It was discovered that the variables: oil revenue and corruption index impacts negatively on Real GDP, while FDI and EXDEBT have positive impact on the growth of the economy. This means that the resource curse theory is proven to be true in Nigeria. The study concludes that, if the petroleum industry bill is passed and implemented to the letters, there exists hope for the Nigerian nation.

Fajingbesi and Odusola (1999) empirically investigated the “relationship between government expenditure and economic growth in Nigeria” using time series data and parametric analysis. The econometric results indicated that real government capital expenditure has a significant positive influence on real output. However, the results showed that real government recurrent expenditure affects growth only by little.

Ogiogio (2009) research revealed a long-term relationship between government expenditure and economic growth. Moreover, the author’s findings showed that recurrent expenditure exerts more influence than capital expenditure on growth as against conventional wisdom. Onaolapo, Fasina and Adegbite (2013) investigated the effect of petroleum profit tax on Nigeria economy. Secondary time series data were used in the regression analysis. The results showed that variables: Gross Domestic Product (GDP), petroleum profit tax, inflation, and exchange rate were all found to have significant effect on the Economic Growth with the Adjusted R^2 of 86.3%. The researchers therefore concluded that the abundance of petroleum and its associated income has been beneficial to the Nigerian economy for the period 1970 to 2010. It was finally recommended that Government should transparently and judiciously account for the revenue it generates through Petroleum Profit Tax by investing in the provision of infrastructure and public goods and services.

Moradi (2008) studied “Oil Resource Abundance, Economic Growth and Income Determination in Iran” using two models. The results highlighted the importance of natural resource abundance in order to improve economic growth and alleviate income inequality. However, the results of both model confirmed that increasing oil revenue increases GDP but reduces Gini coefficient. This impact is minor though, according to the aforementioned researcher. So, the effect of oil revenue on economic growth and income distribution is not very strong. This may support the hypothesis that oil abundance is not a blessing for Iran. Moreover, the findings of growth model show that physical capital and human capital have positive and significant effects on GDP in both the short run and the long-run. Gini coefficient model confirmed that GDP have positive and significant effect on income distribution. The findings of growth model show that physical capital and human capital have positive and significant effects on GDP in both the short-run and the long-run. Policy recommendation reveals that there is a need to revise macroeconomic policies to improve the efficiency and productivity of resource allocation in the economy. A nation can get more benefits from oil revenue if it is converted towards efficient activities. This means that there is a huge need to revise budgeting systems.

Nwajideobi (2011) analysed the dynamic relationship between petroleum revenue and food security in Nigeria using Ordinary Least Square approach for the period 1976 to 2009. The proxies for food security were Consumer Price Index (CPI) and Secondary School Enrolments (SSENR). The results of the estimation reveal that the petroleum revenue has a minimal impact on food security in Nigeria. According to the researcher, over dependence on oil resulted in the neglect of the agricultural sector, hence decline in the production of food for the teeming population in Nigeria. Nwajideobi (2011) also suggested an enhanced domestic production of staple foods, investment of petroleum revenue in real sector and reduced dependence on oil resource in Nigeria.

Samia (2011) assessed the effect of oil on economic development in Sudan. Using secondary data and time series analyses, the research found that although oil has helped to improve economic performance in Sudan, the dependence on oil has created other problems through price volatility. Such problems include lack of diversification and Dutch disease. Samia (2011) stated that the policy implication of the findings is the fulfilment of long-run sustainable growth and development strategies in Sudan requires various sources of growth, including revitalising and enhancing non-oil exports, notably traditional agricultural exports.

Worgu (2000) analysed and evaluated natural resource extraction, its impact on the environment and its effect on development in the Niger-Delta communities in Nigeria, in the context of world system analysis and theories. The paper concluded that intensive oil resource extraction has affected the Niger-Delta environment and communities negatively through resource degradation, pollution, poverty and misery in the Niger-Delta communities in Nigeria. These factors have been inextricably interwoven in a complex web of relationship with the intensification of the exploitation, extraction and production of natural oil for export purposes. This has led to deprivation, violence, socio-cultural neglect in all ramifications in the region and hampered peasant agriculture in the region (Worgu, 2000).

