GDN Working Paper Series

Oil and Institutions

"Tale of two cities": Nigeria and Colombia

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Working Paper No. 44

June 2011

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This Working Paper has been prepared as part of the GDN's first Inter-regional Research Project *Latin America and Africa: Cross-Regional Dialogue on the Effects of Commodity Dependence.* The project has been funded by the World Bank and the UK Department for International Development (DFID). The views expressed in this publication are those of the author(s) alone.

Oil and Institutions
"Tale of two cities": Nigeria and Colombia

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Abstract

This paper compares the macroeconomic and regional effects of oil abundance (or dependence) in Colombia and Nigeria and how they have managed it (both in terms of sectorial and macroeconomic policies and institutions), in order to derive policy recommendations for them, as well as for other oil abundant countries. We examine the evolution of oil sector institutions, and the effects of changes in oil production and prices on macroeconomic performance. We test also the institutional hypothesis that states that better institutions mitigate the possible negative effects of resource abundance. We use a variety of different techniques to test these hypotheses. First, we estimate the effects using a cross-country model for 95 oil and non oil producer countries between 1980 and 2005. Then we turn to individual estimations in the two countries separately. OLS estimations allow us to estimate the effects of institutional quality. Then, SVAR methodology help us to identify for both countries the presence of Dutch Disease phenomenon, ie, the main effects of oil production and price booms on several macroeconomic variables. For these two models we use time series for the 1963-2008. We analyze also stylized facts of macroeconomic performance of both countries during the most important oil price booms: 1972-1980 and 2003-2008. Finally, we analyze through case studies the regional effects of oil abundance in both countries.

JEL Classification Numbers: H72, H77, Q38, R58

Key Words: Natural Resource Curse, Institutions, Colombia, Nigeria, Royalties, Oil Production and Price Booms

[1] We would like to thank Oscar Arboleda, Diana Contreras and Yanira Oviedo for their excellent research assistance. We would like to thank also comments received at University of Ibadan and Fedesarrollo seminars, as well as comments from Mauricio Cárdenas.

I. Introduction

Nigeria is a low income oil dependent country. It had an income per capita of US $2.162 in 2008 and an oil production of 2.09 million barrels per day, representing 37.1% of its GDP. In contrast, Colombia is a middle income country with a more modest production of oil and just mildly dependent on this resource. It had an income per capita of US $8.205 in 2008 and an oil production of 0.6 million barrels per day, representing just 4.9 % of GDP.

The objective of this paper is to compare the macroeconomic and regional effects of oil abundance (or dependence)[1] in these two countries and how they have managed it (both in terms of sectorial and macroeconomic policies and institutions), in order to derive policy recommendations for them, as well as for other oil abundant countries. The paper analyzes in a comparative way the effect of oil sector institutions and policies on sector performance and of oil abundance (and in the case of Nigeria, oil dependence) on macroeconomic and sub-national performance. The questions to be answered and the hypothesis to test are the following. Has oil production been a blessing or a curse at national and regional levels? Specifically, has growth in oil production and revenues resulted in higher GDP growth rates? Have oil booms led to reductions in other exports in the short and long run? Has oil abundance resulted in higher GDP volatility and income inequality? In particular, we examine the role of institutions and policies. Have oil sector institutions promoted exploration and exports and guaranteed a sound balance between investment and sector growth, on the one hand, and Government take, on the other? Has the effect of oil production and revenues on development depended on the quality of institutions and governance? Have institutions and policies augmented or mitigated the effects of oil price volatility and changes in oil production on GDP volatility? Have institutions and policies helped mitigate potential Dutch Disease effects? (e.g., have they guaranteed output and export diversification in the long run?)

The paper is divided in five parts, including this introduction. In the introduction we compare the main stylized facts in both countries. In Section II we discuss the rules of the game that regulate the sector: extent of public and private ownership, governance of the oil State enterprise and incentives to invest in exploration and development of oil and gas reserves, government take and use of fiscal resources. In Section III we present a comparative analysis of the macroeconomic effects of oil production, exports and fiscal revenues on macroeconomic performance in both countries, attempting to identify structural characteristics, institutions and policies that explain the observed differences. We use in a complementary way simple bi-variate comparisons, cross-country panel regressions, and time series econometric estimations (ie, SVAR and OLS) to test the main hypotheses. In Section IV we present comparative regional case studies to identify different regional impacts of oil production in both countries, attempting to identify how governance and fiscal relationship between central and sub-national governments, in terms of allocation of revenues and expenditures (and in particular in the way both levels of government share oil rents), influence the observed outcomes. Section V concludes.

[1] Although there is not a clear definition in the literature, in order to differentiate Nigerian from Colombian natural resources, in this paper we define natural resource dependence as natural resource exports over total exports ratio higher than 90%. As Table 2 shows, Nigeria is oil dependent, while Colombia is oil abundant.

The two countries are of similar area, but Nigeria has more than three times the population of Colombia, and thus higher density. As mentioned, Nigeria is a much poorer country with income per capita one fourth lower than Colombia. Colombia has a higher per capita GDP than middle income countries average and lower linguistic fragmentation. Nigeria, in turn, also has a larger per capita GDP than the low income countries average, but higher linguistic fragmentation (see Table 1).

Social indicators show large differences in both countries, as well. Income poverty is almost three times higher in Nigeria. However, income distribution is worst in Colombia, although higher in both countries as compared to their own peers. Finally, Colombia presents generally better indexes of quality of institutions, except with respect to political stability, in which both countries have similar and very poor rankings. As compared to their peers, Nigeria presents better institutional quality indexes except for the corruption perception index, while Colombia presents lower values of such indexes (See also Table 1).

