

# Oil Shock Vulnerabilities & Impacts: Nigeria Case Study

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## List of Abbreviations

BP	British Petroleum
DFID	Department for International Development
DPA	Distributive Pool Account
EIA	Energy Information Administration
GDP	Gross Domestic Product
IEA	International Energy Agency
IMF	International Monetary Fund
JV	Joint Venture
kbpd	kilo-barrel per day
MNOC	Multinational Oil Company
MEND	Movement for the Emancipation of the Niger Delta
NEEDS	the National Economic Empowerment and Development Strategy
NEITI	Nigeria Extractive Industries Transparency Initiative
PSC	Production Sharing Contracts
REERI	Real Exchange Rate Index
US	United States
WTO	World Trade Organisation

## 1. Introduction

This report forms part of the “Oil Shock Mitigation Strategies” research project for the UK Department for International Development (DFID). This section of the report presents the net oil exporting country case study (namely, Nigeria) of oil dependencies and vulnerabilities to oil price and supply shocks.

The **primary research question** is:

- What are the key socioeconomic vulnerabilities to and likely impacts of oil price and supply shocks in Nigeria?

The purpose of this case study is to provide a deeper level of data, analysis and discussion about the vulnerabilities to and likely impacts of global oil price/supply shocks on Nigeria, which can inform the section of the report that deals with net oil exporting developing countries (the fourth generic country category).

The case study preparation is based on desktop research and utilises existing secondary data sources (such as World Bank, IMF, Energy Information Administration, EIA country analysis for Nigeria, and BP Statistical Review of World Energy). A mix of quantitative and qualitative analysis is employed, to the exclusion of formal quantitative modelling which is beyond the scope of this study.

Section 2 lists some key socio-economic indicators for Nigeria. In section 3 Nigeria’s vulnerability to oil price shocks are discussed and section 4 highlights the possible economic and societal impacts of oil shocks. Section 5 summarises and concludes.

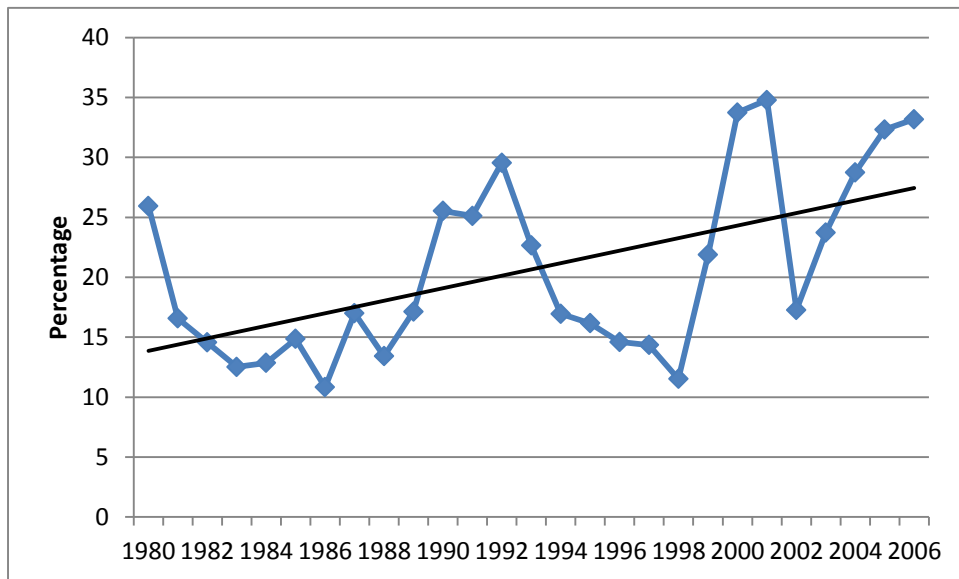
## 2. Socioeconomic indicators for Nigeria

This section presents several critical socioeconomic indicators for Nigeria that are related to its oil production and oil vulnerabilities, including the contribution of oil revenues to total government revenues and total export revenues, income inequality and poverty, and a corruption index.

### **Oil revenue/ real GDP**

Although volatile, oil revenues as percentage of GDP have shown a steady increase since at least the 1980s (Figure 1). By 2006, the percentage share of nominal GDP stood at almost 35 percent.

**Figure 1: Oil revenue as percentage of nominal GDP**

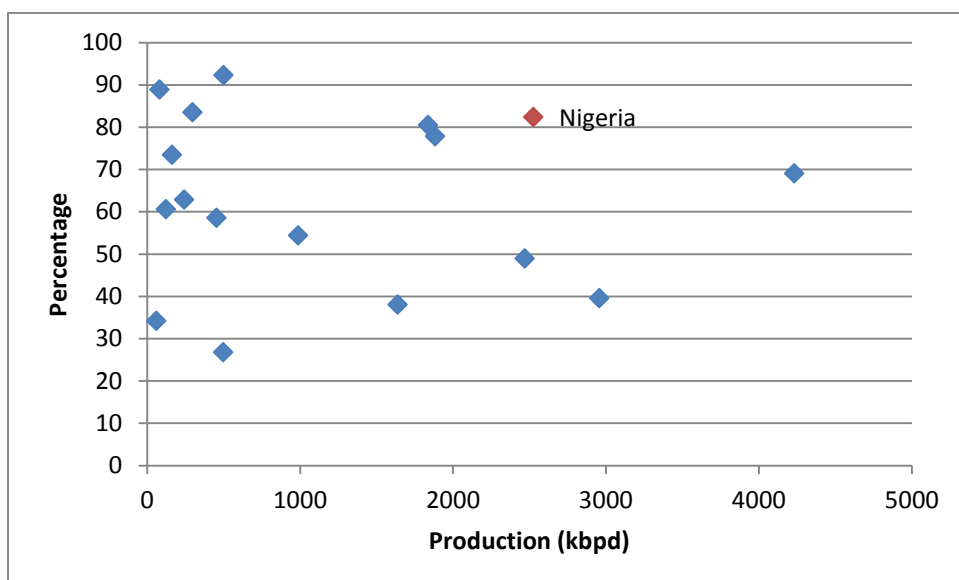


Source: Oil revenue: Akpan, 2009; GDP: IMF, 2012

**Oil revenue/total government revenue**

Nigeria is a lower middle income country with high oil dependence. According to Villafuerte and Lopez-Murphy (2010), 82 percent of total government revenues are derived from oil. Nigeria’s government has one of the highest oil dependencies for its level of production as measured for a cohort of 27 oil exporting Low Income, Lower Middle Income and Upper Middle Income countries (Figure 2).

**Figure 2: Oil revenue as percentage of total government revenue, Average 2005-8**

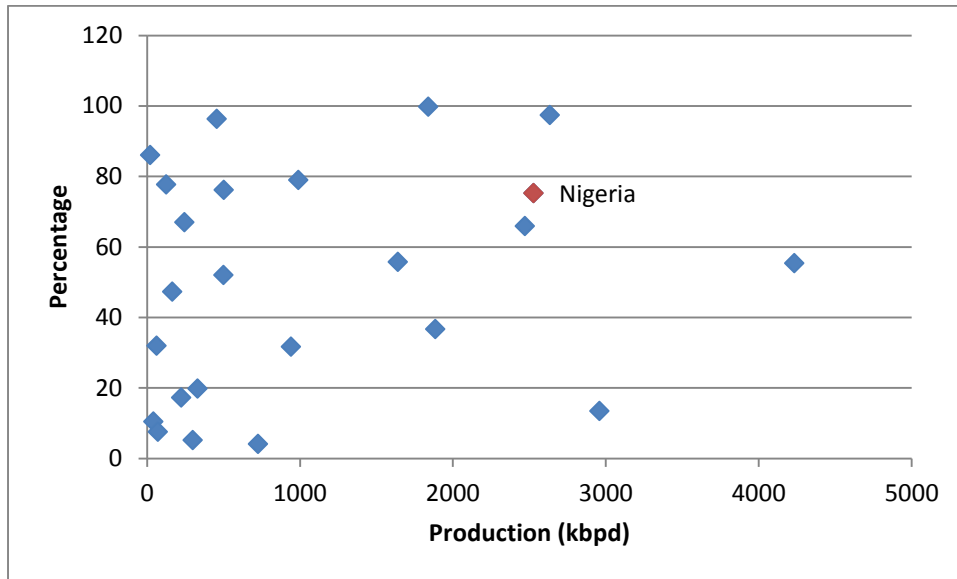


Source: EIA, 2012a for production data, Oil revenue percentage Villafuerte and Lopez-Murphy (2010)

### Oil export earnings/total export earnings

Nigeria's dependence on oil is further demonstrated in Figure 3 when compared with the oil exporting countries in the generic study. Seventy five percent of total exports in 2010 were crude oil exports. This is slightly down from estimates for 1990-2008 reported in Perry et al (2008) of 83 percent and substantially less than estimates by Akpan (2009) of 99.6 percent in the year 2000 but is still a sizeable share of exports. It is likely that dependencies on oil exports will be higher again in 2011 following the sharp spike in oil prices and also higher production levels in that year.