Nourizi (2014) presented a paper on the topic, “Human Development and Iranian Economy; Rethinking about Resource Curse Hypothesis”. The paper aimed to consider the impact of oil revenue on HDI in Iran. The paper used threshold regression model to study whether a non-linear relationship between oil revenue and HDI exists in Iran. Results indicated that since the oil revenue is low (the threshold value is less than 0.125) in two-regime model, oil revenue divided by GDP and HDI have a significantly positive relationship, but when the oil revenue is high (the threshold value is larger than 0.125), oil revenue divided by GDP and HDI have not a significant relationship. The results confirmed the resource curse hypothesis in Iran. It is necessary for Iranian economy to decrease its dependent to oil revenue.

Qureshi (2015) researched on the relationship between petroleum income and standard of living in Iran. Classical linear regression approach was used in estimation of the model. Real per-capita GDP was not significantly affected negatively by oil revenue. However, investment affected real per-capita GDP significantly and positively. The study concluded that there is a negative relationship between standard of living and petroleum revenue in Iran. It also concluded that investment plays a more important role in improving the standard of living.

Nwoko (2014) presented a dissertation that assessed the socio-economic impacts arising from oil pollutions in the Niger-Delta region of Nigeria, including a possible solution. The study was multidimensional, therefore leans on scientific, law and social methods. The study presented two major conclusions. Firstly, oil related environmental problems have socio-economic impacts. Secondly, solutions can be sought through adequate regulatory measures, such as establishing an independent mediatory institution.

Farzanegan et al (2011) studied “Resource Curse and Power Balance: Evidence from Oil-Rich Countries”. The paper, examined the role of political fractionalization for the “resource curse” hypothesis in oil rich economies, using panel data for 30 oil-rich countries from 1992-2005 and parametric econometric analyses. It was discovered that a positive direct relationship between oil rents and income exists. However, this positive effect is moderated by factional politics. This suggests that the resource curse does not emerge from oil revenues per se but from the rent seeking of political factions. The results still held when the effects of other determinants of income, time varying common shocks, and country-fixed effects were controlled for. In other words, it was found that oil revenue increased the national income, but rent seeking politics frustrated the use of the income for development, hence the phenomenon of underdevelopment in the midst of plenty-resource course.

Diouf (2014) studied petroleum revenue effect on food security in Sudan in the long run. It was discovered that oil revenue had positive effect on food security for the period of the study. The slope of the variable, oil revenue was however insignificant. This cast doubt on the significance of the positive effect. The researcher however concluded that the effect of oil income on economic development was not significant enough to engender economic development.

Karl (2007) presented a working paper on “Oil Led Development: Social, Political and Economic Consequences”. The study used secondary data and graphic illustrations to show the socio-political and economic results from countries that have depended on petroleum revenue for economic development. The Gulf Nations were acknowledged as having reaped developmental benefits of petroleum rents, because of relatively low population. The study concluded that oil dependent countries more than any other group of countries demonstrate perverse linkages between economic performance, poverty, bad governance, injustice and conflict. This is not due to the resource per se, but due to structures and incentives that oil dependence creates. Without implementation of reforms, the consequence of oil dependence will continue to be adverse (Karl, 2007).

Nasri (2013) used the panel data and dummy variable regression technique to test how political stability and oil income affected economic wellbeing in the three Gulf nations. It was discovered that political stability was of little significance in affecting unemployment rate among the three countries studied. The dummies did not affect the change in unemployment rate to any significant level. On the average oil income increased unemployment rate regardless both in period of economic stability and instability.

