

CRUDE OIL AND THE NIGERIAN ECONOMIC PERFORMANCE

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For the past three decades, crude oil has been a major source of revenue, energy and foreign exchange for the Nigerian economy. Against this background, this paper analyses the relationship between the crude oil sector and the Nigerian economic performance. Using the Ordinary Least Square regression method, the study reveals that crude oil consumption and export have contributed to the improvement of the Nigerian economy. However, one of the recommendations of the study is that government should implement policies that would encourage the private sector to participate actively in the crude oil sector.

1. INTRODUCTION AND THE PROBLEM STATEMENT

Oil is a major source of energy in Nigeria and the world in general. Oil being the mainstay of the Nigerian economy plays a vital role in shaping the economic and political destiny of the country. Although Nigeria's oil industry was founded at the beginning of the century, it was not until the end of the Nigeria civil war (1967 - 1970) that the oil industry began to play a prominent role in the economic life of the country.

Nigeria can be categorized as a country that is primarily rural, which depends on primary product exports (especially oil products). Since the attainment of independence in 1960 it has experienced ethnic, regional and religious tensions, magnified by the significant disparities in economic, educational and environmental development in the south and the north. These could be partly attributed to the major discovery of oil in the country which affects and is affected by economic and social components.

Crude oil discovery has had certain impacts on the Nigeria economy both positively and adversely. On the negative side, this can be considered with respect to the surrounding communities within which the oil wells are exploited. Some of these communities still suffer environmental degradation, which leads to deprivation of means of livelihood and other economic and social factors. Although large proceeds are obtained from the domestic sales and export of petroleum products, its effect on the growth of the Nigerian economy as regards returns and productivity is still questionable,

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hence, the need to evaluate the relative impacts of crude oil on the economy. In the light of the study, the main objective is to assess the impact of crude oil on the Nigerian economy.

Given the fact that the oil sector is a very crucial sector in the Nigeria economy, there is the dire need for an appropriate and desirable production and export policy for the sector. In Nigeria, though crude oil has contributed largely to the economy, the revenue has not been properly used. Considering the fact that there are other sectors in the economy, the excess revenue made from the oil sector can be invested in them to diversify and also increase the total GDP of the economy.

This study comprises of five sections. Section two presents the background of the study, while the third section focuses on the research methodology. Section four includes data analysis and interpretation of results, and the final section presents and policy proposal and study conclusions.

2. BACKGROUND TO THE STUDY

2.1 History of the Nigeria Economy

Nigeria's economy is struggling to leverage the country's vast wealth in fossil fuels in order to displace the crushing poverty that affects about 57 percent of its population. Economists refer to the coexistence of vast natural resources wealth and extreme personal poverty in developing countries like Nigeria as the "resource curse". Nigeria's exports of oil and natural gas at a time of peak prices have enabled the country to post merchandise trade and current account surpluses in recent years. Reportedly, 80 percent of Nigeria's energy revenues flow to the government, 16 percent covers operational costs, and the remaining 4 percent go to investors. However, the World Bank has estimated that as a result of corruption 80 percent of energy revenues benefit only one percent of the population. During 2005 Nigeria achieved a milestone agreement with the Paris Club of lending nations to eliminate all of its bilateral external debt. Under the agreement, the lenders will forgive most of the debt, and Nigeria will pay off the remainder with a portion of its energy revenues. Outside of the energy sector, Nigeria's economy is highly inefficient. Moreover, human capital is

underdeveloped Nigeria ranked 151 out of 177 countries in the United Nations Development Index in 2004 and non-energy-related infrastructure is inadequate.

During 2003–2007 Nigeria has attempted to implement an economic reform program called the National Economic Empowerment Development Strategy (NEEDS). The purpose of NEEDS is to raise the country's standard of living through a variety of reforms, including macroeconomic stability, deregulation, liberalization, privatization, transparency, and accountability. NEEDS addresses basic deficiencies, such as the lack of freshwater for household use and irrigation, unreliable power supplies, decaying infrastructure, impediments to private enterprise, and corruption. The government hope that NEEDS will create 7 million new jobs, diversify the economy, boost non-energy exports, increase industrial capacity utilization, and improve agricultural productivity. A related initiative on the state level is the State Economic Empowerment Development Strategy (SEEDS).

A long-term economic development program is the United Nations (UN) sponsored National Millennium Goals for Nigeria. Under the program, which covers the years from 2000 to 2015, Nigeria is committed to achieve a wide range of ambitious objectives involving poverty reduction, education, gender equality, health, the environment, and international development cooperation. In an update released in 2004, the UN found that Nigeria was making progress toward achieving several goals but was falling short on others. Specifically, Nigeria had advanced efforts to provide universal primary education, protect the environment, and develop a global development partnership. However, the country lagged behind on the goals of eliminating extreme poverty and hunger, reducing child and maternal mortality, and combating diseases such as human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) and malaria.

A prerequisite for achieving many of these worthwhile objectives is curtailing endemic corruption, which stymies development and taints Nigeria's business environment. Corruption mostly harms Nigerians themselves, but the country is widely known around the world for a fraudulent activity known as the "Advance fee fraud" scheme, a.k.a the "419" scam or the Nigerian scam, which seeks to extort money from foreign recipients of letters and emails with the promise to transfer a nonexistent windfall sum of money.

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. In 2000 oil and gas exports accounted for more than 98 % of export earnings and about 83 % of federal government revenue. New oil wealth, the concurrent decline of other economic sectors, and a lurch toward a statist economic model fueled massive migration to the cities and led to increasingly widespread poverty, especially in rural areas. A collapse of basic infrastructure and social services since the early 1980s accompanied this trend. By 2000 Nigeria's per capita income had plunged to about one-quarter of its mid-1970s high, below the level at independence. Along with the endemic malaise of Nigeria's non-oil sectors, the economy continues to witness massive growth of "informal sector" economic activities, estimated by some to be as high as 75 % of the total economy.