Figure 3: Oil export dependencies, 2010

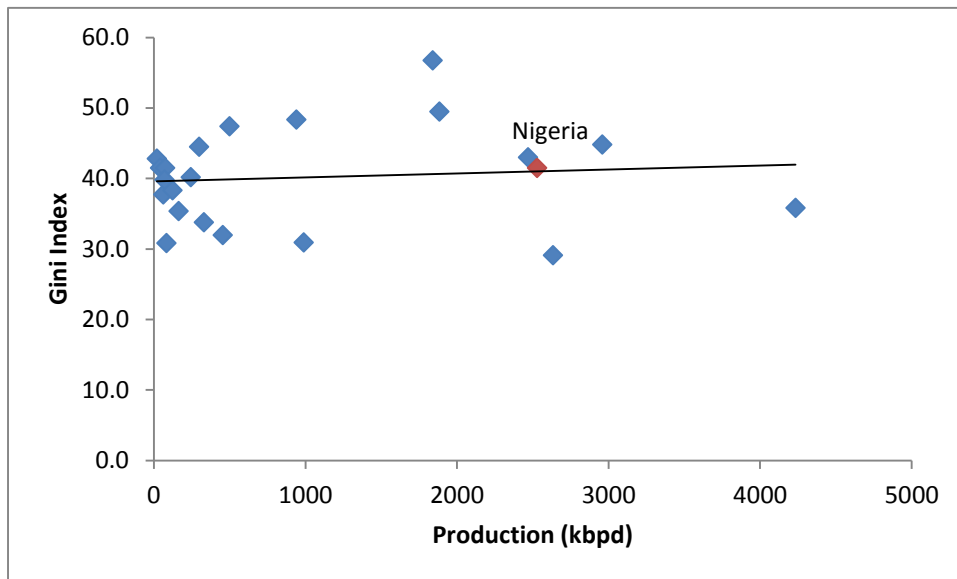


Source: Oil price: BP, 2011. Crude oil exports: EIA, 2012a. Exports of goods and services: WTO, 2012.

### Income/wealth inequality (Gini coefficient)

Nigeria's inequality is more or less in the middle of the oil exporting nationals, as measured by the Gini index, averaging around 42 (Figure 4). Furthermore, there is some indication of inequality increasing with higher levels of oil production. Nigeria's inequality has actually increased over time. According to Sala-i-Martin and Subramanian (2003), in 1970 the top 2 percent of the population earned the equivalent income of the bottom 17 percent of the population; by the year 2000 the top 2 percent of the population earned the equivalent income of the bottom 55 percent.

Figure 4: Gini Index, 2009 or latest

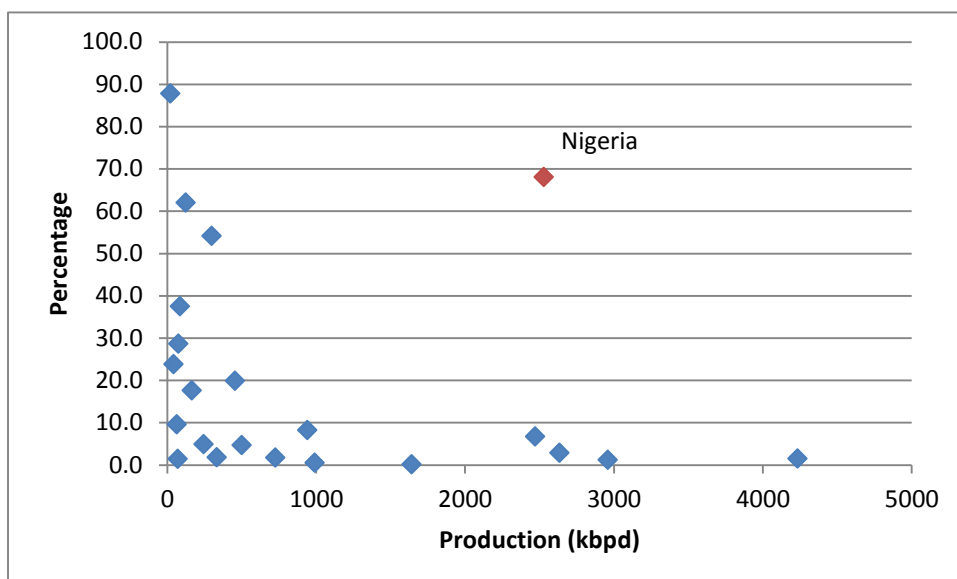


Source: EIA, 2012a (production); World Bank 2012 (Gini index)

### Poverty rate

There is strong evidence for oil abundance decreasing levels of poverty (as measured by the poverty headcount ratio) in oil exporting countries (Figure 5). Low levels of oil production are associated with higher levels of poverty and high levels of production are associated with low levels of poverty. The exception to this is Nigeria. In spite of high levels of production, the percentage of the total population earning less than \$1.25 per day is almost 70 percent (Figure 5). This suggests that income from oil in Nigeria has not been spread throughout the whole population (see also Demachi, 2012). Oil-rich Nigeria ranks 142<sup>nd</sup> out of 169 on the Human Development Index (Human Development Report, 2010).

Figure 5: Poverty headcount ratio, 2010 or latest

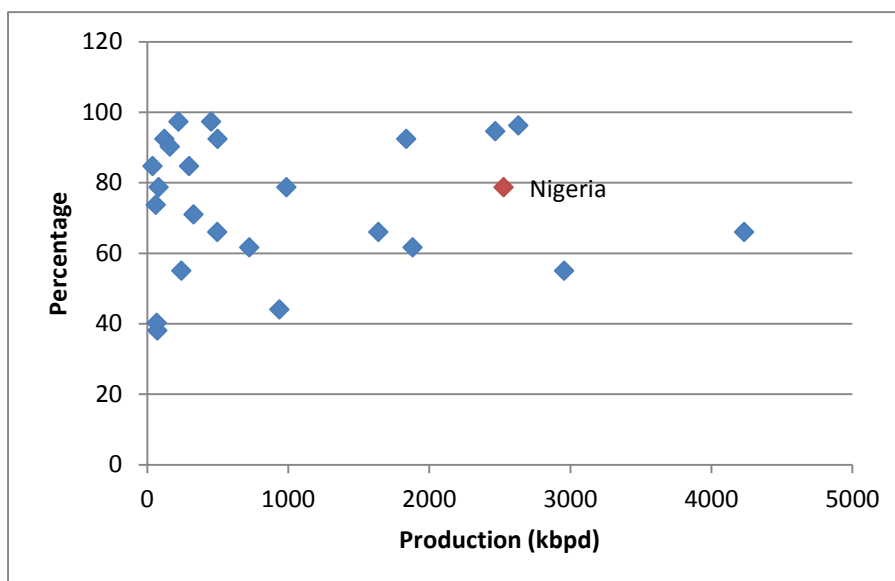


Source: World Bank, 2012

## Country corruption index

The corruption perceptions index indicates the degree to which corruption is perceived to exist among public officials and politicians by business people and country analysts (Transparency International, 2012). Scores are expressed in percentage terms, ranging from 0 (highly clean) to 100 (highly corrupt). In general oil exporting countries are highly corrupt according to this measure. Only three oil exporting countries rank less than the average for all countries for which data are available (50%): Ghana, Tunisia and Colombia. Nigeria's ranking is high (80%) but roughly average for oil exporting nations (Figure 6). It appears that the presence of oil is associated with high levels of corruption, although further work is required to investigate this relationship further. Certainly in the case of Nigeria there is strong evidence for corruption and resource waste affecting economic fundamentals in the past (Sala-i-Martin and Subramanian 2003).