Khalid (2014) studied the impact of Nigerian fuel subsidy removal on poverty. An economy-wide framework was used to identify the impact of removing the fuel subsidy on the Nigerian economy and investigated how alternative policies might be used to meet socio-economic objectives related to fuel subsidies. The results showed that while a reduction in the subsidy generally results in an increase in Nigerian GDP, it can

have a detrimental impact on household income, and in particular on poor households. Accompanying the subsidy reduction with income transfers aimed at poor households or domestic production of petroleum products can alleviate the negative impacts on household income.

Paki and Ibiyefa (2011) whose work bordered on “Oil and Development Deficit in Africa: the Failure of Intervention Agencies in Nigeria’s Niger Delta”, found that, the intervention agency approach to the problem of Niger Delta development is evidently a mere cosmetic solution to the deep rooted issue of sustainable development of the region. The researchers however employed a nonparametric approach to the study. The recommendation bordered on a change of attitude on the part of government and those appointed to administer the agencies.

Oyeleke (2011) carried out a research on the topic “Reassessing Oil Curse Syndrome in Sub-Saharan Oil Countries. The study confirmed that the oil industry has increased revenue of the states. However, GDP per Capita fell at the long run confirming the resource curse syndrome, prevailing in the countries in question. Also the result showed that GDP per capita rose at some intervals within the study but fell on average.

Baghegbo and Atima (2013) conducted a study on the impact of petroleum revenue on economic growth in Nigeria, using time series data from 1980 – 2011. It was discovered that the variables: oil revenue and corruption index impacts negatively on Real GDP, while FDI and EXDEBT have positive impact on the growth of the economy. This means that the resource curse theory is proven to be true in Nigeria. The study concludes that, if the petroleum industry bill is passed and implemented to the letters, there exists hope for the Nigerian nation.

In summary, some empirical studies concluded that oil industry growth has been detrimental to the economic growth and development. Others have concluded that revenue from the oil industry has affected the economy and the society positively. This study has set out to study how petroleum revenue growth over the decades has affected economic development in Nigeria.

V. Research Methodology

This study period covers from 1980 to 2013. It includes data from the significant petroleum revenue boom periods. The proxies of economic development are real GDP per capita and unemployment rate. The variables regressed on are “Petroleum Revenue”, “Consumer Price Index”, “real GDP”, “Price of Crude Oil”, “Population” and “Investment”. Data were sourced from the World Bank, the Central Bank of Nigeria statistical bulletin and the National Bureau of Statistics. E views 3.1 and Stata10 statistical package were used in the estimation process.

Two functions were specified; whose regressands proxy economic development. The simple linear equation was used. The Ordinary Least Squares of the Standard Linear Regression Model was used in the estimation. In the first model, Unemployment is regressed, petroleum revenue. The functional form of model 1 is thus: $UN = f(PET)$. The econometric form is expressed thus:

$$diffUN_t = \alpha_1 + \alpha_2 diffPET_t + \mu_t$$

Where;

UN = UNEMPLOYMENT RATE (difference of 1)

PET = PETROLEUM REVENUE (difference of 1)

μ_t = STOCHASTIC DISTURBANCE TERM

α_1 is the intercept term for the regression; RPCGDP equals α_1 , if α_2 is statistically insignificant; α_2 is the slope of the explanatory variable as well as the OLS estimate.

Model 2 is also specified in linear model. The functional form of the model is:

$$RPCGDP = f(PET)$$

The econometric form of the model is specified thus;

$$RPCGDP_t = \beta_1 + \beta_2 diffPET_t + \varepsilon_t$$

Where;

RPCGDP = REAL PER CAPITA GROSS DOMESTIC PRODUCT

PET = PETROLEUM REVENUE (difference of 1)

ε_t = Stochastic Residual

β_1 is the intercept term for the regression; RPCGDP equals β_1 , if β_2 is statistically insignificant; β_2 is the slope of the explanatory variable as well as the OLS estimate.