Nigeria's proven oil reserves are estimated to be 35 billion barrels; natural gas reserves are well over 100 trillion ft³ (2,800 km³). Nigeria is a member of the Organization of Petroleum Exporting Countries (OPEC), and in mid-2001 its crude oil production was averaging around 2.2 million barrels (350,000 m³) per day. Poor corporate relations with indigenous communities, vandalism of oil infrastructure, severe ecological damage, and personal security problems throughout the Niger Delta oil-producing region continue to plague Nigeria's oil sector. Efforts are underway to reverse these troubles. In the absence of government programs, the major multinational oil companies have launched their own community development programs. A new entity, the Niger Delta Development Commission (NDDC), has been created to help catalyze economic and social development in the region. Although it has yet to launch its programs, hopes are high that the NDDC can reverse the impoverishment of local communities. The U.S. remains Nigeria's largest customer for crude oil, accounting for 40% of the country's total oil exports; Nigeria provides about 10% of overall U.S. oil imports and ranks as the fifth-largest source for U.S. imported oil.

The United States is Nigeria's largest trading partner after the United Kingdom. Although the trade balance overwhelmingly favors Nigeria, thanks to oil exports, a large portion of U.S. exports to Nigeria is believed to enter the country outside of the Nigerian Government's official statistics, due to importers seeking to avoid Nigeria's excessive tariffs. To counter smuggling and under-invoicing by importers, in May 2001 the Nigerian Government instituted a 100 % inspection regime for all imports, and

enforcement has been sustained. On the whole, Nigerian high tariffs and non-tariff barriers are gradually being reduced, but much progress remains to be made. The government also has been encouraging the expansion of foreign investment, although the country's investment climate remains daunting to all but the most determined. The stock of U.S. investment is nearly \$7 billion, mostly in the energy sector. Exxon Mobil and Chevron are the two largest U.S. corporate players in offshore oil and gas production. Significant exports of liquefied natural gas started in late 1999 and are slated to expand as Nigeria seeks to eliminate gas flaring by 2008.

Oil dependency, and the allure it generated of great wealth through government contracts, spawned other economic distortions. The country's high propensity to import means roughly 80 % of government expenditures is recycled into foreign exchange. Cheap consumer imports, resulting from a chronically overvalued Naira, coupled with excessively high domestic production costs due in part to erratic electricity and fuel supply, have pushed down industrial capacity utilization to less than 30 %. Many more Nigerian factories would have closed except for relatively low labor costs (10 % - 15 %). Domestic manufacturers, especially pharmaceuticals and textiles, have lost their ability to compete in traditional regional markets; however, there are signs that some manufacturers have begun to address their competitiveness.

Nigeria's official foreign debt is about \$28.5 billion, about 75 % of which is owed to Paris Club countries. A large chunk of this debt is interest and payment arrears. In August 2000 the International Monetary Fund (IMF) and Nigeria signed a one-year Stand-by Arrangement (SBA), which to a debt rescheduling agreement in December between Nigeria and its Paris Club creditors. By August 2001, despite continued dialogue with the IMF, Nigeria had been unable to implement many of the SBA conditions. The IMF consented to extend its SBA by a few months and seek out revised targets and conditions for a new agreement. As of September 2001, only a few of Nigeria's creditor governments had signed bilateral rescheduling agreements. Another obstacle to debt restructuring involves World Bank classification. Any long-term debt relief will require strong and sustained economic reforms over a number of years.

In the light of highly expansionary public sector fiscal policies during 2001, the government has sought ways to head off higher inflation, leading to the implementation of stronger monetary policies by the Central Bank of Nigeria (CBN) and under spending

of budgeted amounts. As a result of the CBN's efforts, the official exchange rate for the Naira has stabilized at about 112 Naira to the dollar. The combination of CBN's efforts to prop up the value of the Naira and excess liquidity resulting from government spending led the currency to be discounted by around 20 % on the parallel (nonofficial) market. A key condition of the Stand-by Arrangement has been closure of the gap between the official and parallel market exchange rates. The Inter Bank Foreign Exchange Market (IFEM) is closely tied to the official rate. Under IFEM, banks, oil companies, and the CBN can buy or sell their foreign exchange at government influenced rates. Much of the informal economy, however, can only access foreign exchange through the parallel market. Companies can hold domiciliary accounts in private banks, and account holders have unfettered use of the funds.

Expanded government spending also has led to upward pressure on consumer prices. Inflation which had fallen to 0 % in April 2000 reached 14. 5% by the end of the year and 18.7 % in August 2001. In 2000 high world oil prices resulted in government revenue of over \$16 billion, about double the 1999 level. State and local governmental bodies demand access to this "windfall" revenue, creating a tug-of-war between the federal government, which seeks to control spending, and state governments desirous of augmented budgets preventing the government from making provision for periods of lower oil prices.

2.2 History of Crude Oil in Nigeria

Oil was discovered in Nigeria in 1956 at Oloibiri in the Niger Delta after half a century of exploration. The discovery was made by Shell-BP, at the time the sole concessionaire. Nigeria joined the ranks of oil producers in 1958 when its first oil field came on stream producing 5,100 bpd. After 1960, exploration rights in onshore and offshore areas adjoining the Niger Delta were extended to other foreign companies. In 1965 the EA field was discovered by Shell in shallow water southeast of Warri.

In 1970, the end of the Biafran war coincided with the rise in the world oil price, and Nigeria was able to reap instant riches from its oil production. Nigeria joined the Organization of Petroleum Exporting Countries (OPEC) in 1971 and established the Nigerian National Petroleum Company (NNPC) in 1977; a state owned and controlled

company which is a major player in both the upstream and downstream sectors [Blair 1976, pp. 98-120].

Following the discovery of crude oil by Shell D'Arcy Petroleum, pioneer production began in 1958 from the company's oil field in Oloibiri in the Eastern Niger Delta. By the late sixties and early seventies, Nigeria had attained a production level of over 2 million barrels of crude oil a day. Although production figures dropped in the eighties due to economic slump, 2004 saw a total rejuvenation of oil production to a record level of 2.5 million barrels per day. Current development strategies are aimed at increasing production to 4million barrels per day by the year 2010.

Petroleum production and export play a dominant role in Nigeria's economy and account for about 90 % of her gross earnings. This dominant role has pushed agriculture, the traditional mainstay of the economy, from the early fifties and sixties, to the background.

While the discovery of oil in the eastern and mid-western regions of the Niger Delta pleased hopeful Nigerians, giving them an early indication soon after independent economic development was within reach, at the same time it signaled a danger of grave consequence: oil revenues fueled already existing ethnic and political tension and actually "burned" the country. This tension reached its peak with the civil war that lasted from 1967 to 1970. As the war commenced, the literature reflected the hostility, the impact, and fate of the oil industry.