**Figure 6: Corruption perceptions index, 2011**



Source: Transparency International, 2012

## 3. Oil and Nigerian socio-economic vulnerabilities

### 3.1 Resource curse

#### GDP growth and exchange rates

The 'resource curse' broadly refers to the idea that countries with greater natural resource wealth grow slower than countries that are poor in resources. One influence could be an appreciation of the real exchange rate of an economy caused by a rise in exports following a resource boom, also known as 'Dutch disease'.

Perry et al (2010) describe trends in GDP growth rates and real exchange rate index (REERI) performance in Nigeria over two periods of oil price shocks: 1972-1980, and 2003-2008. They find evidence for Dutch disease during the first oil price boom and less for the second oil price boom as non-oil exports increased during the second boom. However, REERI appreciated during both oil price booms and GDP growth rates fell during the both the price booms (Figure 7), suggesting that Dutch disease is nonetheless present, although certain factors may have contributed to higher non-oil exports, such as government incentives and expenditure (Perry et al 2010). Other analysts have



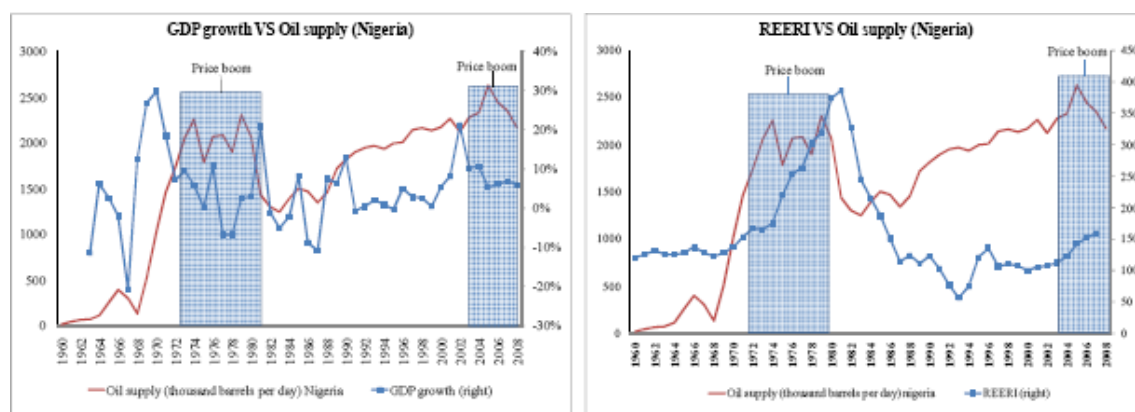
also found evidence for Dutch Disease in the Nigerian economy (Akpan 2009a; Akpan 2009b; Sala-i-Martin and Subramanian, 2003; Fosu, 2011).

In spite of natural resource abundance, this has generally not translated into sustained economic growth for Nigeria. Nigeria's real GDP growth rate has averaged 1 percent per annum since 1960, in contrast to Botswana, another resource rich Sub-Saharan African economy, which has enjoyed sustained economic growth of 7 percent annually over the same period (Fosu 2011). Sala-i-Martin and Subramanian (2003) argue that it is resource waste and corruption that has caused these low growth rates rather than Dutch disease, but that a broader defined resource curse is nonetheless prevalent in Nigeria. Economic growth has, however, begun to recover in recent times (Perry et al 2010) and Nigeria experienced real GDP growth rates in excess of 5 percent per annum from 2000 to 2008. Perry et al (2010) argue that, although this corresponds with a period of oil price booms, institutional reforms since 1999 have contributed to this growth in contrast to the previous oil price boom of the 1970s:

- Nigeria adopted a democratic government in May 1999 following 16 years of military dictatorship, which introduced a number of economic reforms and transparency initiatives; and
- from mid-2004 further economic reforms were implemented: the NEEDS strategy (the National Economic Empowerment and Development Strategy), which implemented a number of further institutional reforms.

These reforms stimulated economic activity and resulted in improved performance of the non-oil sector (Perry et al 2010).

**Figure 7: GDP growth, Real Exchange Rate Index (REERI)**



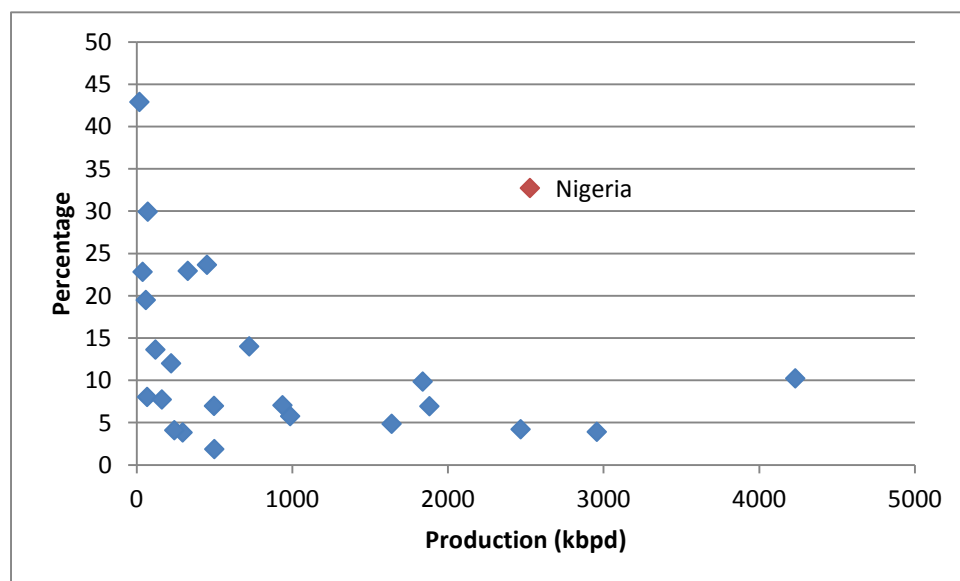
Source: Perry et al (2010)

### Lack of economic diversification

There are two notable features related to economic diversification of the Nigerian economy. On the one hand, the country has a very high reliance on the primary sector, significantly agriculture, compared with other oil exporting nations (Figure 8). Time series data do, however, indicate a shift away from dependence on agriculture in recent times. In 2002, agriculture comprised 49 percent of GDP, but by 2007 this had declined to 33 percent (World Bank, 2012, see also Figure 8). This period corresponded with the oil price boom of 2003-2008, but as we shall see in the next paragraph, increased oil rents were not a contributing factor to this reduced dependence on agriculture. A major contributor was the growth in the services sector, including government services, which grew from a share of 21 percent of GDP in 2002 to 27 percent in 2007 (World Bank, 2012). Manufacturing remained unchanged over that period at 3 percent of GDP, so the rest of the growth originated from the contribution of other non-oil sectors. The extremely small share of manufacturing in GDP is a

significant weakness of the Nigerian economy, as it makes the country highly reliant on imported manufactured goods including capital equipment.

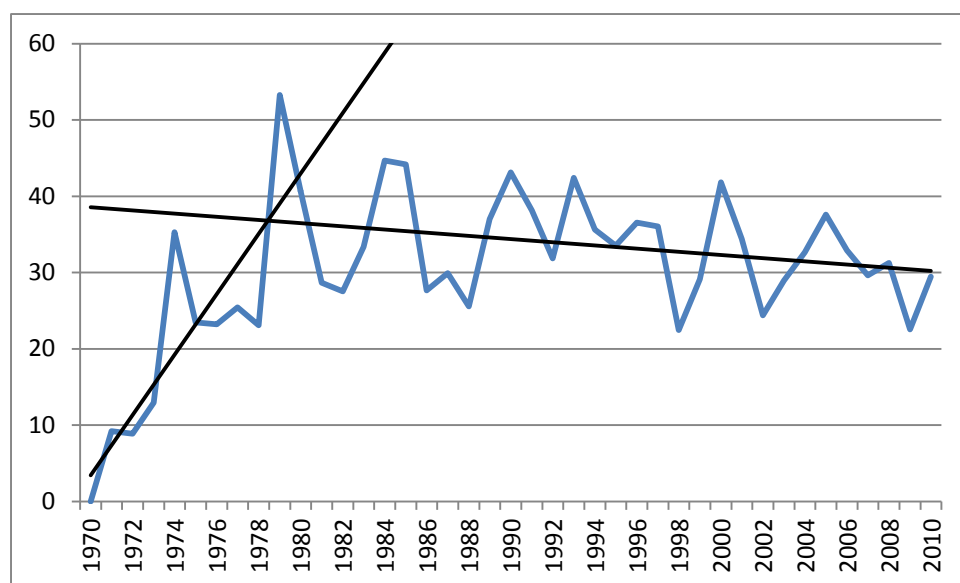
**Figure 8: Agriculture value added as percentage of GDP, 2010 or latest**



Source: World Bank, 2012.