A priori expectations are illustrated in Table A

TABLE A: A PRIORI EXPECTATIONS

MODEL	VARIABLE	SIGN (RPCGDP)
MODEL ONE	PET	-
MODEL TWO	PET	+

The beta coefficient of the PET (petroleum revenue) was used in testing hypotheses I and II. There was an assumption of no simultaneity or endogeneity problem; in other words that the regressors and the regressand are not correlated with the error term.

The regression output data were evaluated statistically using: the co-efficient of Determination (R^2); the student t-test; and the F-test. Other Statistical Tests carried out were the Normality Test; Stationarity Test using the Dickey-Fuller (DF) test; Multicollinearity Test using the Correlation Matrix (in Stata 10); Heteroscedasticity test; Autocorrelation using the Bartlett’s periodogram; Granger Causality Test used in testing significance of the hypothesis III of the research: Petroleum revenue does not granger cause real per capita GDP in Nigeria.

VI. Data Presentation And Analyses

The input data were depicted in Appendix A.

Models one and two were specified as:

Unemployment rate = f(Petroleum Revenue)

$$\text{diffUN}_t = \alpha_1 + \alpha_2 \text{diffPET}_t + \mu_t \dots\dots\dots (I)$$

Real per capita GDP = f(petroleum revenue)

$$\text{rpcGDP}_t = \alpha_1 + \alpha_2 \text{diffPET}_t + \mu_t \dots\dots\dots (II)$$

The test of stationarity conducted on variables for model 1 shows that all the variables did not follow order of integration 0, i.e. I(0). Gujarati and Sangeetha (2010) said that the regression of a non-stationary time series on another non-stationary time series may produce a spurious regression. Therefore the variables, unemployment and petroleum revenue were differenced and found to be stationary at first differencing. rpcGDP was stationary at level form so no differencing was done.

The regression models are depicted in Table B and Table C respectively.

Table B: Regression Model 1

MODEL 1 :UN(dif1) as the regressand	
PET(dif1)	-0.000154
Cons	0.3838
R-squared	0.0223
F-statistic	0.71
Prob. >F-statistic	0.4

Source: Output data from stata

Table C: Regression Model 2

MODEL 2: RPCGD as regressand	
PET(dif1)	0.99
CONS	294102.3
R-squared	0.007
F-statistic	0.22
Prob. > F statistic	0.64

Source: Output data from stata

All the coefficients are estimated at 5% level of significance or 95% confidence interval.

VII. Evaluation Of Output Results

The a priori expectations were compared with the output result and depicted in Table D.

Table D: Comparative Table of a priori Expectations

MODEL ONE (rpcGDP)		
Variable	Apriori	Result
Pet	+	+
MODEL TWO (UNEMPLOYMENT RATE)		
Variable		
Pet	-	-

Source: Authors’ design

Model 1: As apriori expected the coefficient of PET (dif1) has positive sign. A unit increase in petroleum revenue reduces unemployment rate by a less than one unit value of 0.00015, all things being equal, at 95% level of confidence. Thus if we conduct this test 100 times we are likely to be right with the result 95 times. If the value of petroleum revenue is zero, then unemployment rate will assume a statistically insignificant value of 0.38. (See Table B and appendix B)

Model 2: In line with a priori expectation, a unit increase in petroleum revenue increases real per capita GDP by less than a unit value of 0.99, all other factors remaining constant. If the coefficient of the regressor, petroleum revenue is zero, then RPCGDP will assume a value of 294102. (See Table C and appendix C).

The statistical reliability of the estimated parameters showed that: **R²:** From the first regression results (Table B), R-squared is 0.02. This means that about 2% of the variation in the dependent variable unemployment rate is explained by the independent variable, petroleum revenue. That is, the model has a poor fit. For model two (see Table C), the R² value is 0.007, meaning that 0.7% of variation in the independent variable is explained by the independent variable. 99.3% percent is explained by other variables not included in the model. This model two has a poorer fit than model 1.

