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OIL AND GAS AND THE NIGERIAN ECONOMY: A SYNTHESIS OF ISSUES AND EMPIRICAL EXTENSION

PATRICK L. AKPAN., Ph.D
FACULTY OF MANAGEMENT SCIENCES
UNIVERSITY OF UYO

ABSTRACT

This paper examines oil and gas in Nigerian economy with reflections on synthesis of empirical issues in the Nigerian economy. The state of oil sector and the performance of the economy with particular reference to stylized facts oil sub-sector are articulated. Empirical modeling and oil production equation which forms the tenet of the paper confirm that oil and gas subsector of Nigeria are paramount for survival of the nation. The empirical equation and the variable associated with petroleum prices in Petroleum sub sector confirm that the sector is a blessing for national growth of Nigeria.

1. INTRODUCTION

The Nigerian Petroleum sector has been significantly accepted as the prime mover and leading section of the economy. The genesis of this is traced back to the 1970s in recognition of the dramatic increase in oil prices as well as the increase in the country's proven oil reserves and production. This sector has functional linkage with the workings of macroeconomic management generally. As popularized by the Lexicorn Universal Encyclopaedia, volume 15, 1989: 207, Petroleum is a composite of two Latin- words "petra" and "oleunm" literally translated in English as *rock oil'". Thus, petroleum therefore is conceptualized as a "naturally occurring substance, usually found beneath the surface of the earth, that comprises the essentials of carbon and hydrogen. Petroleum is a viscous. flammable liquid that varies significantly in its properties depending on the sources. There are various forms in which petroleum exists. The most well-known include: crude oil or unrefined liquid petroleum, natural gas; asphalt - a solid or semi-solid bituminous substance obtained in a residue from some petroleum and gilsonit, a solid asphalt - 1ike compound. In international economic relations, the ranking of these Petroleum product in descending order of their significance reveals that crude oil is the most important form of petroleum, with natural gas ranking next. On the basis of proportionate distribution, about 45 per cent of oil crude is refined into petrol, about 7 per cent into diesel, Tuel, and about 7 per cent into jet fuel. Fuel for heating and energy production account for about 26 per cent of all refined petroleum while about 13 per cent of petroleum fragments are meant for raw materials in manufacturing.

Oil is adjudged to be very flexible and versatile, non-reproductive and depleting natural resource. Fundamentally, it is a major input into modern economic activity contributing about 50 per cent of the total energy demand globally. Oil exporting countries of the developing world for which Nigeria is one, depend solely on revenue derivable from oil for foreign exchange earnings. Nigeria as an oil-based economy has become heavily dependent on her oil revenue to the tune of about 95 per cent to the total neglect of non- oil sectors one of which is agriculture. This was the mainstay of the Nigerian economy before Nigeria was declared a major oil producer in 1973. Prior to this, Nigeria joined Organization of Petroleum Exporting Countries (OPEC) in 1971. This was as a result of realizing that Nigerian state could not function in isolation of other oil producing nations of the world. As far back as 1967, Nigeria was endorsing OPEC terms in posted prices though she was not yet a member of OPEC as at then. The refore Nigerian membership of OPEC places her at an advantageous position in line with other exporting nations. On joining OPEC, Nigeria has been one of OPEC's outspoken member. Agricultural produets such as palm produce, groundnut and cocoa were found in many regions of the country as follows: Northern Nigeria:

Groundnut production, Eastern Nigeria was known for palm produce production and cocoa production became the products of western Nigeria. These products contributed about 70 to 80 per cent of Nigeria's earnings from foreign exchange. The emergence of oil facilitated the relegation of export crops and domestic agricultural products. This has been so in view of the fact that the oil business has been more lucrative than non-oil products. The lucrative nature of oil makes petroleum a leading sector in Nigeria Characterized by high incidence of increase in total productivity thereby creating a high supply of foreign exchange. This has impacted on the macroeconomic performance of Nigeria through job and wealth creation and export earnings. This paper in its five sections examines the state of oil sector in section two after this introductory segment which serves as section one.

Section three focuses on Economic Performance of Nigerian economy with particular reference to stylized facts of oil sub-sector while section four is centred on Gas Production, utilization and principal mineral production. Empirical modeling and oil production equation form the tenet of section five. The paper terminates with policy recommendations and brief concluding remarks.