Oil rents contribute significantly to GDP, although this share is declining (Figure 9). During the oil price shocks of the 1970s, oil rents share as percentage of GDP grew to a peak of over 50 percent in 1979 (Figure 9). Since 1980, the share of oil rents in GDP has shown a gradual decline over time. During the oil price shock of 2003-2008, oil rent's contribution to GDP has actually declined (Figure 8). This decline is due to the growth of the non-oil sector, which since mid-2004 has grown more rapidly than the oil sector: 9.6% and 9.5% in 2006 and 2007, respectively, and 7.6% in 2008 (Perry et al 2010). Long term trends since 1980 do therefore indicate a gradual diversification of Nigeria's economy away from oil.

**Figure 9: Oil rents as percentage of GDP, 1970-2010**

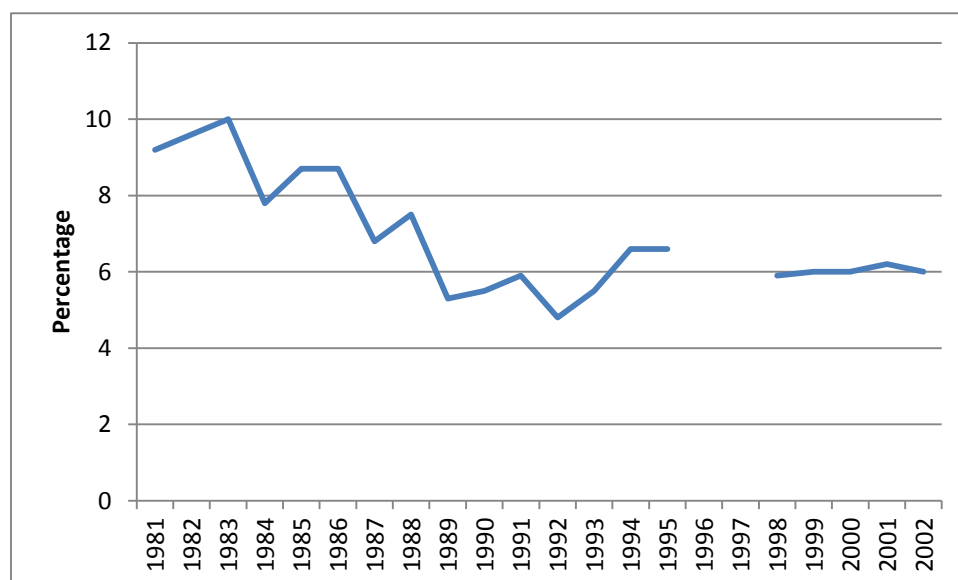


Source: World Bank, 2012

## Deindustrialisation

There is evidence of deindustrialisation in Nigeria during the ‘lost’ years of the 1980s and 1990s. Manufacturing’s share of GDP peaked at 10 percent in 1982 and has subsequently declined to around 6 percent in 2002 (Figure 10). The oil price shocks of 2003-8 and government institutional reforms over the same period did not succeed in stimulating the manufacturing sector. World Bank (2012) data show that manufacturing’s share of GDP between 2002 and 2007 was only 3 percent. Manufacturing activities exhibit high degrees of concentration, being situated in only a few localities in Nigeria. Ajayi’s (2007) survey indicated that 33 percent of manufacturing industries are located in Lagos state alone, with high concentrations of industries in the southern part of the country (Lagos state is situated in the southwest). Other studies have found major concentrations around state capitals, around ports, and major administrative areas (Ajayi 2007). High levels of spatial concentration may be problematic for industrial growth as there is excessive competition for available resources and facilities (Otto 2008).

**Figure 10: Manufacturing’s share of GDP, 1981 - 2002**



Source: Ajayi, 2007.

Note: Data in 1995-1997 were missing in the original source.

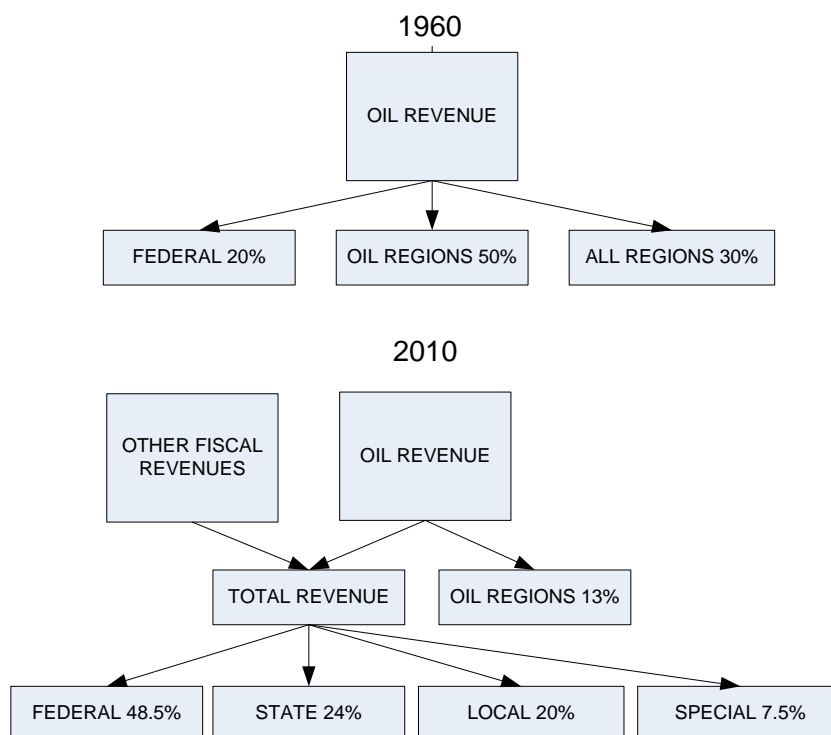
### 3.2 Oil price volatility

#### High oil prices, tax revenues and social spending

Nigeria’s government is highly dependent on oil revenues, which comprise 82 percent of government’s total revenues (Section 1.1). Figure 11 summarises how revenue accruing to the federal government has evolved over time. At independence in 19xx, 20 percent of oil revenue accrued to the federal government, 50 percent to the natural resource producing regions and 30 percent to a Distributive Pool Account (DPA) which allocated the remainder of the money to all regions (Figure 10). At present, only 13 percent of oil revenues accrue to the oil producing regions, while the remainder is added to the federal account along with other revenues (Figure 10). Of that, 48.5 percent then accrues to the federal government and the remainder is allocated to the state

government joint account (24 percent), local government joint account (20 percent), and special funds (7.5 percent) (Figure 11).

**Figure 11: Changes in distribution of oil revenues, 1960-2010**



Source: Adapted from Perry et al (2010)

Since 2004 government expenditure has been linked to a benchmark oil price fiscal rule (OPFR) so as to reduce the effects of a volatile oil price on fiscal expenditure (Perry et al. 2010). Table 1 summarises the differences between the benchmark oil price and realised oil price per barrel, which resulted in accumulated savings of over \$23 billion by December 2008. The increase in the benchmark oil price from \$27 in 2004 to \$40 in 2007 shows that government expenditure has increased as a result of higher realised oil prices over that period (see also Akpan 2009).