(i) **The t-test.** For a two tail test, the decision rule is to reject **H₀** if the absolute value of the t-statistic is greater than the absolute value of the critical t-value; with n-k degrees of freedom at 5% level of significance.

Testing Hypotheses one and two: Each model has 2 parameters and 33 observations.

Thus, **H₀:** $\alpha_1 = \alpha_2 = 0$

H₀: $\beta_1 = \beta_2 = 0$

Decision Rule: Reject **H₀** if $|t| > t_{0.05/2} (n-k)$, accept otherwise. Where n is the number of observations and k is the number of parameters including the intercept. In this case, n=33, k=2 then n-k =31. $t_{0.025}^{31}=2.056$, using the t-table. The result of the t-test is presented in table D and evaluated based on the value of the critical t value.

Table D: Decision Table of the t-test

Model 1 unemployment rate			Model 2 rpcGDP		
Variable	t-value	Conclusion	Variable	t-value	conclusion
PET	-0.84	Insignificant	PET	0.47	insignificant
Cons	0.78	Insignificant	Cons	5.17	significant

Source: Authors' design

The f-test: The f-test is used to measure the overall significance of the variables used in the model. We proposed 5% level of significance:

H₀: $\alpha_1 = \alpha_2 = 0$

H₀: $\beta_1 = \beta_2 = 0$

Decision Rule: Reject **H₀** if $F_{cal} > F_{0.05}$, Accept otherwise.

From the regression results (See Tables B and C respectively), $F = 0.71$ and 0.22 . From the F-table, $F_{0.05} = 2.92$. We therefore do not reject **H₀** and conclude that the variables are jointly insignificant at 5% level.

We further examined the significance of the models one and two output data. Applying the Normality Test: Bartlett's periodogram based test for white noise. The B statistic shows whether the error term (residual) has a zero mean, constant variance and zero covariance. The statements are negated in the null hypothesis. For model one, from the periodogram in Appendix D: the B-statistic is 0.70, $prob > B = 0.71$. The probability of getting a B value equal to or greater than the B-statistic is close to certainty. We therefore do not reject the null hypothesis. The variables in regression one do not follow a white noise process. It is rather deterministic.

For hypothesis two, from the periodogram in Appendix E, the B-statistic is 0.70. $prob > B = 0.7$. The probability of getting a B value equal to or greater than the B-statistic is 70 percent. The error term was NOT normally distributed, with non-zero mean, non-constant variance and non-zero covariance. We therefore do not reject the null hypothesis.

The correlation Matrix was used for multicollinearitytest. According to Gujarati, Multicollinearity becomes a problem if the correlation between two variables is as low as 0.4. From the correlation matrix in the appendix F, no value is as high as that, therefore there is no multicollinearity in the models one and two.

The Dickey Fuller Test for unit Root was applied in a test of stationarity. We proposed that: **H₀:** $\delta=0$ or $P=1$ (unit root problem exists). **Decision Rule:** Accept **H₀** if $DF_{cal} > DF_{critical}$ value, at 5% level of significance. For model 1: The DF results in the appendix G shows that Unemployment rate and petroleum revenue are non-stationary but rpcGDP is stationary. Therefore Unemployment rate and petroleum revenue were differenced. Both were stationary at first differencing.

Heteroscedasticity tests for equal variance of the error term. The Bartlett's white noise test has already established the non-homoscedasticity of the variance. Therefore heteroscedasticity problem exist.

The hypothesis three stated that the petroleum revenue does not granger cause real per capita GDP in Nigeria. The Granger Causality Test of no causality was applied. The Schwarz and Akaike Information Criteria (SBIC and AIC) were used to select the appropriate lag length in the Vector Autoregressive System (VAR) for the Granger Causality test. The lag order with the least AIC value was selected. The result of the granger test conducted with e-views was presented in the appendix H. We conclude that: the petroleum revenue does not granger cause real per capita GDP. This means that petroleum revenue has no meaningful impact on economic

development in Nigeria. The correlation between petroleum revenue and economic development in Nigeria is low.