Table 1: Colombia and Nigeria: General Characteristics

	Colombia	Nigeria	Low Income Countries	Middle Income Countries
Area (Km^2)	1.109.500	923.768	n.a	n.a
Population 2006	45.558.450	144.719.953	n.a	n.a
GDP per capita PPP [1/] (Average 1980-2006)	$ 5.090	$ 1.308	$ 1.211	$ 4.318
Linguistic fragmentation Index[2/]	0,019	0,850	0,414	0,425
Poverty line under 1US/daily (Average 1995-2005)	16%	64%	49%	
Gini index (Average 1995-2005)	57,78	44,60	39,20	40,80
Corruption Perception Index (Average of available ten last years data)[3/]	75 (3,78)	130 (2,5)	2,36	4,47
ICRG Index[4/] (Ten last years available average)	106(-0,69)	(-1,58)	-1,05	0,409
Political Stability & Absence of Violence/Terrorism[5/] (average 1996-2007)	203 (-1,81)	202 (-1,67)	-0,71	0,26

1/ US Dollars in 2005 constant prices
2/ Herfindal index of languages, see Easterly (2001)
3/ Ranking of 180 countries; source: Transparency International
4/ Composite Risk Index; source: ICRG
5/ Ranking of 210 Countries; source: World Bank Governance Indicators
Other sources are The World Bank World Development Indicators (WDI) and Deininger and Squire Database for income distribution.

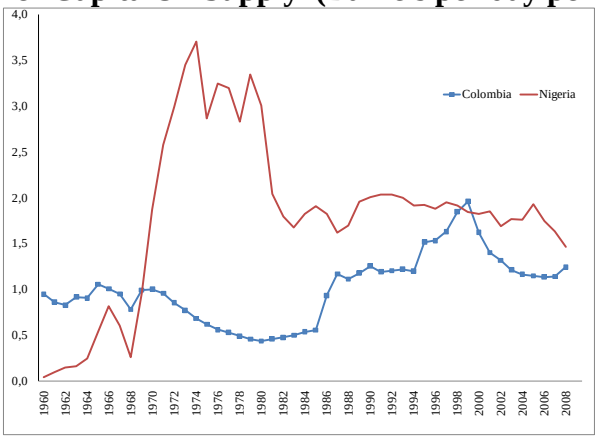
Nigeria is a more oil abundant country than Colombia. As Table 2 shows, all sectorial figures have been much larger in Nigeria: average oil production has been six times larger, reserves are twenty four times larger and oil exports sixty times larger. However, oil production in per capita terms reached a similar level in both countries at the end of last decade, and is 31% lower in Colombia at present (See Figure 1). Oil dependence is much higher in Nigeria: oil exports and fiscal revenues represent much lower fractions of total exports and fiscal revenues, respectively, in Colombia than in Nigeria. Non-oil exports to GDP are approximately 4% in Nigeria and above 12% in Colombia.

Table 2: Colombia and Nigeria: Oil Abundance-Dependence

Country	Colombia	Nigeria
Crude Oil production (Thousand barrels per day, average 1997-2007)	340,36	2053,36
Proved Reserves (Billion Barrels) 2008	1,5	36,22
Net hydrocarbons exports (Million dollars 2008) (Average 1997-2007)	11.301	661.052
Reserves/ production (2008)	2,56	17,95
Number of exploratory oil wells (Average 1998-2008)	34	2552
Net oil exports/Total exports (average 1990-2008)	2%	83%
Oil revenues/Total fiscal revenues (average 2004-2008)	22%	81%
Non oil exports/GDP (Ten last years available average)	12%	4,2%

Sources: WDI, IFS-IMF, IMF Article IV and national sources.

Figure 1: Total Per Capita Oil Supply (Barrels per day per 100 population)

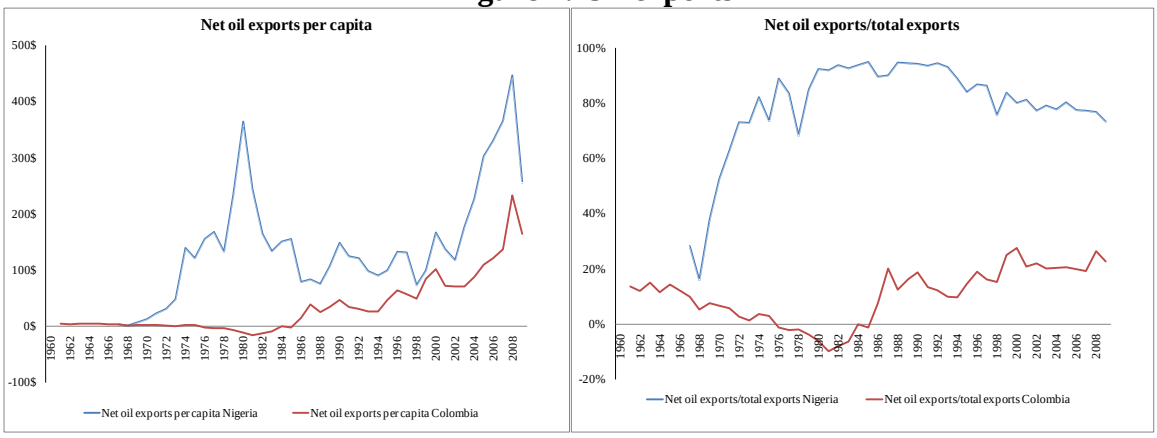


Nigeria's per capita oil production peak coincided with the first price boom (1972-1980), declined afterwards sharply and has been relatively constant since 1982. This trend has been in line with OPEC production quota agreements, an organization that Nigeria joined in July 1971. OPEC has been reducing supply in order to shore the price of crude oil. In contrast, Colombian production was declining and at its lowest during the first price boom, increased afterwards peaking in 2000 and declined again during the second price boom. It has increased slightly again more recently.

In per capita terms, Nigerian net oil exports had two peaks during the oil price booms, while Colombia had an increasing trend since 1987, when the country became again a net exporter. Oil exports in Nigeria increased rapidly during the first oil price boom, attaining a participation in total exports above 80%, peaking over 90% during most of the eighties, and decreasing slowly during the last decade. In Colombia oil exports participation on total

exports increased continuously since 1987 reaching 10% at the end of the 90s and peaked to 20% in 2008 (See Figure 2).