**Table 1: Differences between Government’s OPFR and realised oil price**

	2004	2005	2006	2007	2008
Benchmark oil price	\$27	\$30	\$35	\$40	n.a.
Realised price per barrel	\$38.3	\$55.3	\$68	n.a.	n.a.
Accumulated savings					\$23 billion

Notes: n.a. = not available

Source: Perry et al (2010)

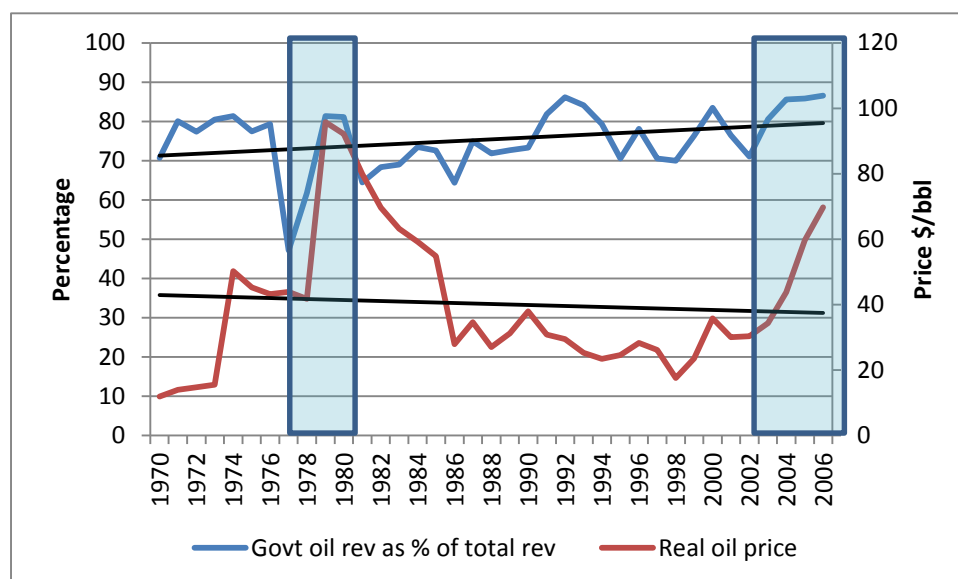
Nigeria has in the past established numerous spending and savings rules for its oil revenues, but has rarely adhered to them for long (Eifert et al, 2002; Ross 2003; Ahmad and Singh 2003).

## Effect of oil price volatility on government revenues

Another aspect of the “resource curse” is a volatility of government revenues owing to uncertainty in resource prices (Demachi 2012). The Nigerian government depends heavily on oil revenues (Section 1.1), and unpredictability in commodity prices may limit the government’s ability to invest in medium or long term development. If government has invested in long term development projects, price collapses, for example during global economic recessions, often compel governments to rely on external borrowing, which results in increased foreign debt (Demachi 2012). During the first oil price boom of the late 1970s and early 1980s, Nigeria was characterised by weak institutions which were ill equipped to implement major investment projects with the required rate of return, thereby undermining the country’s ability to repay loans (Dada 2011). External debt rose from \$4.3 billion (around 6.6 percent of GDP) to \$11.2 billion over that same period, while foreign exchange earnings fell from \$10 billion to \$1.23 billion between 1981 and 1983 (Ibid.) Foreign debt has since then continued to rise: in 2004 external debt to GDP stood at 38.8 percent (Perry et al. 2010). However, the country benefited from a debt relief package from the Paris club of public lenders and London Club of private creditors, and by 2006 the debt to GDP ratio had fallen to 2.1 percent (Ibid.).

The Nigerian government has become increasingly reliant on oil revenues since 1970 (Figure 12). This could be related to higher oil prices. For example, [real?] oil prices have shown a long term upward trend (red line on the graph) and government revenue has also shown an upward trend over the same period (blue line on the graph). Furthermore the oil price shocks of the late 1970s and early 2000s did increase government revenues, as indicated by the shaded blue area in Figure 12.

**Figure 12: Government oil revenue as percentage of total revenue, 1970-2006**



Notes: shaded blue area indicates oil price shocks

Source: BP, 2011 (price); Akpan (2009)

## Effect of price volatility on foreign exchange earnings

Detailed information on capital flows from oil revenues in Nigeria is not available, but according to recent Nigeria Extractive Industries Transparency Initiative (NEITI) reports, the first published in 2004 and the second in 2011, one part of revenues from oil sales is paid to local governments in the local currency (naira), and the rest is deposited with JP Morgan Chase in New York in US dollars (Demachi 2012). The amount of money that is deposited as foreign reserves is related to the realised price per

barrel (Perry et al 2010), so an increase of the oil price could substantially increase the amount of foreign reserves deposited in external accounts. Figure 13 indicates that Nigeria’s foreign reserves have grown substantially during the oil price boom of 2003 – 2008, but less so during the second oil boom of 2010-2011.

**Figure 13: Nigeria’s total reserves (US\$) and real oil price (2010 \$)**



Source: World bank, 2012

The financial crisis of 2008 has further increased the demand for foreign currency in Nigeria, notably from foreign investors in the country who wanted to move funds to safer havens (Demachi 2008). Furthermore, expectations that the naira would depreciate following the economic recession stimulated demand for the US dollar (Ibid). Nigeria’s exchange rate has also been affected by major oil companies, such as Shell, selling large quantities of dollars on the domestic interbank market (Ibid).

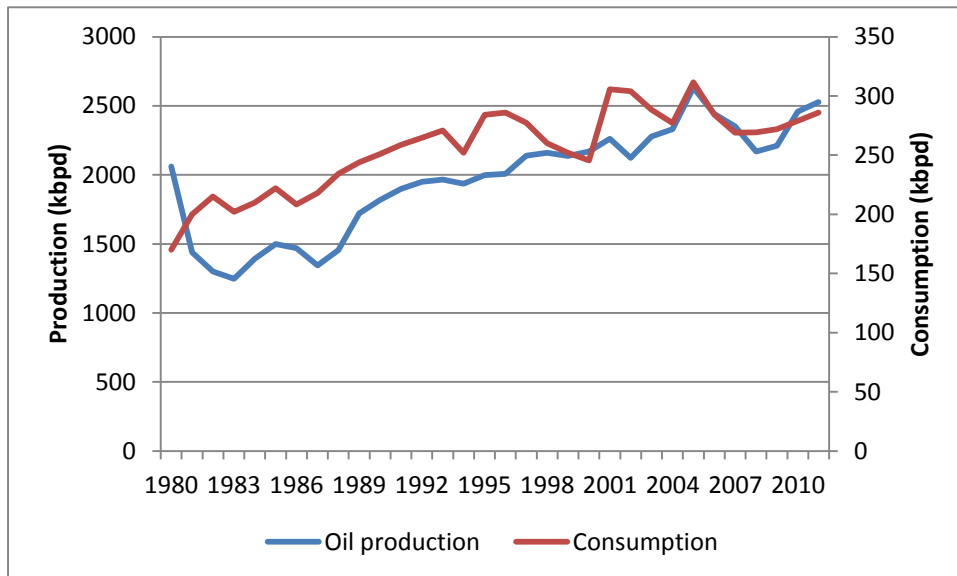
### 3.3 Impacts of domestic oil depletion

#### Peak oil production

Oil production in Nigeria reached a peak of 2,630 kbpd in 2005, but declined significantly thereafter (Figure 14). The main reason for the decline post 2005 was as a result of violence from militant groups, which had the effect of causing oil companies to withdraw workers and reduce production (EIA 2012b). Factors that precipitated the violence included (EIA 2012b): lack of transparency over oil revenues and tensions over revenue distribution, the environmental damage caused by oil spills, as well as local ethnic and religious tensions. The vast majority of Nigeria’s oil production is located in the Niger Delta which lies to the south of the country and currently comprises nine states (Perry et al 2010): Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Imo, Ondo and Rivers. While oil is produced in all nine of these states, three states in particular (Bayelsa, Delta and Rivers) account for approximately 75 percent of all crude oil produced in Nigeria (Ibid.). Two major factors led to the increase in production from 2009 (EIA 2012b): Firstly, an amnesty programme was introduced that led to a reduction in attacks on oil facilities, which afforded oil companies the opportunity to rebuild damaged infrastructure and boost production. Secondly, Nigeria’s government provided incentives for further offshore drilling, by offering production sharing contracts (PSCs) in which multinational oil companies (MNOCs) obtained a greater proportion of revenue as the depth increased. As a result of

this, deepwater offshore production has continued to increase. The 2005 production peak might not therefore be an all-time peak, depending on how much additional oil can be brought on-stream from the new offshore fields. Petroleum consumption, on the other hand, has been erratic over the past two decades, but since 2005 has shown an upward trend (Figure 14).