Nigeria survived the war, and was able to recover mainly of the huge revenues from oil in the 1970s. For some three years an oil boom followed, and the country was awash with money. Indeed, there was money for virtually all the items in its developmental plan. The literature of the postwar years shifted to the analysis of the world oil boom and bust, collectively known as the "oil shock." Starting in 1973 the world experienced an oil shock that rippled through Nigeria until the mid - 1980s. This oil shock was initially positive for the country, but with mismanagement and military rule, it became all economic disaster. The larger middle class produced by the oil boom of the 1970s gradually became disenchanted in the 1980s, and rebellious in the 1990s. The enormous impact of the oil shock could not escape scholarly attention. For almost twenty years (1970s - 1990s), the virtual obsession was to analyze the consequences of oil on Nigeria, using different models and theories. A set of radical-oriented writers was

concerned with the nationalization that took place during the oil shock as well as the linkages between oil and an activist foreign policy. Regarding the latter, the emphasis was on OPEC, Nigeria's strategic alliance formation within Africa, the vigorous efforts to establish the Economic Community of West African States (ECOWAS), and the country's attempts to use oil as a political weapon, especially in the liberation of South Africa from apartheid.

If many had hoped that oil would turn Nigeria into an industrial power and a prosperous country based on a large middle class, they were to be disappointed when a formally rich country became a debtor nation by the 1980s. The suddenness of the economic difficulties of the 1980s "bust years" had an adverse effect on class relations and the oil workers who understood the dynamics of the industry. As if to capture the labor crisis, writings on oil workers during this period covered many interrelated issues, notably working conditions, strikes, and state labor relations. To be sure, labor issues were not new in the 1980s, since the left-oriented scholars had made a point of exposing labor relations in the colonial era. What was new after 1980 was the focus on oil workers, unions, and class conflict [OPEC annual report 1983].

2.3 The Performance of the Oil Sector in Nigeria

The Nigerian oil sector can be categorized into three main sub-sectors, namely, upstream, downstream and gas. The most problematic over the years has been the downstream sector, which is the distribution arm and connection with final consumers of refined petroleum products in the domestic economy. The incessant crisis in supply of products culminated in the decision by Government in 2003 to deregulate the downstream sub-sector. However, the manner of its implementation has been controversial because it ignores the economic realities in Nigeria.

Oil production by the joint venture (JV) companies accounts for about 95 % of Nigeria's crude oil production. Shell, which operates the largest joint venture in Nigeria, with 55 % Government interest (through the Nigerian National Petroleum Corporation, NNPC), produces about 50 % of Nigeria's crude oil. Exxon Mobil, Chevron Texaco, ENI/Agip and TotalfinaElf operate the other JV's, in which the NNPC has 60 % stake. The over-dependence on oil has created vulnerability to the vagaries of the international

market, as observed in the preceding section that show the contribution of oil to some macro-economic variables.

In particular, the place of oil in the mind of the average Nigerian has become more profound since the deregulation of the downstream segment of the Nigerian oil industry in 2003. The contradiction is more glaring now with the recent rise in crude oil prices at the global markets, which meant more external earnings for Nigeria, but also increased the expense burden on imported refined petroleum products! It is such contradictions that make the Nigerian economy appear strange at times, as policies seem to ignore what appears obvious to do. As such, policies designed to address the deficiencies and defects in the structure end up being poorly articulated and/or implemented because of regional, political or rent-seeking selfish interests.

Obviously, it is the same rent-seekers that continually sabotage the reinvigoration of the domestic refineries, making Nigeria to depend on importation of refined products to meet the domestic need. At present, Nigeria has four refineries, with a combined installed refining capacity of 445,000 barrels per day (bpd). These four refineries are:

1. The first Port Harcourt Refinery was commissioned in 1965 with an installed capacity of 35,000 bpd and later expanded to 60,000 bpd.
2. The Warri Refinery was commissioned in 1978 with an installed refining capacity 100,000 bpd, and upgraded to 125,000 bpd in 1986.
3. The Kaduna Refinery was commissioned in 1980 with an installed refining capacity of 100,000 bpd, and upgraded to 110,000 bpd in 1986.
4. The second Port Harcourt Refinery was commissioned in 1989 with 150,000 bpd processing capacity, and designed to fulfil the dual role of supplying the domestic market and exporting its surplus.

The combined capacities of these refineries exceed the domestic consumption of refined products, chief of which is premium motor spirit (gasoline), whose demand is estimated at 33 million litres daily. The refineries are however, operating far below their installed capacities, as they were more or less abandoned during the military era, skipping the routine and mandatory turnaround maintenance that made products importation inevitable. Importation notwithstanding, there have been persistent product

shortages that gave strength to the argument for deregulation of the downstream oil sub-sector in Nigeria.

The monetization of oil revenue has been a major factor in liquidity management in Nigeria. Measuring liquidity as the narrow and broad money definitions by the CBN, the early 1990s saw increases that were dampened by 1995 up until the civilian administration came on board in 1999. The new Government maintained disciplined fiscal operations for about one year and thereafter, the floodgates were opened. Since then, the CBN has been battling to keep liquidity in check, in order to ensure that it does not create adverse effects on the three key macroeconomic prices (i.e., interest rate, exchange rate and inflation rate). The greatest challenge is when Nigeria generates more revenue from crude oil sales than it budgeted, like now. Such excesses have always been monetized, creating market distortions and inflationary pressure [Biodun Adedipe 2004].

The same argument goes for deficit fiscal operations in comparison to the GDP. The pattern of this ratio indicates the optimism that accompanies increase in oil revenue and makes Government to engage in frivolous spending or unnecessary projects. Deficit spending invariably makes Government resort to borrowing from the Central Bank through the instrument of Ways and Means Advances, which later convert into short-term debt instruments that are quite expensive to service at market rates.

At this point, there is sufficient ground to examine how economic policy formulation has been impacted or induced by petroleum oil in Nigeria. As much as possible, major economic policies since Nigeria gained political independence would be examined vis-a-vis the state of the oil sector. This should provide adequate basis for making a few specific recommendations on how to reduce the dependency.