2. STATE OF OIL SECTOR: PATTERN AND TRENDS

A vivid classification of the Nigerian oil section reveals three basic sub-sectors encompassing upstream, downstream and gas. Over the years, the most challenging sub sector has been the downstream. This has been the distribution arm and is directly linked to the final consumers of the refined petroleum products most especially in the domestic economy. Rampant crisis in this sector compelled the government to deregulate the downstream sector in year 2003. The implementation strategies have been characterized by much controversy as it neglects the Nigerian economic realities. It is obvious that deregulation of the downstream sub sector of the Nigeria petroleum industry have ignited labour strikes resulting in losses of man hour and growth opportunities, loss of capacity utilization, manufacturing and work stoppages. These are better explained empirically by the table below:

TABLE 1: LABOUR STRIKES AND IMPACT ON OIL PRODUCTION IN NIGERIA (1990-2010)

YEAR	INDP	CONFL	CAPU	MANU	WSTP	MNHRSLST
1990	6.3	174	40.30	1144766228.2	102.0	1339105
1991	6.3	204	38.1	113510163.5	117.0	2257382
1992	6.9	221	38.1	130825085.1	124.0	966611
1993	11.3	160	35.0	99093436.11	90.0	6192167
1994	-1.9	199	30.4	110611969.3	110.0	234307748
1995	-0.4	46	29.1	185769850	26	2269037
1996	2.8	29	32.5	8984894.0	24	94664
1997	0.8	31	37.2	137081164.0	31	359801
1998	0.4	16	32.4	127081164.0	11	47631
1999	-3.6	52	35.9	137081164.0	27	3158087
2000	7.5	49	36.1	42848070.7.0	47	6287733
2001	4.6	51	39.6	46079148.4	37	4722910
2002	0	50	44.4	46079148.4	42	5505322
2003	1	149	42.8	598100257.0	669	4518321
2004	1.87	152	43.87	717720308.4	308	3302112
2005	0.96	155	43.69	93303400.0	489	2085903
2006	1.28	46	43.45	1492858241	112	2446085
2007	1.37	117.67	43.67	1047871650.1	303	2611366.7
2008	1.20	106.22	43.60	1157922097.3	301.3	2381118.2
2009	1.29	89.96	43.57	1232883996.1	238.78	2479523.3
2010	1.28	104.6	43.61	1146225914.5	281.03	2490669.4

Source: CBN Statistical Bulletin (Various Issues)
CBN Major Economic Financial & Banking Indicators (Various Issues)
World Bank Development Report (Various Issues)

KEY: INDP - Industrial Production
CONFL - Conflict /Crisis
MANU - Manufacturing
WSTP - Work Stoppages as a result of strikes/crisis
CAPU - Manhours lost as a result of crisis
- Capitality utilization

The above table shows the impact of crisis/labour strikes on the productivity of the petroleum sub sector as well as the man hours lost. It reveals the statistics of work stoppages, crisis, manhours losts and rates of capacity utilization for the period 1990 1o 2010. The pattern and trend of conflict associated with pipeline vandalisation and related crisis had risen from 174 in 1990 to 199 in 1994. There was a drastic reduction from 46 to 16 in 1995 and 1998 respectively and latter in creased to 104.6 in year 2010. These reactions subsequently influenced the work stoppages and manhours lost in the production process of petroleum products in the country Thus the rationale for deregulation is simply to remove challenges in produce distribution thereby. facilitating efficient and effective utilization of resources.

Appropriate pricing of petroleum product in Nigeria is identified as one of the challenges cob-webbing the downstream sub-sector. At the heart of these bottlenecks has been the issue of whether prices should reflect their fuel cost and or contain subsidies most especially in relation to sharp practices, obvious abuses and black market syndrome associated with product sourcing and distribution. Therefore "market based Approach" in which case prices are determined by the forces of demand and supply then become one of the methods of pricing petroleum product aimed at price stability, balance of payments viability, reduction of unemployment and achievement of economic growth in the country. These synchronizes with the triology and goals of macroeconomic management.