**Figure 14: Nigeria’s oil production and petroleum consumption, 1980-2011**

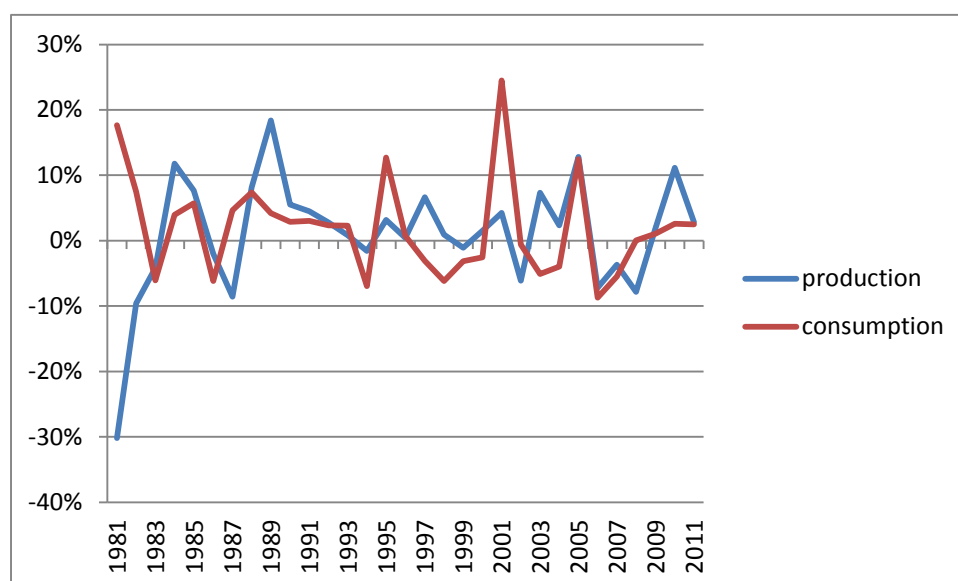


Source: EIA, 2012a.

### Domestic consumption and production

There were a number of years in which the growth in Nigeria’s oil consumption exceeded growth in oil production (e.g. 1981, 1987, 1995, 2001 and 2008, see Figure 15), but for the most part changes in Nigeria’s oil production are reflected in changes in oil consumption. If the country experiences continued economic growth (partly driven by its oil revenues), it seems likely that incomes will rise for at least a portion of the population. This in turn is likely to raise the domestic demand for oil products, which at some point in the future may cut into the amount of oil available for export.

**Figure 15: Annual percentage change in oil production and consumption, 1981-2011**



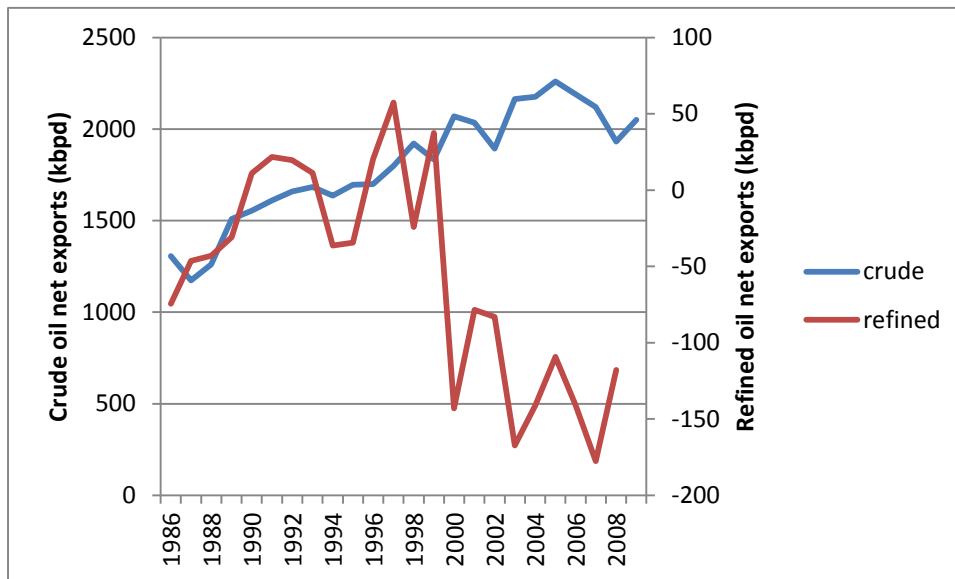
Source: EIA, 2012a.

### **Opposing trends in net crude and refined oil exports**

Nigeria's net crude oil exports generally show an increasing trend between 1986 and 2009, with the exception of 1999 and the period between 2005 and 2008 where disruptions lead to a decline in production (Figure 14). By contrast exports of refined oil products have generally declined since 1997, to the extent that Nigeria has in fact been a net oil importer since 1999 (Figure 16). The year 1999 was a period when the Ijaw Youth Council of the Niger Delta mobilised with "Operation Climate Change" which led to the turning off of oil valves through much of Ijaw territory and resulted in clashes with the military (Aghadiuno 1999). Nigeria currently has four refineries (Port Harcourt I and II, Warri and Kaduna) with a total capacity of approximately 445 kbpd (EIA 2012b). None of these refineries have been fully functional due to fire, theft, sabotage and poor maintenance that resulted in operational failures (Ibid.) In 2009 and 2010 low production resulted in Nigeria importing approximately 85 percent of its fuel requirements (Ibid.). Production in 2010 was only 22 percent of full operational capacity, although in 2011 production was up slightly to 24 percent (Ibid.) Maintenance is planned for 2012 which may improve production rates for 2013 (Ibid.) The implication for Nigeria's oil shock vulnerabilities is that despite the country being one of the world's top net exporters of crude oil, it is nonetheless heavily reliant on imports of refined fuels, which are essential to the functioning of its economy. This poses a risk to the domestic economy in the event of global oil and refined fuel shortages in the future.



**Figure 16: Nigeria's net oil exports, 1986-2009**



Source: EIA, 2012a.

### 3.4 Conflict over access to oil wealth

Poverty and inequality in the distribution of oil wealth in Nigeria has led to widespread oil bunkering, which refers to the theft and trade in stolen oil. According to EIA (2012b), there are three main ways in which oil is bunkered in Nigeria: 1] by puncturing of pipelines and the siphoning off of crude oil into small tanks in the Niger Delta. The culprits access the pipelines by using small canoes to navigate the waterways of the Delta; 2] stealing crude oil directly from the well-head; and 3] filling tankers at export terminals (“white collar” bunkering). EIA (2012b) reports that, according to Nigeria’s ministry of Finance, 400,000 bbl/d of oil was stolen in April 2012, which reduced official oil sales by 17 percent. Royal Dutch Shell estimated that 6 percent of the country’s total production is lost through oil bunkering and spills, although some believe that this estimate excludes white collar bunkering (Ibid). If oil prices continue to rise in the future, it will increase the incentive for these various types of oil bunkering to continue or escalate.

### Intervention by foreign powers

Some stolen oil is taken to illegal refineries in the Niger Delta and sold regionally or domestically, while some is traded on the international market (EIA 2012b). A recent article published by Reuters describes the international trade in illegal oil and who the main beneficiaries are (Cocks, 2012). It estimates that 90 percent of stolen oil ends up on world markets, and the main buyers are organised criminal networks in the Balkans and also refiners in Singapore. This international scale oil theft involves collusion by politicians, the military, Western banks and global organised crime. To resolve these issues requires collaboration with foreign powers as well as improved metering and monitoring of pipelines and oil export terminals by the Nigerian authorities (Cocks, 2012).

### Civil conflict

There have been no known border conflicts between 1960 and 1999, but there have been two civil wars (Fosu 2011): the first was from January 1966 to January 1970, and the second from December 1980 to January 1984. The former is the well-known Biafran civil war and the latter involved major

ethnic clashes that led to at least 1,000 deaths per year over that period (ibid.). The main group responsible for the increased pipeline vandalism, the kidnapping of oil workers for ransom and militant takeovers of oil facilities since December 2005 is the Movement for the Emancipation of the Niger Delta (MEND) (EIA 2012b). This group attacks oil infrastructure for political purposes, to enforce greater local control of oil production and also a redistribution of oil profits (Ibid.) The resultant instability has led some oil services firms to withdraw from the country, and has led some oil workers to threaten strikes over security concerns (Ibid.). As global oil supplies continue to tighten over the coming years, placing upward pressure on prices (see the introduction to the main report), there is a risk of increased civil conflict as the stakes are raised.