2.4 Contribution by the Oil Industry

Over the past fifteen years the oil industry has made a variety of contributions to the Nigerian economy. These have included the creation of employment opportunities; local expenditure on goods and services; contributions to government revenues, to gross domestic product, and to foreign exchange reserves; and the supply of energy to industry and commerce.

❖ Employment Opportunities.

One of the first contributions of the oil industry to the Nigerian economy was the creation of employment opportunities. From the start, Nigerians were employed in a variety of non-basic activities such as the building of roads and bridges, the clearing of drilling sites, transportation of materials and equipment, and the building of staff housing and recreational facilities. As time went on and as the industry's training programme progressed, they began to be employed in seismic and drilling operations, and in supervisory and managerial functions. However, direct oil industry employment in Nigeria is not likely to expand significantly in the future because the industry is very highly capital intensive, as is illustrated by the size of the capital-labour ratio in the industry, compared with other industries.

The very high capital-labour ratio in the oil industry means that growth in oil operations is generally reflected, not in the relative expansion of employment, but in the expansion of capital investment. This will be particularly the case when, with the passage of time and increased extraction, the need arises for increased investment in costly techniques of secondary recovery. At the moment total oil industry employment in Nigeria (including employment by ancillary firms) represents only 1.3 per cent of total modern sector employment in the country.

❖ Contribution to Gross Domestic Product

In general, the contribution of an industry or branch of activity to the gross domestic product (at factor cost) during any accounting period is measured by its gross output less the cost of inputs-materials, equipment, services, etc. purchased from other industries or branches of activity. (Deduction of any taxes net of subsidies paid, gives the gross domestic product at market prices). The gross output of the petroleum sector consists of the proceeds from oil exports, local sales of crude oil for local refining, and local sales of natural gas. But because of the massive involvement of foreign operators in the Nigerian petroleum industry, not all of the industry's value added is retained in the country; at the moment a substantial proportion is sent out in the form of factor payments profits, dividends, interest, fees, and wages and salaries paid abroad. It is therefore more realistic to consider the industry's contribution to gross national product

i.e., gross domestic product less factor payments made abroad. The industry's value added can also be obtained by adding together the various payments to the government in the form of rents, royalties, profit taxes, harbor dues, etc.; the wages and salaries of employees paid locally; and any net retained earnings.

❖ Local Expenditure on Goods and Services

The oil industry's periodic injection of purchasing power through its local expenditure on goods and services is another of its important contributions to the Nigerian economy. Apart from direct payments to the government, oil industry expenditure in Nigeria takes the form of payments of wages and salaries, payments to local contractors, local purchases of goods and services, harbor dues, vehicle licenses, telephone and postal charges, local rents, educational grants and scholarship awards, donations and subventions, and other minor social charges. Cumulative expenditure on these items totaled about N950 million by the end of 1974. Apart from the direct stimulation given to the producers of these goods and services such injections also exert secondary influences, through the multiplier process, on the level of output and employment in other related sectors of the economy, the magnitude of the overall effect depending on the size of the initial injection and the extent of leakages out of the local economic system that may exist.

❖ Contributions to Government Revenues

The payment of substantial revenues to the government is another important aspect of the contribution of the oil industry to the Nigerian economy. The significant increase in government receipts in recent years is a reflection of three factors: increased crude oil production in Nigeria; the huge increase in crude oil prices and the more favorable fiscal arrangements obtained by the government as a result of its improved bargaining position over the years. At the early stages of oil operations when the prospects of establishing a viable oil industry in Nigeria were rather uncertain, the government was in a weak bargaining position via the oil companies. Consequently, the terms negotiated at that time with the Shell-BP Petroleum Company of Nigeria were favorable to the Company, and included relatively low concession rents, a 12.5 per cent royalty rate, a 50:50 profit-sharing formula based on realized prices, and large capital allowances. The use of realized prices in the calculation of taxable profits meant that the country's oil revenues fell as oil prices fell throughout most of the 1960s. But as the

country's oil prospects improved and the government's bargaining power consequently increased, these terms were progressively revised to take account of the changed conditions. These changes resulted in a significant increase in government oil revenues, particularly in 1973 and 1974. As noted above, a large part of the increase in oil revenues was accounted for by the huge increase in crude oil prices during 1973-74.

How far oil prices will continue to be high in the future will depend on the balance between the demand for and the supply of energy-in particular, on the level of economy in energy consumption, and the speed of development of substitute fuels in consuming.

❖ Foreign Exchange Reserves

This is an important aspect of the oil industry's contribution to the Nigerian economy, which could not have come at a more opportune moment because the country is embarking upon a massive programme of industrialization and economic development which postulates huge imports of capital goods and specialized services involving massive expenditure of foreign exchange. In many underdeveloped countries, especially those that depend heavily on a narrow range of primary commodities, acute shortages of foreign exchange, often exacerbated by massive declines in world commodity prices, constitute a major obstacle to effective economic development. The oil industry in Nigeria now has substantial foreign exchange reserves and is in the healthy position of being able to finance the foreign exchange cost of her development programmes. The industry's contribution to foreign exchange is not measured by the gross value of crude oil exports because the practice followed by the oil companies is to retain the entire proceeds from exports abroad, and to remit to the producing country only the amount needed to sustain their local operations.

❖ Contribution to Energy Supply

Another contribution of the oil industry to the Nigerian economy is the provision of a cheap and/or readily available source of energy for industry and commerce, through the operations of the local refinery and the utilization of locally discovered natural gas. The Eleme refinery, near Port Harcourt, which came into operation in November 1965, had an initial capacity of 1.9 million tonnes per annum, and was designed to meet the country's main product requirements at that time, with the exception of bitumen, aviation gasoline, and lubricating oils. A liquefied petroleum gas plant, with a capacity

of 15,000 tonnes per annum, was added in 1966. The refinery was damaged during the civil war but has since been rebuilt and expanded to a capacity of about 2.75 million tonnes. It is planned further to expand the capacity of the refinery to 3.75 million tonnes per annum and to build two new refineries one at Warri in Bendel State (now Delta State) and the other at Kaduna in Kaduna State-during the current National Development Plan (1975 - 1980). The objective is to eliminate the scandalous shortage of petroleum products in a country that is currently swimming in oil.