Figure 2: Oil exports



During the last four decades macroeconomic performance also showed important differences (Table 3). While per capita annual GDP growth in Colombia for the period 1965-2006 was a modest 2,1%, in Nigeria it was a low 1,7%. Nigeria's growth was lower than the average for low income countries, and Colombia´s growth was also lower that the average of middle income countries. GDP volatility was significantly higher for Nigeria - and it was higher for both countries as compared to their peers. From 1996 to 2006 Nigeria had higher savings and investment rates as compared to Colombia, though both countries had lower rates than their respective categories.

Table 3: Macroeconomic Performance

Country	Colombia	Nigeria	Low Income Countries	Middle Income Countries
Average GDP per capita growth (1965-2006)	2,1%	1,7%	1,9%	2,8%
Annual volatility of GDP (Standard deviation 1965-2006)	5,5%	9,2%	1,5%	3,2%
Total saving %GDP (Average 1996-2006)	15,4%	21,9%	24,2%	26,7%
Total investment %GDP (1996-2006)	18,1%	21,7%	22,5%	25,3%

Sources: WDI and IFS-IMF.

II. Oil Sector Evolution, policies and institutions

This section describes sector regulation and institutions across time, showing the most important reforms connected to the evolution of the sector: ie, role of the State Oil Company and changes in Governance, investment regimes, private sector participation, royalties, taxes, allocation and use of revenues, etc. This section describes sector regulation and institutions across time, showing the most important reforms connected to the evolution of the sector: ie, role of the State Oil Company and changes in Governance, investment regimes, private sector participation, royalties, taxes, allocation and use of revenues, etc. Main questions asked are: What were the main reforms that generated changes in sector

outcomes? Which were the main determinants of these reforms? How has the role and governance of the Oil State Company changed overtime? How much private participation is there? Have the rules for private investment been stable and credible? How do they distribute risks and rents between actors? Related to the distribution of resources and to macro-stability policies, how is the use of oil revenues regulated? Is there a stability fund that saves during booms and spend during busts? How are fiscal revenues shared between different levels of government? Are expenditures earmarked?

Colombia

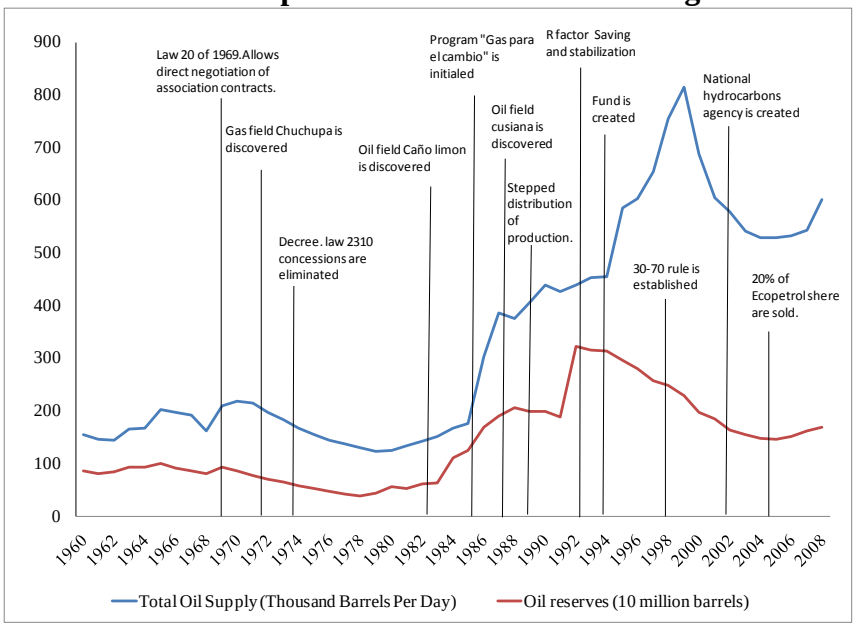
The history of Colombian oil dates back to 1905 when the government of General Reyes granted two land concessions for oil exploration and exploitation to Virgilio Barco and Roberto De Mares, the first one located in the Catatumbo zone, close to the border with Venezuela, and the second one in the Magdalena Medio Zone. The De Mares concession was scheduled to end in 1951. The Colombian government created the National Petroleum Company (Empresa Colombiana de Petróleos - Ecopetrol) to assume the assets and operations of the De Mares concession. Ecopetrol subscribed the first partnership contract in 1955.

During the 69 years (1905-1974) of the concessions system "2807 proposals were submitted and 454 were concluded in concession contracts" (Ecopetrol, 2001). Colombia had no significant exploration activity in the fifties and sixties, until 1969. Several reasons explain this behavior. First, awarding concessions was a time-consuming process. Concessions did not require minimum exploration levels, nor devolution of non prospective areas. This process allowed foreign companies to request large chunks of land that remained unexplored for long periods. Second, prices were set arbitrarily to pay for the oil needed for internal refining, which discouraged exploration. This was seen by the Government as a way to compensate by low oil taxation, due to generous depletion allowances. Third, since its creation, Ecopetrol was consolidated as an upstream company, receiving significant reserves under production and a refinery complex and under no pressure to explore. In exploration "... had not ventured outside the De Mares Concession, although the legal framework empowered it to procure and explore prospective areas by itself at any corner of the country" (Ecopetrol, 2001). There was no pressure to reform these policies for a long time since the country was a net oil exporter.

However, "By 1967 the Colombian oil reserves situation was disturbing. It was expected that with the 867 million barrels available and with a demand growth of 6%, the country would be self sufficient until 1973, unless new reserves were discovered" (Ecopetrol, 2001, p. 91). The decline in reserves (see Figure 3), the international environment of greater private ownership of oil reserves and the need to reform the legal basis necessary to encourage exploration, led to the adoption of Law 20 of 1969, which regulated joint venture contracts[2] that would be directly negotiated by Ecopetrol in the areas it chose, in addition to the existing concessions contracts.

[2] There had been a couple of joint venture contracts signed since 1953.

Figure 3: Oil reserves and production and investment regimes in Colombia



Source: Ecopetrol & ANH

The new scheme attracted foreign investors. The new contracting Law allowed the entry of new companies to the country, both small and medium, as well as traditional multinationals, such as Aquitaine. In 1972, under a joint venture agreement, Texaco achieved the most important discovery in the gas sector: Chuchupa in La Guajira department.