## **4. Likely economic and societal impacts of oil shocks**

### *4.1 Negative economic impacts*

#### **Non-oil sectors may suffer**

Oil price shocks have the potential to trigger recessions in non-oil countries. Cantore (2012), for example, cited Dr Fatih Birol, Chief Economist and Director of Global Energy Economics at the International Energy Agency (IEA) as stating that every oil price shock since World War II has triggered a recession in industrialised countries. Evidence for this having affected non-oil exports in Nigeria is mixed. On the one hand, Akpan (2009a, 2009b) investigated the effects of oil price shocks in Nigeria, and found that an oil price rise lowers demand for non-oil exports as a result of the economic recession experienced by trading partners. More recently, Perry et al (2010) found evidence of non-oil exports decreasing during the first oil price boom of the 1970s, but found an increase in non-oil exports during the second oil price boom of 2003-8, albeit off a low base. This growth in non-oil exports is attributed to institutional and economic reforms within the Nigerian government that triggered economic activity and increased exports in the non-oil sector (Ibid), but was also assisted by a generalised commodity price boom during that period, which was driven by strong demand particularly from Asian countries. Adeniyi et al (2011) concluded that 'oil price shocks do not account for a significant proportion of observed movements in macroeconomic aggregates', pointing to the 'enclaved nature of Nigeria's oil sector with weak linkages'.

### *4.2 Societal impacts of oil shocks*

As noted above, oil revenues are not shared equally amongst Nigeria's population, a substantial majority of whom continue to live in poverty. For the majority of the people, therefore, oil price rises can translate into additional socioeconomic hardship, as discussed below.

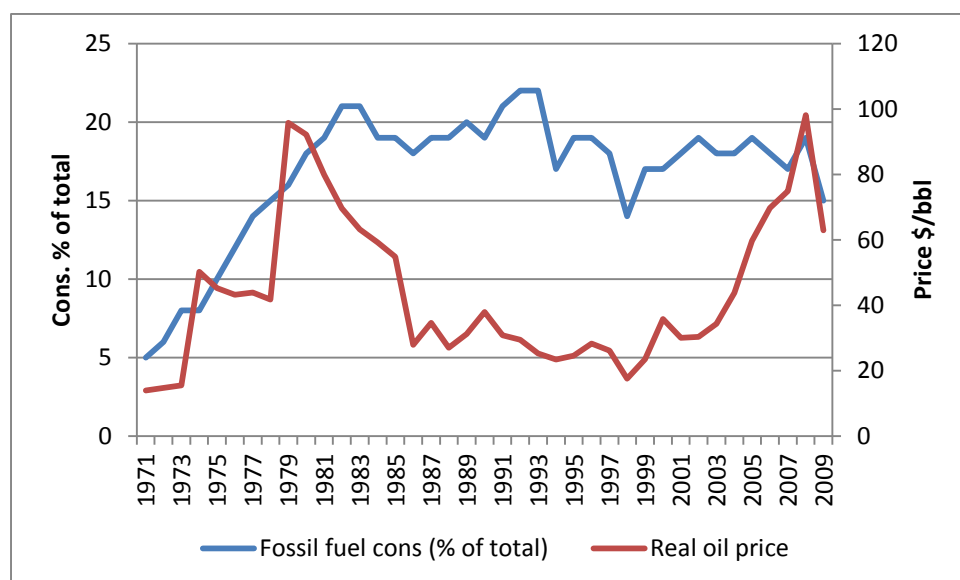
#### **Poverty & inequality**

Aye (2012) found that the poverty headcount rate increased with rising food and oil prices, but an oil price shock only increased poverty in the short run. A 10 percent increase in the oil price increased poverty by 4.1 percent. The effect of a 10 percent rise in oil prices on poverty was, however, less than the effect on poverty of a 10 percent rise in food prices. Ebohon (2012) also pointed out that oil wealth has not led to expected developments.

Perry et al (2010) consider the effect of an oil production shock on inequality, as measured by the Gini coefficient. They found that an increase in oil abundance (as measured by an increase in net exports per capita) increases inequality in Nigeria. These results were compared with Colombia where the effect of an oil production shock on inequality was less pronounced. These differences were due to a lower institutional quality in Nigeria compared with Colombia and also greater political competition.

The share of fossil fuel consumption (oil, coal, petroleum products and natural gas) as a percentage of total energy consumption in Nigeria has remained fairly low, ranging between 12 and 22 percent of total energy use (Figure 17). This is compared with South Africa that averaged around 88 percent between 2007 and 2009. Furthermore, the oil price shock of 2002-2008 did not have a notable effect on overall fossil fuel consumption in Nigeria (Figure 17). This is consistent with recent research done by Suleiman & Shahbaz (2012:2) on four African member countries of OPEC, including Nigeria, who concluded that ‘demand for oil products are more responsive to changes in income than the real prices, both in the short and long run’.

**Figure 17: Fossil fuel consumption and real oil price, 1971-2009**



Source: World Bank, 2012 and BP, 2011 (price).

The Nigerian government has historically subsidised the pump price of fuel: prior to 2012 the pump price of a litre of fuel was \$0.40, compared with an actual cost of \$0.86 per litre (EIA 2012b). This subsidy cost the government annually \$7.6 billion, or 2.6 percent of GDP (Ibid.). The fuel subsidy is perceived by many Nigerians as one of the primary benefits of living in a country with high oil reserves (Ibid.). On January 1, 2012, the federal government removed the subsidy as it caused market distortions and inhibited investment in downstream industries (Ibid.). This resulted in a massive public outcry and strikes organised by both oil and non-oil unions that threatened a complete shutdown of all oil production in Nigeria (Ibid.). The government has subsequently reinstated a partial subsidy of \$0.6 per litre, compared with the new actual cost of \$0.87 per litre (EIA 2012b).

## Household food security

King et al (2004) describe agricultural practices in the area where oil production occurs. The Niger Delta has some of the richest farmland in Africa although the value of crop production is low and much of the farming is subsistence. Agricultural activities include fishing and the farming of yams and cassava. Oil pollution in various forms has had a significant adverse effect on farming production (Ibid.). Firstly, oil spills and leakages have polluted rivers and agricultural land. From 1970 to 1982, 1,581 oil spills were recorded in the Niger Delta. Secondly, gas flaring, a process whereby gas is combusted, results in noise pollution (there is a loud explosion associated with flaring) and also releases large amounts of carbon dioxide into the atmosphere (Ibid.). Flaring, combined with soot and methane which is also a by-product of oil refining, produced air pollution that is linked to asthma, cancer and other lung diseases (Ibid.). It also is an important contributor to greenhouse gas emissions on the African continent (Eleri et al 2011). Of more direct significance for agricultural production, flaring has also been associated with lower crop yields and inhibited plant growth (King et al. 2004).

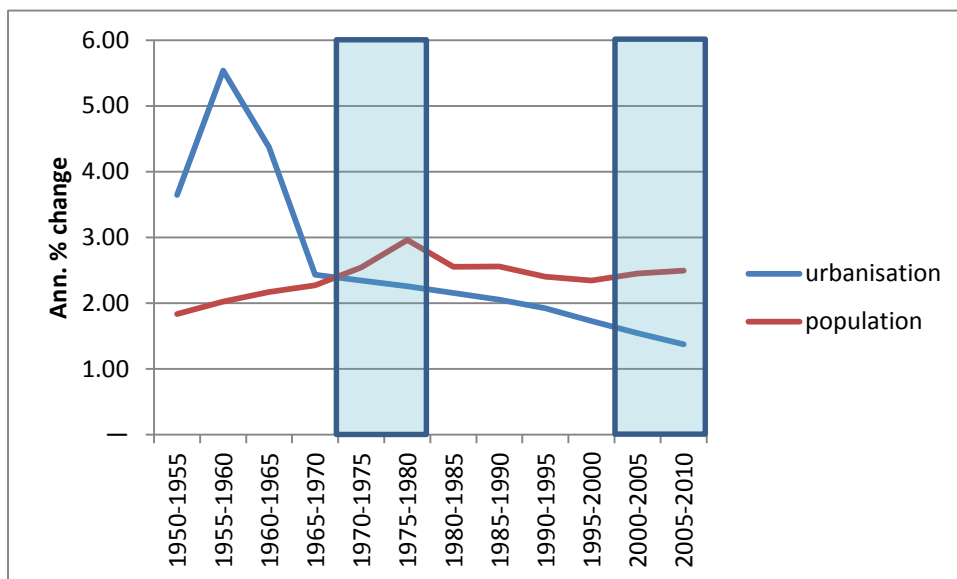
Agriculture's share in GDP has declined in recent years, from 49 percent in 2002 to 32 percent in 2006, although this rose slightly to 32.7 percent in 2007 (World Bank, 2012). Prior to independence in 1960, agriculture contributed 70 percent of GDP and accounted for 90 percent of foreign earnings and federal government revenue (Akpan 2009). Agricultural production has improved significantly since President Obasanjo's democratic government was introduced in 1999, but the majority of Nigerians (65 percent) remain food insecure (Dada 2011), although the proportion of undernourished in the population has declined from 16% in 1990-92 to 6% in the period 2005-7 (Grebmer et al, 2011). The discovery of oil has resulted in a general neglect of the agricultural sector, resulting in food shortages and accessibility problems (Ibid.). Akpan's (2009b) vector autoregression (VAR) model found that food imports contributed a negligible amount to alleviate food security in Nigeria, neither did an increase in government oil revenues. He found, however, that 85 percent of Nigeria's food insecurity would be reversed through an increase in domestic food production. The value of food imports have grown from 442 million naira in 1976 to 16 billion naira in 2006, an increase of 13 percent per annum over the 30 year period (data from Akpan, 2009b).