The availability of huge reserves of natural gas provides a good opportunity for the supply of cheap energy to industry and commerce. Already, associated natural gas natural produced jointly with crude oil is being supplied by Shell-BP to the National Electric Power Authority for thermal electricity generation; to the Nigerian Petroleum Refining Company for use as fuel in petroleum refining at Elesha Eleme; and to a number of industrial undertakings around the centres of oil operations. Total consumption of natural gas in Nigeria, excluding the amount used as fuel at the oilfields by the producing companies has increased from 1,100 million cubic feet in 1963 to 6,916 million cubic feet in 1973. However, annual consumption is still a tiny proportion of total production and the latter, which at the moment comes wholly from oilfields, is much less than available productive capacity.

The above brief review shows that the oil industry is making a variety of very useful contributions to the Nigerian economy, especially in the provision of revenues and foreign exchange. But when we move from the immediately apparent to the long-lasting impact-from the largely monetary contribution to the real economic impact-a completely different picture emerges which show that, notwithstanding the massive increase in oil wealth, the industry has yet to make a significant impact on economic development in Nigeria. As a recent World Bank report on Nigeria commented, "At present, petroleum remains a typical enclave industry whose contribution to the [Nigerian] economy is limited largely to its contribution to government revenue and foreign exchange earnings".

Although, the industry's value added is helping to boost the country's gross domestic product, but the latter is not necessarily synonymous with increased economic development. The increase in the oil industry's value added is essentially a reflection of the significant increase in crude oil production since the end of the civil war and, more

especially, of the huge increase in oil prices since 1973 factors which are quite independent of the level of development of the local economy.

2.5 Challenges in the oil sector

The oil sector has been plagued by various problems which undermined its optimal development over the years. In general terms, the oil sector of the Nigerian economy in the 1990ies faced (and still faces some of) the following problems:

❖ Public control and bureaucracy

The Nigerian National Petroleum Corporation (NNPC) is controlled by the Ministry of petroleum Resources. It lacks autonomy, as a result of which decision taking is often bureaucratic and unnecessarily delayed. Therefore, the operation of the NNPC is characterized by inefficiency, especially in refinery operations, distribution and marketing.

❖ Poor funding of investments

Frequent delays in the payment of cash calls to the joint venture operators have tended to discourage increase in the level of investment by the oil companies. Insufficiency of funds has also constrained adequate equipment maintenance and efficient refinery operations by the NNPC. The Federal Government's delays in the payment of cash calls for its JV operations in the upstream sub-sector, focusing more on maintenance rather than growth.

❖ Communal Disturbances

There had been frequent communal disturbances which disrupts crude production as oil communities' clamour for higher stake in oil operations.

Smuggling and diversion of petroleum products

There are reported cases of massive smuggling of petroleum products across the borders in quest for foreign exchange and to take undue advantage of the lower domestic prices vis-a-vis neighboring countries prices.

❖ Fraudulent domestic marketing practices

Some marketers hoard products in periods of scarcity in order to sell in the black market at higher prices.

❖ Products adulteration

This is encouraged largely by price differential of some products and the proliferation of illegal sales outlets where some adulterations occur. Others are

- ❖ Relatively low level of investments in the sector, compared to its potentials.
- ❖ High technical cost of production, due to low level of domestic technological development.
- ❖ Restrictions imposed by crises and production disruptions caused by host communities.
- ❖ Environmental degradation due to the flaring of associated gas.

3 RESEARCH METHODOLOGY

3.1 Theoretical Framework

The growth theory has evolved over the years as a major feature of development economics. One of the earliest attempts to model economic growth is popularly referred to as the ‘Harrod-Domar’ Model associated with the English economist, Sir Roy Harrod and American Economist, Evsey Domar. The model is an early attempt to show that growth is directly related to savings and indirectly related to the capital/output ratio. According to the model, growth (G) can be written symbolically as:

$$G = \frac{s}{k}, \quad (3.1)$$

where k - incremental capital-output ratio and;
 s - the average propensity to save.

The model indicated that saving affect growth directly, while the incremental capital/output ratio affects growth indirectly or inversely.

But Solow’s model of economic growth is based on the premise that output in an economy is produced by a combination of labour (L) and capital (K), under constant returns, so that doubling input results in doubling output. Contemporary versions distinguish between physical and human capital. Thus, the quantity of output (Y) is also determined by the efficiency (A) with which capital and labour is used. Or mathematically:

$$Y = Af(L, K). \quad (3.2)$$

Solow assumed that this production function exhibits constant returns to scale, that is, if all inputs are increased by a certain multiple, output will increase by exactly the same multiple.

The Solow neoclassical growth model uses a standard aggregate production function in which

$$Y_t = A_t K_t^\alpha L_t^{1-\alpha}, \quad 0 < \alpha < 1. \quad (3.3)$$

In this case, Y is gross domestic product, K is stock of capital, L is labour and A represents the productivity of labour, assumed to grow at exogenous rates n and g.

$$L_t = L_0 e^{nt}, \quad (3.4)$$

$$A_t = A_0 e^{gt}. \quad (3.5)$$

The number of effective units of labor, $A_t L_t$ grows at rate $n+g$.

For developed countries, these rates have been estimated at about 2 % per year. For developing countries, it may be smaller or larger depending on whether they are stagnating or catching up with the developed countries. In the equation (3) above, α represents the elasticity of output with respect to capital (the percentage increases in GDP as a result of a 1 % increase in human and physical capital). It is usually measured statistically as the share of capital in a country's national income accounts.

The model assumes that a constant fraction of output, s , is invested. Defining k as the stock of capital per effective unit of labour, $k = K/AL$ and y as the level of output per effective unit of labour, $y = Y/AL$, the evolution of k is governed by:

$$\begin{aligned} K_t &= sy_t - (n + g + \delta) k_t \\ &= sk_t - (n + g + \delta) k_t. \end{aligned} \quad (3.6)$$

Where δ is the “rate of depreciation”, equation (6) above implies that k converges to a steady-state value k^* defined by $sk^* = (n + g + \delta) k^*$, or

$$k^* = [s/(n + g + \delta)]^{1/(1-\alpha)}. \quad (3.7)$$

The steady-state capital-labor ratio is related positively to the rate of saving and negatively to the rate of population growth. The central predictions of the Solow model concern the impact of saving and population growth on real income. Substituting (5) into the production function and taking logs, we find that steady-state income per capita is:

$$\ln \left[\frac{Y^t}{L^t} \right] = \ln A_0 + gt - \frac{\alpha}{1-\alpha} \ln(s) - \frac{\alpha}{1-\alpha} \ln(n + g + \delta). \quad (3.8)$$

Based on the fact that the model assumes that factors are paid their marginal products, it predicts the magnitudes alongside the signs of the coefficients on savings and population growth.