Thus the regression analyses proved the presence of resource curse problem in Nigeria. This might be due to failure of the political process and poor leadership at the national level. Poor execution of development plans, fragile governments, unfavourable environment for private sector participation in business and growing recurrent expenditure over capital expenditure in national budget, against the wiser proposition the New Growth Theorists (Black et al, 2014), caused rising petroleum revenue not to reflect into much economic development. The revenue accruing to government in the form of oil rents cannot work on its own. It is the use to which it put that brings the development level to desirable point. The R^2 of the two regression models showed that petroleum revenue better explained the variations in unemployment rate than those in real per capita GDP for the period of study. Therefore unemployment rate is negatively more responsive to petroleum revenue. This means that unemployment rate was proven to be a better proxy for economic development than real per capita GDP in Nigeria. Since petroleum revenue, is not a pure random walk process, the revenue from petroleum can be forecasted or predicted with some degree of accuracy.

VIII. Summary of Findings, Conclusion And Recommendations

Ssummary of Findings:

Two simple classical linear regression models were specified and subjected to rigorous statistical and econometric tests. The following findings were made.

Economic development when proxied by unemployment was affected negatively by petroleum revenue but not at a significant level. This is in support of Seers theory in Black et al (2014) that unemployment not real per capita GDP is a better indicator of economic development. When proxied by the real per capita GDP, petroleum revenue had an insignificant positive impact on economic development. This showed that petroleum revenue increase has on the average not increased the standard of living of Nigerians over the period of study.

The unemployment rate is a better proxy for economic development than real per capita GDP as seen from the F-test, the R^2 values and the values of the intercepts in the models. The Granger Causality test performed showed that petroleum revenue does not cause real per capita GDP. Therefore petroleum revenue cannot be used to forecast real per capita GDP in Nigeria. Petroleum revenue is NOT a determinant of economic development in Nigeria.

Economic development does not influence or cause petroleum revenue and petroleum revenue does not cause economic development. Economic development and petroleum revenue in Nigeria are two poorly correlated variables as shown by the correlation matrix and granger-causality test.

R-squared of both models showed poor fitness of the model. This means that in Nigeria, petroleum revenue does not impact favorably on economic development in Nigeria. The regression analyses proved the existence of resource curse problem in Nigeria.

IX. Conclusion

The rents from petroleum have not been used to develop Nigeria to a significant level. The revenue accruing from petroleum seems to have been poorly channeled to sustain economic development of Nigeria by political leaders. The rents from petroleum have not been appropriated to ensure meaningful developmental uses as the needs of the moment requires. The nation Nigeria is in stage of industrialization, we have consumed enough. It is time to diversify the economy and contribute values to other nations too.

X. Recommendations:

The following recommendations are apt considering our findings:

1. The policy makers would prefer unemployment rate as an indicator of economic development than real per capita GDP as shown in the models. Therefore concerted efforts should be made by all stakeholders in project Nigeria to create employment opportunities for Nigerians. Imposing high tariff on importation of luxury goods can promote think home mentality and instigate local production and create employments.
2. Government therefore needs to leverage on other sectors of the economy because petroleum revenue has not improved the standard of living of the country to any desirable level. Government should border most on investment in other sectors as a tool for economic development in Nigeria. Some key areas of interest shall be agricultural development; developing industrial parks; encouraging entrepreneurial activities; power generation and distribution; and transportation.
3. The government should diversify the economy, as the dependence on oil revenue harms economic development. This diversification can be achieved through various means such as investment in solid minerals. The revenue from oil may well be used to invest in real sector of the economy which might yield significant rise in economic development even in the short run.