Another way of pricing petroleum product is the exhaustive resource theory which recognizes oil and Gas and other exhaustive resources as being ephemerally available and on this score, its prices are regarded as being consumer cost and depletion charge capable of compensating future generation in view of denial of access to the product. Capital Replacement. Approach is another method and is premised on the principle of cost recovery embracing production and refining. On the whole. Nigeria focuses attention on the application of market based strategy of pricing which is associated with exXport parity.

TABLE 2: STYLISED FACTS ON THE PATTERN AND TRENDS OF CRUDE OIL EXPORT, PRODUCTION, GDP, GROWTH RATE, TOTAL REVENUE FROM OIL AND CONTRIBUTION TO NIGERIAN ECONOMY (1970-2011)

(1) YEAR	(2) COE	(3) COP	(4) DOMC	(5) AGDP	(6) GRD		(8) NORE	(7) MILLIONS	(9) TREN	(10) IEC	(11) LOP (BL)
					(6B) CPNGGAOR						
1970	383455.0	395689	12234	58.2	NA	NA	-	166.6	-	22.9	
1975	627638.0	660148	32510	73.7	NA	NA	-	4271.5	-	33.3	
1980	656260.0	760117	103857	73.1	NA	NA	2880.2	12353.3	15233.5	83.3	83.3
1981	469095.0	525291	56196.0	205222.1	73019.7	150.5	4726.1	8564.4	13290.5	148.7	148.7
1982	401658.0	470638	68980	199685.3	65327.8	158.4	3618.8	7814.9	11433.7	151.6	151.6
1983	392031.0	450961	58930	185598.1	59458.0	114.6	3255.7	7253.0	10508.7	114.6	114.6
1984	450580.0	507487	56907	183563.0	66884.3	112.9	2984.1	8269.2	11253.3	99.1	99.1
1985	456580	547088	60508	201036.3	72152.0	160.8	4126.7	10923.7	15050.4	100.0	100.0
1986	486584	535929	49345	205971.4	70791.0	80.9	4488.5	8107.3	12595.8	103.2	103.2
1987	390514	483269	92755	204806.5	69014.8	119.0	6353.6	19027.0	25380.6	97.8	97.2
1988	435797	529602	93805	219875.6	70837.7	136.0	7765.0	19831.7	27596.7	92.0	92.0
1989	522481	625908	103427	236729.6	79321.9	177.0	14739.0	391304	53870.4	88.1	81.1
1990	548249	660559	112310	267550.0	100223.4	174.9	26215.3	71887.1	98102.4	96.9	96.9
1991	585838	689550	104012	265379.1	91313.9	186.5	18325.2	82666.4	100991.6	88.7	88.7
1992	604300	711340	107040	271368.5	93614.3	182.8	26375.1	164078.1	190433.2	88.7	123.2
1993	563614	691400	127786	274833.2	98810.1	181.0	30667.0	162102.4	192769.4	123.2	107.6
1994	578044	696400	118146	275450.6	91387.4	178.3	41718.4	160192.4	201910.8	104.1	104.0
1995	616900	715400	98500	281407.4	93536.7	189.6	135439.7	324547.6	459987.3	73.8	73.8
1996	648690	140190	91500	293745.4	100239	211.3	114814.0	408783.0	523597.0	72.0	96.9
1997	673340	759710	86370	302012.0	101717	207.9	174339.9	416811.1	591151.0	76.3	89.5
1998	687390	776010	88620	310890.0	103923	186.6	139297.8	324311.2	463608.0	94.7	89.5
1999	666490	778900	112410	312183.5	96129.2	195.2	224765.4	724422.5	949187.9	86.4	98.2
2000	688080	1786080.0	1098000	329178.7	106827.5	193.3	314483.9	1591675.8	1906159.7	104.0	102.4
2001	674930	817150.0	142220	344285.8	112417.4	562.7	523970.1	1707562.8	2231532.9	162.4	106.4
2002	521973	68577.0	163800	356305.8	106002.1	518.4	1105133.3	1230851.1	1731837.5	165.9	118.0
2003	490210	655060	164250	392767.0	131336.6	567.6	500815.3	2074280.6	2575095.9	161.1	121.0
2004	524990	682084	166500	398268.2	142362	582.2	364639	2490382.4	2865021.8	172.2	124.0
2005	531280	894655	178240	402368.0	150250	598.4	163774	2862674.6	3026448.6	173.8	130.2
2006	536493	902773	196482	480422.0	152841.5	604.6	234293.0	2894386.4	3128679.4	179.2	132.8
2007	590810	920840	198840	482566	158660	628.6	404664	3205218.2	3609882.6	181.0	138.2
2008	651450	940720	201720	488902	160240	642.4	561658.0	3246184.4	3807842.4	184.4	138.8
2009	664160	960812	220640	502422	164842	668.5	502080	3384648.6	3886728.2	186.6	136.2
2010	764680	968922	222956	510300	172820	681.2	499525.6	3528994.2	4026519.8	198.2	142.0
2011	785490	980291	250480	514624	82360	698.6	398918.0	3649826.4	41487444	198.8	144.0