In the case of competitive markets being assumed, the growth rate of the economy can be seen as a weighted sum of growth rates of efficiency parameter gA (sometimes referred to as technical progress, of the labor force gL , and of the capital stock gK . The weights on labour and capital are the shares of payment to labour and capital in Gross Domestic Product (GDP).

$$gY = gA + algL + ak gK . \quad (3.9)$$

The Solow Growth model assumes that the marginal product of capital decreases with the amount of capital in the economy. In the long run, as the economy accumulates more and more capital, gK , approaches zero and the growth rate is determined by technical progress and growth in the labour force. However, in the short run, an economy that accumulates capital faster will enjoy a higher level of output. The above argument relates to the entire economy, but can also be extended to subsectors of the economy such as education.

According to the traditional neoclassical growth theory, output growth results from one or three (3) factors: increases in labour quality and quantity (through population growth and education), increases in capital (through saving and investment), and improvement in technology [Todaro & Smith 2004].

Following up from the neoclassical viewpoint which is based on a technological relationship between output and productive inputs as considered in the pioneering work of Robert Solow, its extensions finds an empirical variant in the Cobb-Douglas production function. Solow's method of the residual and his estimate were disapproved on many grounds; that the residual approach was not of much use in understanding the growth process because it is based on the concept of a stable production function; his approach was based on the unrealistic assumptions of perfect competition, constant returns to scale and complete homogeneity amongst other criticisms.

In the light of the shortcomings of Solow's growth model, the amplified version of the model was specified by Mankiw, Romer and Weil (1992). In this augmented version of the model, a Cobb-Douglas production function is assumed. This started off by adding human capital accumulation to the Solow model

According to Mankiw, Romer and Weil (1992), the aggregate output of the economy can be written as:

$$Y_t = A_t K_t^\alpha H_t^\beta L_t^{1-\alpha-\beta}. \quad (3.10)$$

Where A - index of technical change that varies overtime but for the moment held constant, K - the capital stock, L - labour supply and H is stock of human capital

Note that the coefficients α and β are assumed to lie between 0 and 1 and $(\alpha+\beta) < 1$, implying that there are decreasing returns to all capital.

Assuming s_k to be the fraction of income invested in physical capital and s_h the fraction invested in human capital, the evolution of the economy is determined by:

$$k_t = s_k y_t - (n + g + \delta) k_t, \quad (3.11a)$$

$$h_t = s_h y_t - (n + g + \delta) h_t. \quad (3.11b)$$

Where $y = Y/AL$, $k = K/AL$, and $h = H/AL$ are quantities per effective unit of labour. It is assumed that the same production function applies to human capital, physical capital, and consumption. In other words, one unit of consumption can be transformed at no cost into either one unit of physical capital or one unit of human capital.

Human capital (H) is the knowledge acquired by workers, often as the result of specific investment in education. Since human capital involves investment just as physical capital, it also depreciates.

In a case where $\alpha + \beta$ equals one, then there are no constant returns to scale in the reproducible factors and there will be no steady state for the model. It is implied in equations (11a) and (11b) that the economy converges to a steady state defined by:

$$k^* = \left(\frac{s_k^{1-\beta} s_h^\beta}{n+g+\delta} \right)^{\frac{1}{1-\alpha-\beta}}, \quad h^* = \left(\frac{s_k^\alpha s_h^{1-\alpha}}{n+g+\delta} \right)^{\frac{1}{1-\alpha-\beta}}. \quad (3.12)$$

Substituting (12) into the production function and taking the natural logs gives an equation similar to (8) above:

$$\ln \left[\frac{Y^t}{L^t} \right] = \ln A_0 + g t - \frac{\alpha + \beta}{1 - \alpha - \beta} \ln(n + g + \delta) + \frac{\alpha}{1 - \alpha - \beta} \ln(s_k) + \frac{\beta}{1 - \alpha - \beta} \ln(s_h). \quad (3.13)$$

This equation shows how per capita income (proxy for economic development – a superset of economic growth) depends on population growth and accumulation of physical and human capital.

In implementing the model above, focus was restricted to human capital investment in the form of crude oil, ignoring investment in health, among others.

3.2 Model Specification and Analysis

The econometric model to consider in this study takes crude oil price, external reserve, domestic consumption and crude oil export as the explanatory variable and gross domestic product as dependant variable respectively. These variables are used at constant prices. This is used to obtain a reliable parameter estimates in the time series regression.

Following from the theoretical propositions explored in the theoretical framework, for the successful examination of the relative impact of crude oil on the Nigerian economy, with regards to the work of Milbourne, Otto and Voss (2003), which is based on studies by Mankiw, Romer, Weil (1992), we specify our model in an attempt to determine the impact of crude oil production ultimately on economic growth in Nigeria.

The model to be used can be explicitly specified as follows:

$$RGDP = F(L, K, DC, E), \quad (3.14)$$

where $RGDP$ - represents the real gross domestic product,

L - represents labour,

K - represents the capital,

DC - represents domestic consumption of crude oil,

E - represents crude oil export.

Note that Real GDP is GDP at factor prices deflated by the consumer price index (at constant factor cost) Incorporating the variables into the Cobb-Douglas production function, we have:

$$RGDP = A L^{\beta_1} K^{\beta_2} DC^{\beta_3} E^{\beta_4}. \quad (3.15)$$

This can be specifically expressed in explicit econometric (linear equation) form as:

$$RGDP = \beta_0 + \beta_1 L + \beta_2 K + \beta_3 DC + \beta_4 E + U, \quad (3.16)$$

where U – stochastic or random error term (with usual properties of zero mean and non-serial correlation).

Adopting a log-linear specification, taking the natural logarithm of both sides of the equation and assuming linearity among the variables gives:

$$\text{Log RGDP} = \beta_0 + \beta_1 \text{Log } L + \beta_2 \text{Log } K + \beta_3 \text{Log } DC + \beta_4 \text{Log } E + U. \quad (3.17)$$

Note that $\text{Log } A = \beta_0$.