4. The government can also ensure that there exists a true federal system of governance where the federating states contribute to revenue of the country and not the other way round. This will ensure that the states become more productive “cake bakers” rather than “cake sharers”. This will invariably lead to a more diversified economy where the sub-nationals are contributing to the economic development of the state through different economic activities.
5. Furthermore, the government at the national level must cut the size of the public sector, which gulps majority of the oil revenue. This will help reduce the size of the recurrent expenditure. Also budgetary capital expenditure has to be increased to ensure rise in development projects.

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Appendix A: Regression Input Data

YEAR	Petroleum revenue in billion naira	rpcGDP	Unemployment rate in percentage
1980	6754.3	293200.6	6.4
1981	73019.7	247876.9	5.2
1982	65327.8	238954.8	4.3
1983	59458	221196.5	6.4
1984	66884.3	211302.8	6.2
1985	72152	223088.3	6.1
1986	70791	198319.6	5.3
1987	69014.8	172402.7	7.0
1988	70837.7	180584.5	5.1
1989	79321.9	187298.5	4.5
1990	100223.4	2058225	3.5
1991	91313.9	199406	3.1
1992	93614.3	195279.9	3.5
1993	93810.1	194428.4	3.4
1994	91387.4	191358.7	3.2
1995	93536.7	186069	1.9
1996	79321.9	190543	2.8
1997	100239	191047.7	3.4
1998	101717	191386.8	3.5
1999	103923.5	187537.2	17.5
2000	96129.2	192626.4	18.1
2001	106827.5	196119.9	13.7
2002	112417.4	198471	12.2
2003	106002.1	213526.2	14.8
2004	131336.6	278318.7	11.8
2005	162122	280508.2	11.9
2006	173234.1	295642.5	12.3
2007	160023.3	307520.8	12.7
2008	146812.5	318113.3	14.7
2009	133601.7	331036.8	16.29231
2010	8402.6	347317.8	16.97802
2011	8534.7	354341.4	17.66374
2012	8321.03	359347.8	18.34945
2013	8897.4	368301.8	19.03517

Sources: CBN bulletin, IMF databank, NBS Bulletin

APPENDIX B: Regression Result (I) performed in Stata.10.0

. reg diffUN diffPET

Source	SS	df	MS			
Model	5.69941554	1	5.69941554	Number of obs =	33	
Residual	250.389051	31	8.07706618	F(1, 31) =	0.71	
Total	256.088467	32	8.00276459	Prob > F =	0.4073	
				R-squared =	0.0223	
				Adj R-squared =	-0.0093	
				Root MSE =	2.842	

diffUN	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
diffPET	-.0000154	.0000184	-0.84	0.407	-.0000528	.000022
_cons	.3838849	.4947333	0.78	0.444	-.6251303	1.3929

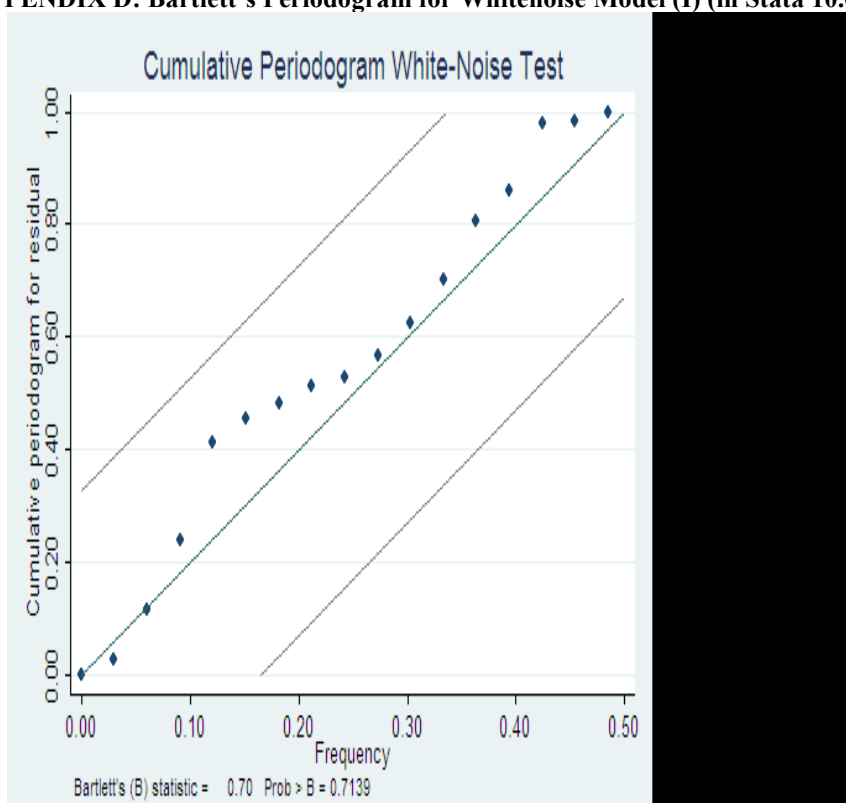
APPENDIX C: Regression Result (II)