Source: Central Bank of Nigeria (CBN) Statistical Bulletin (Various Issues).

KEY

1. Year
2. COE = Crude Oil Export
3. COP = Crude oil Production
4. DOMC = Domestic Consumption of Crude Oil Production
5. AFGP = Annual Gross Domestic Product (GDP) at 1990 constant Basic Prices.
6. GRD = Growth rate of Domestic Production of Crude Oil

6A CPNG = Crude Petroleum and Natural Gas
6B OR = Oil Refining
7. NRO = Nigeria Revenue /rom Oil
8. NORE = Non Oil Revenue
9. TREN = Total Revenue
10. IEC = Index of Energy Consumption (Tonnes of Coal Equipment)
11. IOP (BL)= International Oil Price, Bonny light US $ per barrel

A cursory examination of the pattern and trends (stylized facts) of lable 2 reveal the state of Crude Oil Production, Export, Domestic Consumption, Annual GDP Growth Rate of Domestic Production, Oil Revenue, non-Oil Revenue and the total Revenue vis-a-vis International oil price of Bonny light US dollar per barrel for the period. 1970 to 2011, a duration of about forty one (41) years.

The overall contribution of oil and. Gas sub-sector to the National Economy of Nigeria has been very significant: For the year 1980 to date crude oil has contributed about 90 per cent of the revenue earnings of Nigeria. It becomes a major export commodity for the country over the years and a source of industrial manufacturing. A major feature of the Stylized facts is the astronomical increase in the volume of crude oil production, export, revenue from oil when compared with non-oil revenue, oil refining as well as crude petroleum and Natural gas. Also having a similar feature is the Growth rate of domestic production and the contribution to economic growth (GDP) in the country.

3. ECONOMIC PERFORMANCE OF THE NIGERIAN ECONOMY:

REFLECTIONS ON OIL SUB-SECTOR

The bulk of foreign exchange inflows to. Nigeria that greatly fuels the Economy today comes from crude oil sales. Thus the Nigerian cconomy has experienced various phases of decline, depression and recession, recovery and boom vis-à-vis business cycle. To appreciate the peculiar economic concept here calls for vivid reflection with understanding of the macroeconomic environment of the Nigerian economy as it relates to the oil and gas sub-sector. Each boom surfaced and disappeared since Nigeria could not maximize the gains derivable from. the Economic boom. The oil boom of 1970s succeeded in transforming in then forming Nigerian Economy from a single dependent state on several agro based commodities to a one product economy. Put simply, Nigerian economy depend on crude oil export. Proceeds from oil could not be used in developing non-oil sectors nor could it be applied for creating a vibrant and sound industrial base.

These led to negative oil stock in 1981 with Nigeria experiencing deteriorating economic conditions. Inflation was not just double-digit but runaway coupled with declining productivity. The trends in interest rate, inlation and volatility of exchange rate reflect the monetization of oil revenues thereby causing increase in money supply. Unemployment persisted and still continue to pose severe threat to the Nigerian economy, and Economic growth has been abysmally low. External deficit in the balance of payments assumed crisis proportions. In view of these state of Economic strangulation, some measures became imminent aimed at reversing the trend. The adverse international economic environment equally impacted on the domestic financial policies. The measures could not provide the desired result of reversing the declining trend in the macroeconomy.

Government introduced Structural Adjustment Programme (SAP) in 1986 with the aim of correcting the distortions and put it on the exit path towards recovery. Some of the elements of SAP continued to torment the economy whose managers and policy makers had to change the gear towards "guided deregulation" strategy.