However, oil production continued to decline and by 1974 the country became a net oil importer, just in the middle of the first price boom. The government proceeded then to revise the legislation. A study by Fedesarrollo in 1973[3], financed by the Central Bank (Banco de la República), gave the basis for the reforms introduced by the Lopez Michelsen´s administration in 1974, through Economic Emergency powers (Decree 2310 of 1974), intending to speed up oil exploration and increase oil reserves. The decree suspended the concession contracts going forward, respecting the ones under active exploration, and eliminated a tax deduction for depletion that reduced oil taxation significantly. From there on private companies could only opt for joint venture contracts with Ecopetrol with stringent exploration requirements, and progressive devolution of the areas allocated for exploration, which put pressure to invest promptly. Private companies explored at their own risk and once a discovery was made and production authorized Ecopetrol would join as a partner paying 50% of development and production costs and receiving half of the production, after a payment of 20% royalties to the national, departmental and municipal governments.

Decree 743 of 1975, that regulated Decree 2310 of 1974, established that the Joint Venture contracts were object of private law and subject to civil jurisdiction. "Ecopetrol would be

[3] *La política petrolera en Colombia*, Hernando Gomez Otálora y Guillermo Perry, Fedesarrollo, mimeo, 1973.

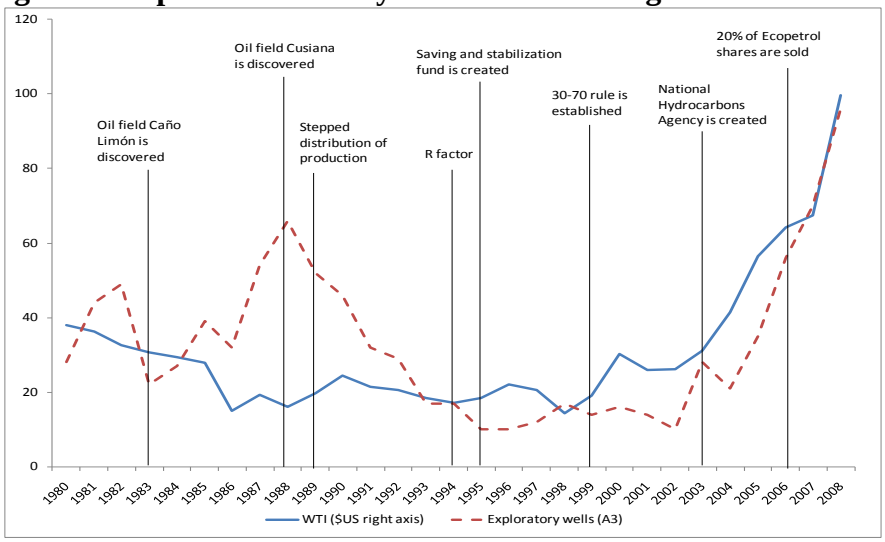
responsible to manage, with the flexibility that gives private law, Colombian crude oil" (Ecopetrol, 2001, p. 97). These reforms were accompanied by liberating controls on prices paid for crude oil for domestic consumption, which, as companies could only export after satisfying domestic requirements, had become a major disincentive for exploration. The domestic price for crude oil was linked from there on to the FOB price converted to pesos at the free market exchange rate. At the same time, the elimination of the depletion allowances increased significantly governement's take.

The new policy increased the number of contracts with foreign companies and reactivated exploration. In 1983 the American company Occidental made the most important discovery since the 50's: Caño Limón in Arauca, near the border with Venezuela. Colombia regained self-sufficiency and became again a net exporter since 1986, after the construction of a long pipeline from Cano Limon to the Atlantic Coast was completed. The improved situation allowed Ecopetrol to make again operational profits, the government took back royalties revenues (which were left to Ecopetrol to compensate losses made on subsidized gasoline sales) and began to "tax" Ecopetrol and request distribution of dividends. Oil taxes and revenues became since then important sources for the government budget.

This same year the Government began the construction of another large pipeline from "Los Llanos" region to Coveñas, which allowed the export of crude oil from the Casanare department, a region with a high potential.[4] This decision and the opening up of former reserve areas for private exploration (as well as a modest plan for direct exploration of Ecopetrol) reactivated exploration throughout the country (see Figure 4) and particularly in this region. This led to the discovery of other major fields (Cusiana and Cupiaga) in 1988 and 1990.

[4] *Estudio Nacional de Energía*, DNP, and Mejía, Millán and Perry, 1980

Figure 4: Exploration activity and investment regimes in Colombia



Source: Ecopetrol & ANH

The enthusiasm for the recent discoveries led to reforms in the joint venture contracts in 1989. The contracts were amended increasing Ecopetrol participation as cumulative production increased, from 50% up to a maximum of 70%, just when well production and profitability of the fields began to decline. These poorly designed contracts affected negatively the interest in drilling

The low competitiveness of the Colombian tax scheme and contract[5] and the weak performance in exploration, led to another change in the joint venture contracts in 1994. The scheme made Ecopetrol share over 50%. This share depended on the profitability of the field (the so called “R factor “: revenues over total expenditures), replacing the distribution based on cumulative production." In 1995 Ecopetrol became involved with venture capital, and paid costs of exploratory wells that were dry".[6] These reforms resulted in increased exploration activity and new joint venture contracts

By 1999, however, reserves and oil production were again declining and it was expected that the country would become again a net oil importer by 2003. This led to another reform in the joint venture contracts, where the participation of Ecopetrol began at 30% and not 50% as before. Law 756 of 2002 defined the amount of royalties between 8% to 25%, percentage depending on production. For heavy oil (less than 15 ° API), established a discount of 25%. The taxes in the exploration phase depend on the location and size of the explored area. Unfortunately, these reforms didn´t have either a major impact in exploratory activity.