. reg rpcGDP diffPET

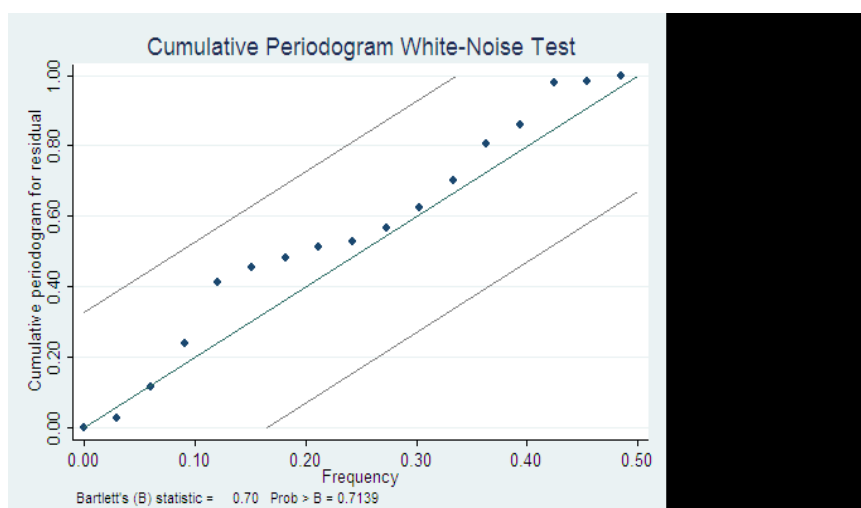
Source	SS	df	MS			
Model	2.3546e+10	1	2.3546e+10	Number of obs =	33	
Residual	3.3077e+12	31	1.0670e+11	F(1, 31) =	0.22	
Total	3.3313e+12	32	1.0410e+11	Prob > F =	0.6418	
				R-squared =	0.0071	
				Adj R-squared =	-0.0250	
				Root MSE =	3.3e+05	

rpcGDP	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
diffPET	.9907817	2.109137	0.47	0.642	-3.310831	5.292394
_cons	294102.3	56862.7	5.17	0.000	178130	410074.5

APPENDIX D: Bartlett's Periodogram for Whitenoise Model (I) (in Stata 10.0)



APPENDIX E: Bartlett's Periodogram for Whitenoise Model (II) (in Stata 10.0)



. dfuller diffPET

Dickey-Fuller test for unit root Number of obs = 32

	Test Statistic	Interpolated Dickey-Fuller		
		1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-5.612	-3.702	-2.980	-2.622

Mackinnon approximate p-value for Z(t) = **0.0000**

APPENDIX H: Granger Causality Test (in e-Views 3.1)

Null Hypothesis	Observations	F-statistics	Prob> (F-stat)
rpcGDP does not granger cause PET	32	0.22583	0.799
PET does not granger cause rpcGDP		0.04487	0.956
Lag length of 2, at 95% confidence interval			