Other mechanics introduced towards economic recovery were National Economic Empowerment and Development Strategy (NEEDS), NEEDS with the States and Local Governments version as SEEDS and LEEDS respectively. This is viewed as a reform process of correcting the structural rigidities. It is followed by vision 2020, vision 20:2020 etc. Despite the torment of SAP, the Nigerian Economy gave signals of growth though stagnation was noticed in the economy at the outset of the programme. After moving at a sluggish rate of 2.2 per cent, in 1986.

Thereby declining at by 0.4 per cent in 1987, the Gross Domestic Product (GDP) at 1984 factor cost increased by 7.0 per cent in the year 1988. The annual average growth rate recorded here was 6.1 per cent for the period 1989 to 1992. This contrasted the growth rate of the three years prior to the introduction of SAP.

Specifically, the mining output dominated by the petroleum production moved at an average rate of 14.8 per cent in the period, 1984 to 1985. This was associated with a decline in 1986 and 1987 to 1.7 per cent. The decline in crude petroleum production occasioned by and resulting from control of production and allocation of quota among OPEC members was responsible for this. The growth of the petroleum sub- Sector was significantly as a result of improved output performance. Crude petroleum production had been growing at an average rate of 7.7 per cent during 1983 to 1985 period and the volume of petroleum production was 547.089 million barrels same period. Oil glut in Organization for Petroleum Exporting Countries (OPEC) made her to reduce overall production as was the quotas allocated to member countries aimed at controlling the supply thereby strengthening prices. The Nigerian crude petroleum production stepped up by 9.8 per cent in a year and oil output increased to806.769 million barrels in 1992, a development above 529.602 million barrels of 1988.

In the international market, the prices of crude oil was characterized by instability and or volatility in 1986 in concert with oil glut. The glut persisted vigorously in the international oil market in 1988. This weakened the oil prices that year, implying that the price of Nigerian crude that had averaged $16.99 per barrel' reduced to S14.78 by December of same year. Mixed reactions ushered in with respect of developments in crude oil prices. The year 1991 witnessed average of $18 per barrel by the end of that year. The oil price continued to be weakened up to 1992 and beyond. Aggregate crude production averaged 2.23 million barrels per day representing 813.95 million barrels in 2006, a remarkable increase from 2005 figure of 2.53 and or 923.45 million barrels. North America was a major importer of Nigerian crude to the lune of 51.9 per cent while other importers include South America (7.8 per cent), the European Union (16.5 per cent), Asia and the Far East (17.1 per cent) and Africa (6.7 per cent). When compared with $55.43 in year 2005 representing about 19.9 per cent increase, the Nigerian average spot price of crude, that is, the Bonny light (37 API) remained at $66.46 per barrel in the year 2006 and beyond. In the same vein 57757.3 million cubic metre (MMm3) of natural Gas was produced in 2006 as against 57369.4 MMm3 in 2005. This signals a marginal increase of 0.7 per cent. Some progress has been recorded in respect of implementation of the liquefied National Gas project.

Generally the oil and Gas sub sector has contributed significantly to improved GDP of Nigeria. Admittedly Nigeria's membership in OPEC since 1971 has impacted positively on the macroeconomic performance of the country with the bulk of Nigeria's foreign exchange inflows that Comes from the oil and Gas sector. Crude oil contributes about 90 per cent or total export in Nigeria and is the main export product of Nigerian economy. The Global economic meltdown was associated with volatility in the price of oil and earnings there from to the Nigerian economy. This has severe impact on all sectors of the Nigerian economy and beyond. As at August 2011. oil price fell thereby extending the previous sessions plunge on renewed fears of weak demand. This is as a result of a slew of dull data from the United States which is the world's top oil consumer. Brent slipped to as low as S106.05. This is after breaking below 200-day moving average culminating at S106.99. As at May 2010 there was a 15 per cent drop. The U.S. crude slipped to as low as $80.66 a barrel. It traded $1.31 a barrel lower at $81.07. This contract has slipped about 6 per cent and adjusted to $82.38. This has been the worst since December 2008 and has lost about 15 per cent as at August 2011. This short term downturn is not yet over. The situation is not completely bad but what could turn the situation round is if OPEC decides to tighten supply at a price which is yet to be favourable. Admittedly, the situation has given significant signals of improvement with price of Nigerian crude increasing to S75.0 per barrel per day as at September 2011 with the $2.8 million barrels per day as an assumption for year 2012 as popularized by the finance minister (Ngozi Okonjo Iweala, 2011).