[5] "While Colombia offered in the early nineties a contractual and fiscal system, which on average generated a State participation of 84% and an expected return for the private partner of around 7%, countries with equal or better prospects than Colombia, the State offered shares between 50% and 60% and expected returns of 15% "(Ecopetrol, 2001, pp. 108).

[6] (Flórez Enciso, 2005, p. 9.)

By 2003 the situation "... was deteriorating due to the internal conflict, a rapid decrease in exploratory activity (only 10 exploratory wells in 2002) and the consequent reduction in production with the fear of loss of self sufficiency."[7] Colombia was still not competitive against other producers. It was estimated that the State's stake in the oil sector reached 82%, while the average of competitors was 67%. This led to a new structural reform in the hydrocarbon sector through Decree-Law 1760 of 2003.

The 2003 reform deeply changed the structure of the oil sector. It separated regulatory powers, handed over to a new National Hydrocarbons Agency (ANH), reinstated concession contracts and gave Ecopetrol more flexibility to operate as a profit making firm, allowing it to issue minority shares through the stock exchange (following Petrobras successful example), which were widely bought by Colombian investors. Minority shareholders are now represented in its Board. Ecopetrol has now to compete with private companies for concession contracts allocated by ANH and can engage freely with private partners in downstream and upstream investments in Colombia and elsewhere. It has significantly expanded its national and international portfolio and its shares have had a significant valorization. Since the creation of the ANH, exploration activity in Colombia has increased steadily. From 28 A3 type wells drilled in 2003 in 2008 were 96 (see Figure 4). The decline in production has been halted and average production has been 543 k (see Figure 3 again).

Share with sub-nationals and public finances

Currently, producer departments receive between 47.5 and 52%[8] of total oil royalties, while municipalities receive between 12.5 and 32%. In addition, departments and municipalities where the port to export oil exist receive 8% of total royalties. The remaining amount is for the National Royalties Fund, and these resources are allocated to regional public projects for all regions. 90% of royalties received by the Departments should be allocated to priority projects included in the Departmental Development Plan; no less than 50% should be allocated to projects included in the municipalities of the department that do not receive royalties, and no more than 15% can be allocated to only one municipality (Law 156 of 2002).

Historically, increases in production since 1986, and the transition to become a net exporter, increased Ecopetrol income and profits. In fact, it generated a boom in fiscal revenues in Colombia. In 1987 oil exports represented 26.2% of total exports, and taxes to oil companies represented 17.6% of total income tax revenues, and 6.5% of total revenues. In sum, savings generated in the sector represented 73.7 % of total public savings. Since 1986 no more than 50% of Ecopetrol profits could be transferred to the central government, as well as a portion of royalties (Perry, 1992), allowing the use of savings for investment and not to finance central government deficit. In the following years, Ecopetrol paid in addition an income tax rate of 50%, and central government revenues from the oil sector reached 17.6% of current revenues.

[7] Colegio de Abogados de Minas y Petróleos, 2005, pág. 127.
[8] These percentages depend on the amount of production.

Later on, Cusiana and Cupiagua discoveries in 1988 and 1992 respectively created the need to implement a stabilization fund, since the amount of both discoveries was high enough to generate Dutch Disease symptoms. In 1995 the Oil Savings and Stabilization Fund (FAEP) was created, aiming to "stabilize currency income from oil exports to isolate its effect on the exchange rate; avoid Dutch Disease phenomenon related to the displacement from tradable goods toward oil and non tradable goods, and avoid inflation increases and unemployment" (Contraloría General de la República, 2000). A savings formula was imposed for the three levels of government -departments, municipalities and the central government- based on a basic income plus the moving average in the previous months. FAEP resources where invested by the central bank abroad. However, central government eliminated this fund in the National Development Plan 2006-2010, not obliging Ecopetrol to save in the fund[9], and distributing saved resources for public finances reorganization.

Recently, to capitalize Ecopetrol, Law 1118 of 2006 allowed issuing bonds for up to 20% of its value, becoming a "Sociedad de Economía Mixta". Although the reform was implemented during the recent oil price boom, it affected a source of central government revenues.

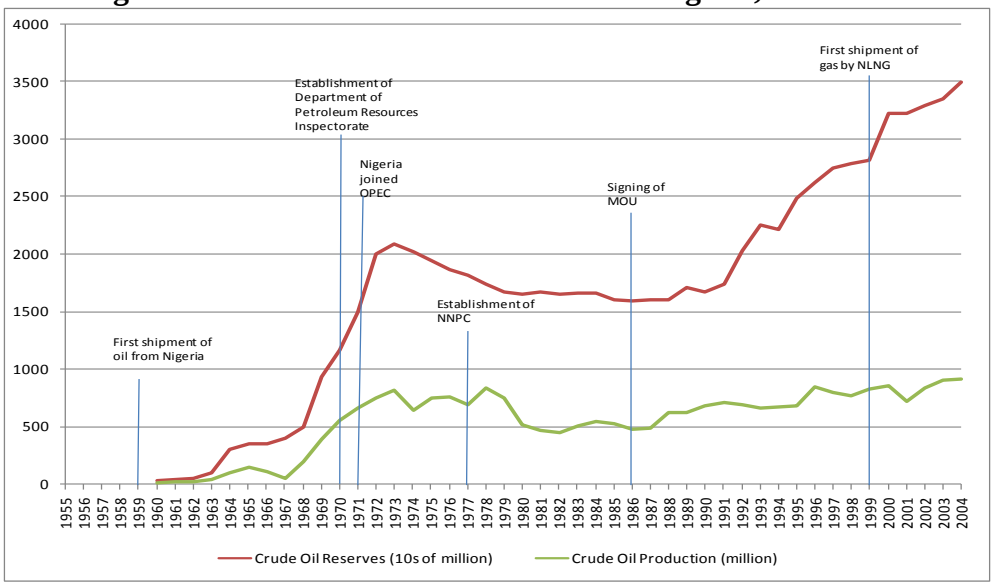
Nigeria

The first oil prospecting licence in Nigeria was issued in 1906 to the British Colonial Petroleum Corporation for an area of 100 square miles in the Benin district. Oil was first discovered in commercially viable quantities in 1956 in Oloibiri by Shell-BP and this was followed by discoveries in other areas such as Afam and Bomu. Production commenced in 1958 with the Oloibiri oil field producing 5,100 barrels per day (bpd) and the first oil exports were made in March 1958 to Amsterdam. Oil reserves increased from 300 million barrels in 1961 to 3.55 billion barrels in 1966 and thereafter stagnated around this value until the late 1969s. The discovery of more reserves led to a steady increase in production from 1958 until 1966 when there was a drastic fall from 420,000 bpd in 1966 to 140,000 bpd in 1968. This drop in crude oil reserves and production was as a result of the Nigerian civil war that was particularly detrimental to the oil industry because the Niger Delta where oil is produced was part of the Biafran region that was trying to secede from the Nigerian state.