A priori **Specification**: the expected signs of the coefficients of the explanatory variables are: $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 > 0$.

3.2.1 Presentation of Data

The table used for the regression is presented in Table 3.1.

Table 3.1

Labour, Capital, Real Gross Domestic Product, Domestic Crude Oil Consumption and Crude Oil Export in Nigeria, 1970 – 2005

Year	L	K	RGDP	DC	E
1970	20.39	17126	250604	12,234.00	383,455.00
1971	20.85	22437	278556	16,144.00	542,545.00
1972	21.32	23221	295255	14,655.00	650,640.00
1973	21.82	22775	313390	23,752.00	695,627.00
1974	22.36	22708	351843	27,610.00	795,710.00
1975	22.96	37802	342208	32,510.00	627,638.00
1976	23.61	53153	378058	21,236.00	736,822.00
1977	24.31	63145	406800	50,815.00	715,240.00
1978	25.05	60609	381774	22,199.00	674,125.00
1979	25.78	48476	375855	37,778.00	807,685.00
1980	26.50	60428	388982	103,857.00	656,260.00
1981	27.17	75597	379972	56,196.00	496,095.00
1982	27.83	59068	373425	68,980.00	401,658.00
1983	28.48	32811	348686	58,930.00	392,031.00
1984	29.15	17790	343954	56,907.00	450,580.00
1985	29.87	18022	382940	60,508.00	486,580.00
1986	30.63	25582	390161	49,345.00	486,584.00
1987	31.42	24601	387456	92,755.00	390,514.00
1988	32.26	22929	416837	93,805.00	435,797.00
1989	33.11	22392	446625	103,427.00	522,481.00
1990	33.98	37411	497351	112,310.00	548,249.00
1991	35.03	38289	497410	104,012.00	585,838.00
1992	36.10	39764	510493	107,040.00	604,300.00
1993	37.20	45715	518441	127,786.00	563,614.00
1994	38.32	35437	522510	118,146.00	578,044.00

Year	L	K	RGDP	DC	E
1995	39.46	30903	533736	98,500.00	616,900.00
1996	40.63	33872	555791	91,500.00	648,690.00
1997	41.83	48570	571854	86,370.00	673,340.00
1998	43.04	39380	587954	88,620.00	687,390.00
1999	44.26	41613	594975	112,410.00	666,490.00
2000	45.49	43797	624072	109,800.00	688,080.00
2001	46.84	34470	653512	142,220.00	674,930.00
2002	48.19	42793	683786	164,250.00	490,810.00
2003	49.56	69841	749202	164,250.00	490,810.00
2004	50.94	105239	798496	164,200.00	736,400.00
2005		134164	848219	73,105.90	846,179.70

Source: Central Bank of Nigeria (CBN) Statistical Bulletin

3.3 Discussion of Results

Table 3.2

OLS Result without Correction for Autocorrelation

Dependent Variable: LOG(RGDP)

Method: Least Squares

Date: 02/26/08 Time: 01:21

Sample(adjusted): 1970 2004

Included observations: 35 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(L)	0.870587	0.058918	14.77623	0.0000
LOG(K)	0.089294	0.018969	4.707451	0.0001
LOG(E)	0.218781	0.038653	5.660076	0.0000
LOG(DC)	0.024371	0.022788	1.069501	0.2934
C	5.878378	0.494224	11.89416	0.0000
R-squared	0.981003	Mean dependent var	13.00090	
Adjusted R-squared	0.978470	S.D. dependent var	0.285593	
S.E. of regression	0.041905	Akaike info	-3.375238	
		criterion		
Sum squared resid	0.052682	Schwarz criterion	-3.153045	
Log likelihood	64.06666	F-statistic	387.2958	
Durbin-Watson stat	0.805521	Prob(F-statistic)	0.000000	

$$\text{Log RGDP} = \beta_0 + \beta_1 \text{Log L} + \beta_2 \text{Log K} + \beta_3 \text{Log E} + \beta_4 \text{Log DC} + U$$

$$\text{Log RGDP} = 5.878 + 0.871 \text{Log L} + 0.089 \text{Log K} + 0.219 \text{Log E} + 0.024 \text{Log DC}$$

$$\text{S.E} = (0.4942) \quad (0.0589) \quad (0.019) \quad (0.0387) \quad (0.0228)$$

$$\text{T-Stat} = (11.894) \quad (14.776) \quad (4.7075) \quad (5.66) \quad (1.0695)$$

$$\text{R-Squared} (R_2) = 0.9810 \quad \text{Mean of Dependent Variable} = 13.0009$$

Adjusted R-Squared (\bar{R}_2) = 0.9785 S. E. of Dependent Variable = 0.2856

S. E. of Regression = 0.0419

F-Statistic ($F_{4,30}$) = 387.2958

DW-Statistic = 0.8055

OLS After Cochrane Orcutt Iterative Estimation

Log RGDP = 6.3923 + 0.8561Log L + 0.0872Log K + 0.1757Log E +
0.0361Log DC

S.E = (0.7402) (0.077) (0.0276) (0.0451) (0.0197)

T-Stat = (8.636) (11.118) (3.156) (3.8922) (1.835)

R-Squared (R_2) = 0.9810 Mean of Dependent Variable = 13.0176

Adjusted R-Squared (\bar{R}_2) = 0.9785 S. E. of Dependent Variable = 0.2719

S. E. of Regression = 0.0338

F-Statistic ($F_{4,30}$) = 421.5828

DW-Statistic = 1.76

Table 3.3

OLS After Cochrane Orcutt Iterative Estimation

OLS REGRESSIONAFTER CORRECTING FOR
AUTOCORRELATION

Dependent Variable: LOG(RGDP)

Method: Least Squares

Date: 02/26/08 Time: 01:21

Sample(adjusted): 1971 2004

Included observations: 34 after adjusting endpoints

Convergence achieved after 26 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(L)	0.856106	0.077001	11.11813	0.0000
LOG(K)	0.087191	0.027626	3.156162	0.0038
LOG(E)	0.175697	0.045060	3.899188	0.0006
LOG(DC)	0.036111	0.019679	1.835021	0.0771
C	6.392283	0.740186	8.636044	0.0000
AR(1)	0.664038	0.192767	3.444779	0.0018
R-squared	0.986891	Mean dependent var	13.01765	
Adjusted R-squared	0.984550	S.D. dependent var	0.271893	
S.E. of regression	0.033796	Akaike info criterion	-3.778175	
Sum squared resid	0.031980	Schwarz criterion	-3.508817	
Log likelihood	70.22898	F-statistic	421.5828	
Durbin-Watson stat	1.769349	Prob(F-statistic)	0.000000	
Inverted AR Roots	.66			

It is important to note that the first regression as shown in Table 3.2 is not reported because it has the problem of autocorrelation. Thus, a close inspection of the Table 3.3 indicates that the specified model has a high coefficient of determination. This can be seen from R-squared of 98 percent and the adjusted R-squared of about 98 percent. The R-squared shows the percentage of variation in the dependent variable that was accounted for by variations in the explanatory variables. The fitness of every regression result is based on its R-squared.