TABLE 3: GAS PRODUCTION, UTILIZATION AND PRINCIPAL MINERAL PRODUCTION (1970-2010)

	INDEX OF PRINCIPAL MINERAL PRODUCTION (Base year: 1985=100)							GAS PRODUCTION AND UTILISTION IN NIGERIA (Million Cubic Metres)		
Year	Petroleum	Gas	Cassiterite	Columbite	Coal	Limestone	All Minerals	Production	Utilization	Flared
1970	71.2	37.5	972.7	1608.1	43.7	38.2	72.2	8029.0	72.0	7957.0
1971	104.0	62.8	899.2	1373.0	138.0	44.6	104.9	12975.0	185.0	12790.0
1972	121.7	92.2	826.4	1351.4	243.9	77.6	122.5	17122.0	274.0	16848.0
1973	137.2	113.2	716.5	1236.5	233.9	99.5	138.0	21882.0	395.0	21487.0
1974	150.6	136.5	669.4	1304.1	217.6	99.9	151.2	27170.0	394.0	26776.0
1975	119.3	152.3	543.8	985.1	177.8	91.2	119.5	18656.0	323.0	1833.0
1976	138.6	223.6	454.5	668.9	186.1	85.8	139.0	21276.0	659.0	20617.0
1977	140.0	200.3	400.8	856.8	189.3	68.7	140.4	21924.0	972.0	20925.0
1978	126.6	347.8	361.2	563.5	156.6	65.4	127.0	21306.0	1866.0	19440.0
1979	154.0	453.5	347.1	563.5	128.8	117.4	154.4	27619.0	1846.0	26073.0
1980	137.6	541.4	322.3	548.6	131.7	143.2	138.1	24551.0	1647.0	22904.0
1981	96.1	382.2	286.0	374.3	86.6	85.8	96.4	17113.0	2951.0	14162.0
1982	86.0	83.6	220.7	167.6	40.7	83.3	86.2	15382.0	3442.0	11940.0
1983	82.5	81.8	190.9	78.4	38.3	85.0	82.6	15192.0	3244.0	11948.0
1984	92.9	84.5	162.0	118.9	52.4	104.3	93.0	16255.0	3439.0	12817.0
1985	100.0	100.0	100.0	100.0	100.7	100.0	100.0	18569.0	3723.0	14846.0
1986	97.9	63.3	9.1	13.5	103.2	102.0	97.8	18739.0	4822.0	13917.0
1987	88.4	57.7	91.0	47.3	82.0	142.3	88.5	17085.0	4794.0	12291.0
1988	92.9	108.8	14.6	156.9	56.1	50.1	92.2	20253.0	5516.0	14737.0
1989	109.9	132.4	23.5	13.3	65.8	40.5	109.5	25053.0	6323.0	18730.0
1990	115.9	145.8	19.9	69.4	102.7	51.2	115.1	28163.0	6343.0	21820.0
1991	121.0	176.6	16.2	55.9	61.0	57.1	120.1	31588.0	7000.0	24588.0
1992	124.3	170.2	6.8	59.7	70.0	8.3	189.0	32464.0	7058.0	25406.0
1993	125.6	172.0	10.7	25.8	38.5	1.7	124.9	33444.6	7536.2	25908.4
1994	122.3	171.1	12.7	25.8	16.1	1.8	121.1	32793.0	6577.0	26216.0
1995	125.4	172.0	12.4	56.2	13.8	2.0	124.3	32980.0	6577.2	26070.0
1996	130.1	196.2	8.6	31.2	14.2	10.0	128.8	36970.0	6910.0	26820.0
1997	128.4	782.0	182.2	697.2	1.0	5.5.18	141.8	36754.8	10150.0	26547.8
1998	134.7	766.7	191.3	73.2	1.2	6.4	134.1	36036.6	10207.0	25150.1
1999	135.1	767.8	211.9	95.1	1.9	6.2	125.5	35856.4	10886.5	23191.8
2000	140.6	71.8	231.6	93.4	12.0	7.2	144.4	47537.0	12664.6	25592.8
2001	141.8	722.0	231.5	97.1	12.3	7.2	147.5	57530.0	21945.0	27890.3
2002	133.0	238.9	124.9	98.1	12.3	4.2	133.7	101976.0	29639.7	75772.7
2003	147.8	245.7	55.9	240.8	6.1	4.8	146.6	153379.0	26203.4	22796.0
2004	152.0	258.6	32.0	246.2	7.8	5.0	147.0	164380.0	30583.0	24622.0
2005	158.2	264.0	38.0	258.2	8.2	5.2	149.0	168492.0	33684.0	24828.0
2006	164.2	268.2	42.0	262.8	10.0	6.8	144.6	182560.0	38728.0	27940.0
2007	179.6	274.0	46.1	268.4	16.0	6.10	148.2	188332.0	40620.0	29690.0
2008	182.4	282.6	42.8	270.2	24.6	7.0	152.8	190212.0	42842.0	30230.0
2009	186.4	296.4	64.6	274.4	32.4	7.6	154.6	194680.0	44974.0	32490.0
2010	198.6	302.4	72.8	278.2	40.8	4.5	160.4	198264.0	46620.0	34624.0