Reserves and production picked up after the civil war (as shown in Figure 5) and by 1973 reserves had reached 20 billion barrels while production was 2.05 million bpd. There was a lull in exploratory and exploitation activities starting from 1975 and this resulted in falling reserves and production levels for about 10 years until 1986.

[9] Article 131, National Development Plan 2006-2010.

Figure 5: Oil Reserves and Production in Nigeria, 1960-2004



Sources: Central Bank of Nigeria Statistcal Bulletin, vol. 18, 2007 and Nigerian National Petroleum Corporation Annual Statistical Bulletin, 2005.

This drop can be attributed primarily to the government's policies in the oil industry. From 1956 when commercial production of oil started in Nigeria until 1970 the government was not actively involved in the oil sector but relied completely on the multinational oil corporations (MNOC's) for both upstream and downstream activities[10]. Starting from 1966 the government started taking a more active role in the oil sector and this was evidenced by the passing of Decree 65 of 1966 and Decree 1 of 1967. The Decrees amended the petroleum tax act to allow for greater revenue from oil to accrue to the government. The role of government in the sector took a more drastic turn in 1968 as a result of both internal and external policies. On the internal front, the Companies Decree of 1968 mandated that all companies operating in Nigeria to register in the country and in 1969 the Petroleum Decree was enacted which made four important provisions:

(i) it reserved exclusive rights for oil exploration, prospecting and producing licences only on Nigerian citizens or companies;
(ii) it gave the government the rights to part ownership of all new concessions;
(iii) it vested ownership and control of all oil resources in the government; and
(iv) the Decree made it mandatory that within 10 years of a company obtaining an oil mining lease, at least 75% of all senior and supervisory staff of the MNOCs were to be Nigerians.

On the external front, in 1968 when OPEC adopted the Declaratory Statement of Petroleum Policy in Member Countries, the Nigerian government came under pressure to start taking measures aimed at wresting full and total control from the MNOCs operating in the country.[11]

[10] Box 1 provides an outline of the Nigerian government.s participation in the oil sector
[11] Nigeria officially joined OPEC in 1971 but its oil policy had been heavily influenced by OPEC since the late 1960s because the country had been attending meetings some years prior to becoming a member.

Consequently, the Department of Petroleum Resources (DPR) was established in 1970 and this was followed by the establishment of the Nigerian National Oil Corporation (NNOC) in May 1971 to oversee and manage the government's interests in the oil sector. In April 1971 the government acquired its first equity in a MNOC by acquiring a 35% stake in Elf with the first participation agreement and by 1973 the government had acquired 35% equity in all the oil companies. The government's participation was in the form of Joint Operating Agreements (JOA) with the oil companies through the NNOC where costs and revenues were split between the partners based on their equity holdings. Government's equity in the oil companies was increased with the second participation agreement to 55% in 1975 and the third and fourth participation agreements increased government's equity to 60% in 1979.[12] The response of the oil companies to this spate of government policies was to desist from exploratory activities and this led to the drop in reserves and production for much of the late 1970s and early 1980s (Figure 5 again).

Following this drop on reserves and production, the government responded by introducing a number of financial incentives to encourage exploration and such incentives included reducing the petroleum company tax for companies who were already exploring but not yet producing and cancelling the requirement of provision of (subsidised) one-third of domestic oil requirements. Exploration and production did not increase substantially following these initial efforts. However, in 1986 the government introduced the Memorandum of Understanding (MOU) which guaranteed a minimum after tax and royalty fiscal margin of $2 per barrel. Box 2 provides a description of the MOU and it can be seen from Figure 5 that the MOU's provided sufficient incentive to the MNOCs as reserves and production witnessed a steep rise after 1986 . Further increases in reserves came from 1991 following the increase of the minimum fiscal margin to $2.50 by the MOU of 1991.

[12] An exception was Shell-BP because BP's shareholding was nationalised and the government obtained 80% equity and Shell having 20%.

Box 1: Evolution of Government Participation in the Nigeria's Oil Sector

Pre-1966 gave multinational oil corporations (MNOCs) free hand in decision making with respect to production level and quoted prices. Even royalty and sales tax payments were determined by the headquarters of these MNOCs leaving the government with virtually no say in how the industry was run and since these corporations aimed at maximising profits, exploratory activities were also at full swing. The sector was truly an enclave as limited inter-sectorial linkages between the oil sector and the Nigerian economy were recorded. Most personnel and equipment were sourced from abroad and majority of the profits were repatriated. This increasingly led to agitations that the country was not benefiting fully from the sector and that there was a need to end the foreign domination of the sector.

Efforts by the government to end domination of the oil sector by MNOCs started in 1968 with the creation of two institutions. However, the creation of the Department of Petroleum Resources (DPR) as a regulatory body and the Nigerian National Oil Corporation (NNOC) in charge of commercial interest of the government was not devoid of operational problems as the relationship between these two bodies resulted in conflict of interest and inefficient service delivery. The creation of Nigerian National Petroleum Corporation (NNPC) in 1977 scrapped these bodies and vested regulatory powers and commercial interest of government in the same body, NNPC. This arrangement did not resolve the problem of the sector as inefficiency, and corruption coupled with ambiguity in its role as national oil company (NOC) and a regulator of the oil sector. In 1983 a new regulatory body was created as the Ministry of Petroleum Resources and Energy.