Aye (2012) develops a cointegration and error correction model (ECM) to investigate the effects of rising food and oil prices on both macroeconomic and socioeconomic variables. He found that higher oil prices increase the food price both in the short and long term. A 10 percent rise in the real crude oil price increases the real food price by 2.4 percent in the short run and 3.3 percent in the long run. A 10 percent increase in real food prices affects the macro-economy by reducing real GDP growth (short run: -9.4 percent; long run:-7.5 percent) and the current account balance (short run: -2.8 percent; long run: -2.3 percent). Inflation (CPI) increases by 4.7 percent (short run) and 6.6 percent (long run). Aye (2012) also investigated the effect of rising food prices on poverty, as measured by the poverty headcount ratio. A 10 percent increase in real food increases poverty by 5.3 percent in the short run and 7.4 percent in the long run. It is therefore evident from this that rising oil prices increases food inflation. Macroeconomic and poverty variables are adversely affected by rising food prices, which in turn increases the vulnerability of the poorest segments of the population.

## Settlement patterns

Urbanisation has been increasing in Nigeria, at least since the 1950s, but at a decreasing rate (Figure 18). By 2011, 50 percent of Nigeria's population lived in urban areas (World Bank, 2012). It is possible that the urbanisation rate has decreased as a result of the commercialisation of oil, but this is unlikely since oil is a capital intensive industry and employment levels for the local population would most likely not be significant enough to reduce urbanisation rates. In 2011, Nigeria had a population of 162.4 million (World Bank, 2012), which equates to a population density of 180.4 people/km<sup>2</sup>, given that the area of Nigeria is around 900,000 km<sup>2</sup> (Perry et al. 2010). By comparison, Colombia, another oil exporter with similar land area, had a population density of 42.6 people/km<sup>2</sup> in 2011 (population= 46.9 million in 2011: World Bank 2012; land area=1,100,000 km<sup>2</sup>: Perry et al. 2010). This implies that Nigeria has a population density of more than four times the population density of Colombia. There is some evidence of spikes in population growth rates around periods of oil price booms (Figure 16), although this may just be a coincidence. The population of the Niger Delta, where oil production occurs, is roughly 17 percent of the total population (calculated from data in Perry et al. 2010). As Nigeria's economy develops, one can expect further increases in urbanisation, and with that an increasing demand for personal transport and hence transport fuels.

**Figure 18: Population, urbanisation, 1950-2010**



Source: UN, 2012.

Nigeria has over a dozen crude oil pipelines that carry oil to domestic oil refineries as well as to export terminals (EIA 2012b). These pipelines vary in length, from 31 miles up to 383 miles (Ibid.). The landscape in the Niger Delta is mostly rural, with many waterways and swampy areas (Ibid.). This makes the pipelines difficult to police and increases vulnerability to pipeline vandalism.

## Social cohesion

Conflicts in the Niger Delta are mainly directed at MNOCs and are two-fold (EIA 2012b): firstly, groups such as MEND, who desire a larger share of the oil wealth, attack oil infrastructure; secondly,

oil ‘bunkering’, or puncturing of pipelines with the intention to steal oil, is also common, which has the effect of further increasing environmental damage through oil spills. Environmental damage from oil production activities, including losses in arable land, water pollution that has affected fish stocks and air pollution caused by flaring, has further undermined relationships between local communities and multinational oil companies (MNOCs) and resulted in protests from local groups (Ibid.). In addition to conflicts with oil companies, a number of political conflicts have also occurred over the history of oil production in Nigeria. During the period 1956-2001, corresponding to the period when oil was first discovered in commercially viable quantities (see Perry et al 2010), Nigeria has experienced 6 ‘successful’ coups, 2 failed coups and 6 coup plots, ranking the country as 7th out of the 46 Sub-Saharan African countries with high Elite Political Instability (Fosu 2011).

### *4.3 Role of multinational oil companies*

Nigeria is heavily reliant on multinational oil corporations (MNOCs) for oil exploration and subsequent production. MNOCs operating in joint ventures (JVs) or production sharing contracts (PSCs) with the Nigerian National Petroleum Corporation (NNPC) include ExxonMobil, Chevron, Total, Eni, Addax Petroleum (recently acquired by Sinopec of China), ConocoPhillips, Petrobras, and StatoilHydro (EIA 2012b). Shell is the largest oil and gas company in Nigeria and operates in Nigeria through the Shell Petroleum Development Company of Nigeria Limited (SPDC) and the Shell Nigeria Exploration and Production Company Limited (SNEPCo) (EIA 2012b). Pre 1966 MNOCs had free reign in production and price decisions, but more recently government has played an increasing role in the industry. Government’s share in the oil industry steadily increased from 35% in 1973 to 60% in 1979 (Perry et al 2010). MNOCs responded by reducing exploration activities, which prompted government to establish a number of incentive schemes (Perry et al. 2010), including the establishment of a Memorandum of Understanding in 1986 which guaranteed a minimum fiscal margin of \$2 per barrel, which was later increased to \$2.50. This provided the necessary impetus to oil companies to resume exploratory activities. The NNPC, established in 1977, currently has around 9000 staff (Perry et al 2010). Apart from joint ventures with MNOCs around the operational aspects of oil production, the NNPC also jointly owns pipeline infrastructure with MNOCs, while the export terminals are operated by MNOCs, specifically Shell (Forcados and Bonny terminals), ExxonMobil (Qua Iboe terminal), Chevron (Escravos and Pennington terminals) and Eni (Brass terminal). (EIA 2012b). MNOCs have also been linked with corruption allegations. A recent report by the former head of government’s anti-corruption agency found that mismanagement and “dodgy practices” by ministers, parastatals, and MNOCs conservatively cost Nigeria \$35 billion over the past ten years, or more than a year’s government spending (Allison 2012).

## **5. Summary and conclusions**

Nigeria is an oil dependent country that is highly vulnerable to fluctuations in the oil price. Higher oil prices have had positive benefits in terms of government spending and also from the Nigerian government’s ability to subsidise the fuel price, which has benefitted many Nigerians. On the negative side, higher oil prices have increased inequality and also resulted in higher food prices, which have adversely affected inflation and also increased poverty. Agricultural production, which at independence was the mainstay of the Nigerian economy, has suffered neglect following the commercial exploitation of oil, which has raised concerns over food security in the country. Furthermore, oil abundance has generally not improved the circumstances of those living in oil rich areas, but rather has led to negative externalities due to increased pollution of rivers and agricultural land. These factors have led to a desire by certain groups (such as MEND) to gain a greater share of the oil wealth which has resulted in civil and political conflict as well as vandalism of oil infrastructure, which has further exacerbated environmental problems. The Nigerian government

has historically been characterised by weak institutional capacity, but since 1999 when a democratic government was instituted a number of positive institutional and economic reforms have been implemented which, along with the oil price boom of the 2002-2008, has brought about some positive change to the country. It remains to be seen whether or not these fiscal reforms and economic incentives will be sustained.

Evidence of an appreciating exchange rate during oil price booms, and deindustrialisation, do point towards a 'resource curse' for Nigeria. Although the country is the largest oil producer in Africa, future oil production is uncertain and exploration activity is the lowest it has been in a decade with only three exploratory wells drilled in 2011 (EIA 2012b). However, reserves are substantial. According to EIA (2012b), Nigeria had proven oil reserves of 37.2 billion barrels at the end of 2011, which at a production level of 2.13 million bbl/day in 2011 equates to 48 years of supply if no new oil reserves are found. Uncertainties over future domestic consumption exist, but could adversely affect net oil exports in the future if current trends continue.

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