Sources:

i. CBN Statistical bulletin (various Issues)
ii. Nigerian National Petroleum Corporation (NNPC)
iii. Federal Ministry of Mines Steel and Power, Abuja.

Table 3 above reveals the volume of Gas Production, and the index of mìneral production in Nigeria, For the year 1970, a total of 8029 million cubic metre of gas was produced, 72.0 million cubic metres utilized while 7957 million cubic metres was cleared, For the same year 71.2 petroleum, 37.5 gas, 972.7 cassiterite were the indexes of principal mineral production using 1985 as the base year, Por the year 1980, volume of gas production and utilization had increased to 2455I million cubic metres and 1647 million cubic metres respectively while 22904 million cubie

metres was flared. Equally, the indexes of principal mineral production with 1985 as the base year were: petroleum (137.6), Gas (541.4), cassiterite (322.3), columbite (548.6) coal (131.7) and limestone (143.2) for the year 1980. The year 1990 recorded increase in gas production and gas utilization to the tune of 28163 and 6343 million cubic metres respectively. The patterns and trends have been on the increase over the years up to year 2000, 2005 and 2010. The marginal increase in the production of Natural gas and in the index of principal mineral production as it affects gas and petroleum has been attributed to the operationalisation of some newly established oil fields, such as the 200,000 barrels per day bonga oil field which is the brain child of Shell Petroleum Development Company (SPDC). Gas is sold to industries including the Nigerian gas Company, the power Holding Company of Nigeria (PHCN) as well as cement and steel industries. In the same vein, gas is converted into natural gas liquids and gas-lift. Similarly oil producing companies use a good percentage as fuel and gas.

EQUATIONS FOR EMPIRICAL MODELING

The upsurge of the Nigerian economy has petroleum sector as a dominant element. The crude oil production in Nigeria has increased gradually to a very high level thus the role of petroleum sector in Economic development of Nigeria and foreign capital inflow could be examined empirically with the use of model so as to determine the linkage between the petroleum sector and the various sub-sectors vis-à-vis macroeconomic variables. Thus the model takes the form:

COP f(GDP, $CEXPt_{t-1}$, IOP, NROE, BOP GOVEREV) + μ………. (I)

Similarly, we have:

$COP = f(\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6,)+\mu$ …………………………………...(II)

Equation iii then takes the form:

$COP = a_0 + a_1L\beta_1 + a_2L\beta_2 + a_3L\beta_3 + a_4L\beta_4 + a_5L\beta_5 + a_6L\beta_6 + \mu$ ……..(III)

$a_1, b_2, b_3, b_4, b_5, b_6 > 0$

Where:

a_0 to a_6 represents parameter estimates/structures

μ represents Stochastic/Disturbance or error term with usual Normality Properties

COP = Crude oil production

$L\beta_1$ = Log of Gross Domestic Product (GDP)

$L\beta_2$ = Log of Crude Oil Export at a particular point in time ($CEXP_{t-1}$)

$L\beta_3$ = Log of International Oil Prince, Bonny light US $ per barrel (IOP)