Various efforts at making the NNPC more efficient and effective have led to a number of restructuring in 1985, 1988, 1998, and 1999. At present NNPC is an integrated oil and gas company which has about 9000 staff. The management structure comprises of the Board of Directors, the chairman of who is the Minister of Energy. The day-to-day operations are run by the Group Managing Director (GMD) assisted by 4 Group Executive Directors (GEDs): Exploration and Production, Refineries and Petrochemicals, Finance and Accounts, and Corporate Services. Other members of the board are the Group General Manager (GGM) Legal Services/ Company Secretary and 6 people appointed by the government from outside the corporation. NNPC is a holding company with 11 wholly-owned and 2 partially-owned subsidiaries or corporate business units (CBUS).

A Petroleum Industry Bill (PIB) is currently before the National Assembly seeking to addresses key issues of regulatory, institutional and fiscal framework of the Nigerian petroleum industry and proposes ways of creating institutions in the oil sector that can participate actively on the global level with other NOCs such as PETROBRAS in Brazil or PERTAMINA in Indonesia. The PIB is to ensure (1) increased transparency in all activities relating to the industry; (2) simplification and expansion of government revenue from the industry through various reforms to taxes and royalties; (3) increase indigenous participation through relaxing barriers to entry of small and medium scale enterprises; (4) employment generation and promotion of local content thorough granting incentives, stipulation of minimum employment requirements for Nigerians, articulation and operation of community development programmes; and (5) restructuring and reforming oil and gas institutions with a view to ensure efficient service delivery and minimise conflict of interest. Furthermore the Bill seeks to unbundle NNPC into nine independent Corporations with two of them in charge of regulation.

From the mid-1990s Nigeria has been producing over 2 million bpd with peak production reached in 2005 with 2.63 million bpd. Since December 2005 oil production has been reduced due to increased militant activity in the Niger Delta.[13] It is estimated that about 20% of Nigeria's oil production capacity has been closed because of such militant activities (Energy Information Administration, 2007). It is further estimated that as at April 2007, 587,000 barrels per day[14] of oil is unable to be produced due to the militant activities; and lost revenue since the start of the militant activities was estimated at US$16 billion (Energy Information Administration, 2007).

[13] Such militant activity started in December 2005 and includes kidnappings and bombing of oil installations.
[14] Out of this figure Shell accounts for 477,000 bpd.

Box 2: MOUs – Incentives for MNOCs Participation in Nigeria's Oil Sector

Following government's increased participation in the oil sector from the 1970s, MNOCs reduced exploration activities and this resulted in dwindling reserves from 1974. Although the government initiated a number of policies and incentives to encourage exploration, these proved insufficient as reserves continued to fall. In 1986 the government introduced the Memorandum of Understanding (MOU) which set out a new fiscal relationship between the government and MNOCs. The fiscal regime in the oil sector comprises of two types of agreements: Joint Operating Agreements (JOAs) and Production Sharing Contracts (PSCs). The MOU only applies to JOAs which account for about 95% of oil production and was revised in 1991.

Under the MOU, two different formulas are used in calculating taxes and MNOCs have the option of choosing which formula (usually the lower) they wish to use. The first formula uses Petroleum Profits Tax (PPT) and royalties; while the second formula, called the Revised Government Take (RGT) uses features embedded in the MOU. Based on the 1991 revised MOU, the RGT guarantees a fixed margin after taxes to the MNOC if oil prices are between $12.50 and $23 per barrel. The actual margin depends on investment per barrel and the margin payable to the MNOC varies if oil prices fall outside the band. The RGT guarantees a margin of $2.30 per barrel if investment is below $1.50 per barrel; or $2.50 per barrel if investment is above $1.50 per barrel. In addition to the guaranteed margin the RGT also features a Reserves Addition Bonus (RAB) which calculates how much to be paid to MNOCs for added reserves.

MNOCs were favourably disposed to the RGT and the guaranteed profit margin was a big incentive. This led to increased investments after the MOU in 1986 which was evidenced through the rapid increase in reserves and production by oil companies.

Distribution of Oil rents

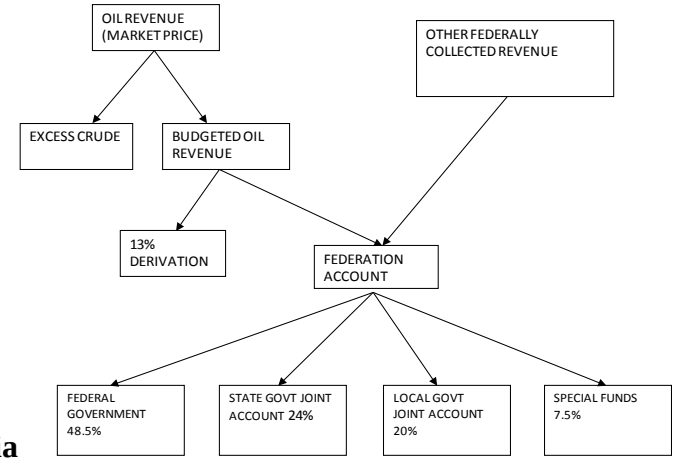
The distribution of oil revenue and the fiscal relationship between the three tiers of government in Nigeria, coupled with the share of oil benefits that should accrue to the oil producing areas has been a contentious issue since independence. Even before the discovery of oil Nigeria has been a country heavily reliant on natural resources with agriculture as the main stay of the economy with the producing regions and other states and local governments of the opinion that they deserved a larger portion of federally collected revenue than the federal government. At independence the revenue allocation formula was that 20% of federally collected revenue should accrue to the federal government, 50% to natural resource producing regions, and 30% was to go into a Distributive Pool Account (DPA) from which allocations would then be made to all regions. Revenue allocation formulas have changed drastically since independence and at present the allocation formula ensures that oil producing areas get 13% of revenue from budgeted crude oil sales while the rest, along with all other federally collected revenues, goes into the federation account.[15] Figure 6 shows the current revenue allocation formula and it is seen that the federal government gets the lions share from the federation account with an allocation of 48.5% while state governments share 24% and local governments share 20% with 7.5% going into special funds. From Figure 6 it is seen that both oil and non-oil revenue go into the central 'pot' called the Federation Account and these are then distributed based on the above formula. However, this figure masks the true composition of the different components of government revenue because revenue from the oil sector completely dominates all government revenue. Oil revenue accounted for 23.6% of federally collected revenue in 1970 but this increased substantially following the oil booms of the 1970s and oil has