The F-statistic value (421.528) shows that the overall model is statistically significant at 1 % and 5 % levels of significance. This is because it is greater than the critical values of 2.57 and 3.79 at 1 % and 5 % respectively. This means that all the explanatory variables simultaneously explain the variations in the real demand for money. Also, all our variables are statistically significant at 95 % confidence interval with the exception of DC.

The result derived from the Cochrane-Orcutt Iterative estimation shows that all the parameters conform to the a priori specification; hence an increase in any of the variables will lead to an increase in RGDP.

The comparison of the standard error of the dependent variable (RGDP) with the mean of the dependent variable shows that the explanatory variables have impact on RGDP as the mean of the dependent variable is greater than the standard error by “13.0176”. As a result of the standard error being small relative to the mean value of the dependent variable, the model is preferred.

Furthermore, the DW statistic which is a measure of auto correlation shows that the error correction model is free from the problem of serial correlation at 1 % level of significance due to its value (1.76). As a result of this, our model estimated can be confidently relied upon for making inferences.

Individual Tests of Significance (Student T-Test)

Decision Rule: if $T_{Cal} > T_{Tab}$ - reject H_0 and accept H_1

$T_{Cal} < T_{Tab}$ - accept H_0 and reject H_1

Critical Values: $T_{0.01} = 2.807$, $T_{0.05} = 2.069$ and $T_{0.1} = 1.714$

The T-Statistic for all the variables (or estimates) appear to be relatively low compared to the critical values at 1 %, 5 % and 10 %, hence we accept H_0 and conclude that the variables; Labour (L), Capital (K), Domestic consumption and Export are not individually statistically significant on the dependent variable (RGDP) at the afore-stated levels of significance

In a bid to carry out the necessary empirical analysis, the following hypothesis were formulated and tested.

Hypothesis 1

H_0 : Crude oil has not significantly improved the growth of the Nigerian economy.

H_1 : Crude oil has significantly improved the growth of the Nigerian economy.

Considering the proxies for crude oil production; domestic consumption (DC) and export (E), the result shows that the variables have the expected signs but did not pass the test of significance at 1% and 5% levels of significance. The result shows that a percentage increase in crude oil production increases economic growth by over 0.01 and 0.04 percent for E and DC respectively. However, the values appear to be of no significance. We therefore accept the null hypothesis (RH_0) and reject the alternative hypothesis (H_1).

Hypothesis 2

H_0 : There is no statistically significant relationship between crude oil production and economic growth in Nigeria

H_1 : There is a statistically significant relationship between crude oil production and economic growth in Nigeria

Following from the results of the individual tests of significance, it is observed that T-Statistic of the coefficient of variables DC and E, which are proxies for crude oil production, are lower than their relative critical values at 1%, 5% and 10% levels of significance. Hence, we accept the null hypothesis (RH_0) and reject the alternative hypothesis (RH_1).

4.0 RECOMMENDATIONS AND CONCLUSIONS

4.1 Introduction

The study explored the association between crude oil production and economic performance in Nigeria. Our results have shown that capital, labour force and oil production can surely lead to economic growth. However, whether or not the various impacts in the crude oil sector as regards production (domestic consumption and export) have actually led to a positive improvement in the economy, the government must participate by investing and making policies that will encourage the private sector to participate actively in the economy.

Reviews were conducted extensively on various literatures and existing works regarding oil production and export on economic growth. Consequently, a Cobb-Douglas production function model was specified following from Solow's growth model regarding human capital with labour force, domestic consumption and export on crude oil production as the independent variables, while Real Gross Domestic Product was used to proxy economic growth as the dependent variable, with data on each variables ranging from 1970 to 2005. The Variables were estimated using the Ordinary Least Squares (OLS) estimation method to derive the relative regression coefficients.

4.1 Recommendations

Based on the findings of this research work, it is inevitable to provide a set of policy recommendation that would be applicable to the Nigeria economy:

- the Nigerian National petroleum corporation (NNPC) should diversify its export baskets through downstream production, this will enhance the refined petroleum for exports;
- the government should encourage more private company participation. So that better equipped refineries can be built and the cost of refining crude oil will reduce;
- security should be boosted on the high sea where crude oil products are being smuggled. This will help reduce the loss from illegal export of crude oil products;

- government should give immediate attention to the indigenes of the region where crude oil is being extracted from. This will reduce the unrest in that region;
- government should establish an institution that will ensure that the multinational oil companies are socially responsible to their host community;
- government should fight corruption by establishing institutions that will arrested and prosecute corrupt public office holders.

There is the urgent need for Nigeria to diversify there export market especially the oil market , high priority should be given to Afrrica; instead of concentrating on European countries and the United states .

4.3 Conclusions

In this research work, we have empirically verified and discussed the impact of crude oil on economic growth. The aim of the study was to ascertain the impact of crude oil on the Nigerian economy. Generally, it is observed that crude oil production (domestic consumption and export) has had a positive impact on the economic growth in Nigeria.

Consequently, based on the results obtained and interpreted in chapter four above, the null hypothesis (H_0) which states that “crude oil has not significantly improve the growth of the Nigerian economy” will be accepted. Thus, from the foregoing, we can conclude that ‘the production of crude oil (domestic consumption and export) despite its positive effect on the growth of the Nigerian economy has not significantly improved the growth of the economy, due to many factors like misappropriation of public funds (corruption) and poor administration.

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