$L\beta_4$ = Log of Nigeria's Revenue from Oil (NRO)

$L\beta_5$ = Log of Balance of Payment(s) BOP)

$L\beta_6$ = Log of Government Total Revenue (GOVERV),

EMPIRICAL RESULTS AND RELATED STATISTICS ON OIL PRODUCTION EQUATION

Method of Estimation = Ordinary Least Squares

Dependent Variable: LCOP
Current Sample: 1980 to 2011
Number of observations: 31

Mean of dep. Var.	=9.40420	LM het. Test	=	3.62583	[.057]
Std. dev. Of dep. Var.	=1.70189	Durbin-Watson	=	.997316	[.000]
Sum of squared residuals	=10.5719	Jarque-Bera test	=	2.82663	[.243]
Variance of residuals	=364549	Ramsey's RESET2	=	6.06735	[.020]
Std. error of regression	=.603779	F (zero slopes)	=	58.2978	[.000]
		Schwarz B.I.C = 37.2011			
R-squared .889394					
Adjusted R-squared	=.874138	Log likelihood	=	28.3852	

Variable	estimated coefficient	standard error	t – statistic	p-value
C	9.81536	.337733	29.0625	(.000)
ΔGDP	.859708E-02	.1226	-2.703206	[.026]
$\Delta CEXP_{t-1}$	-.033158	.014339	-.2.31239	(.028)
ΔIOP	.48457E-06	.774386E-07	6.25718	(.000)
ΔBOP	.014822	.012174	1.21758	(.233)
ΔNROE	-.019237	.257723E-02	-7.46412	(.000)
ΔGOVREV	-018247E-02	.896364E-08	5.31246	(.0100)

R^2 = .888394 : DW = .997316

The regression result and related statistics of oil produetion equation is as stated above based on (31) thirty one observations. The equation regresses crude oil production (COP) on Economic Growth (GDP), Crade Oil Export at a particular point in time (CEXPt-i), International Oil Price (1OP), Balance of Payments (BOP), Nigerian Revenue from oil (NROE) and Government Total Revenue. The regression coefficient of the constant term is 9.81536 and is statistically significant at better than 0.1 per cent. This moves in concert with apriori predictions that oil sector is the pivot of the Nigerian economy. Crude oi! export carries a negative sign but the t- value is statistically significant at O.3 per cent level. The coefficient of international oil price is positive. The associated t-value is statistically significant at better than 0.1 per cent level. This implies that the behaviour of international oil price leads to satisfactory performance of the Nigerian economy. The result of balance of payments is at variance as the estimated coefficient is positive but statistically not significant. This is a departure from the expected siluation in the cconomy. The regression result of Nigeria Revenue from oil and the government total Revenue demonstrate respectable expectations. Their estimated coefficient is negative and the associated t-value is statistically significant at better than 0.1 per cent for Nigeria Revenue from oil and 0.01 per cent for Government total revenue. This overall result is respectable and reveals the positive relationship existing between the oil and gas sub-sector and the Nigerian economy.

4. POLICY RECOMMENDATIONS AND CONCLUDING REMARKS

The Petroleum sector holds the key to the survival and growth of the Nigeria economy. The variables associated with petroleum prices are subjected to the manipulation of Organization of Petroleum Exporting Countries (OPEC) and the forces of demand and supply in the international petroleum market conditions. This sector for now is, a blessing but it could also be a curse for any economy that depends solely on this sector as the only source of foreign change carnings in event of contrary happenings. This paper advocates that Nigeria should embark on diversification of the sources of revenue earnings Instead of putting all eggs in one basket. Encouragement of investment on the non oil sector is strongly recommended in view of the volatile and fluctuating lendencies that cobweb the petroleum sector. This is capable of improving and generating high rate of employment. Since the petroleum sector is adjudged to be very flexible, versatile, non reproductive and depleting natural resource, it is pertinent that non oil sectors should be developed side by side in the macrocconomy.

Nigeria should move up to external trade in refined petroleum product which is adjudged to be associated with stable and increasing prices internationally. The above put together results in diversification of the sources of revenue and thereby provide for fluctuations in the macro economy by way of making it more stable considering the peculiar socio political conditions of a petroleum based economy such as ours,

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