[15] See Table A1 in the appendix for the evolution of revenue allocation in Nigeria.

accounted for over 70% of governemtn revenue since the mid-1970s. In 1980 oil contributed 81.1% to government revenue and this fell to 73.3% in 1990, but increased again in the 1990s and it was 83.5% in 2000.by 2007, oil accounted for 78.1% of government revenue[16]. On the other hand non-oil revenue has on average contributed less than 30% to total government revenue since the mid-1970s[17]. Thus, a substantial part of the federation account consists of oil revenue.

From 1975 the federal government has been getting a larger percentage of federally collected revenue and the derivation going to oil producing areas has been falling and this reached a dismal 3% in the 1990s and was increased to 13% in the 1999 constitution. This has prompted numerous agitations from both the states and oil producing areas. The states are heavily dependent on federally collected revenue and many states complain of inadequate revenue to fund development projects. Also, oil producing regions feel that since they bear the negative externalities of oil and gas exploration and production they should be adequately compensated for environmental degradation such as oil spillages, pollution, soil erosion, acid rain, among other things. The states and local governments regularly complain of federal dominance in revenue allocation and this can be traced back to the era of military rule which appropriated a lot of power to the centre. Unfortunately, the civilian administrations have not made any significant changes to the fiscal arrangement between different tiers of government and consequently power continues to be concentrated at the federal government level.

Figure 6: Current Revenue Allocation Formula in Nigeria



Sources: Udeh (2002) and Budget Office of the Federation and Federal Ministry of Finance (2008).

Related to macroeconomic policies, the fiscal balance of the federal government has improved in the last few years with the implementation of a medium-term expenditure framework (MTEF) to maintain prudent expenditures and due process in public procurement, and of an oil price based fiscal rule (OPFR) since 2004, where government expenditure is linked to a benchmark oil price so as to reduce the effects of volatile oil prices on revenue.

[16] Oil revenue comprises of crude oil and gas exports, petroleum profits tax and royalties, domestic crude oil sales, and other oil revenue
[17] Non oil revenue comprises of companies income tax, customs and excise duties, value added tax, and federal governemnt independent revenue.

Conclusions

Both countries exhibit a pattern that is common to many oil producing developing countries. When proven reserves stagnate or diminish, Governments introduce reforms that promote exploration, usually through enhanced incentives for private participation. On the contrary, when significant new reserves are found, government take is increased in a way that stifle exploration.

In Colombia, the initial finding of reserves in Magdalena Medio and Norte de Santander, was followed by a long period in which there were few incentives for new exploration. Reserves declined and the country became a net oil importer just when the first oil price boom began in 1972. This prompted a major revision of legislation and policies in 1974 and 1975 that strengthened incentives for private exploration (the domestic price was tied to the international price, reducing uncertainty and previous implicit taxation through low and arbitrary domestic prices) and private companies could easily access new areas through standard joint venture contracts with Ecopetrol (with a 50%-50% split after royalties), but had to offer and implement tight investment schedules in exploration and progressive devolution of areas. These changes led to a surge in joint venture contracts and exploration levels and, after a few years, to a major discovery in 1983 (Caño Limón). The country became again a net oil exporter in 1986.

In 1989 Government take was increased in new contracts in a poorly designed way (Ecopetrol share increased with accumulated production, hence when unit costs were increasing) and exploration levels declined after peaking in 1988. This rule was replaced by a better designed one, in which Government share increased with a profitability factor, in 1992. This change, and subsequent reductions in royalties and Ecopetrol share in marginal areas, led to a modest increase in exploration, which was however not sufficient to avoid a continuous decline in reserves after the Cusiana finding in 1992.

In 2002 a major reform was enacted, fueled by the fear of becoming again a net oil importer in a few years. Regulation and allocation of areas was shifted to a new agency (ANH), Ecopetrol issued minority shares in the stock exchange and became more agile and more independent from political pressures, concession contracts were reestablished and ANH hold succesive allocation rounds in which Ecopetrol had to compete with private companies. The number of contracts and exploration levels surged again. The decline in reserves and production was halted and reversed and, though there haven't been major new findings, the phantom of oil imports has faded and there is talk in town about –a yet uncertain- oil boom.

In Nigeria huge findings followed a long period of civil war in the Nigger delta. These findings prompted increases in government control and participation. In 1969 the Petroleum Decree reserved exclusive rights of exploration and production for Nigerian citizens or companies and gave to the Government partial ownership in all new concessions. These measures led to a slow but constant decrease in exploration and reserves, followed by a dcline in production (under OPEC rules in which production levels are set according to reserves). This was reverted in 1986 when the Memorandum of Understanding (MOU)

guaranteed a minimum after tax and royalty fiscal margin of US $2 per barrel (which was increased to US $2.5 in 1991). This led to a significant rise in exploration and reserves, followed by an increase in production

In both countries the share of royalties and proceedsallocated to local governments is high. Departments and municipalities receive in Colombia between 60% and 92% of royalties, and in Nigeria state and local governments receive about 44% of oil rents, though with higher central control. The fifth part of this paper is dedicated to analyze the effects of these decentralized allocation of rents on regional and local economic performance.

III. Oil and Macroeconomic Performance

In this section we test the main hypotheses related to oil abundance and dependence. We examine the effects of changes in oil production and prices on macroeconomic performance, and we test the institutional hypothesis that states that better institutions mitigate the possible negative effects of resource abundance. We use a variety of different techniques to test these hypotheses. First, we estimate the effects using a cross-country model for 95 oil and non oil producer countries between 1980 and 2005. This model allows identifying general effects of oil abundance in the world, and how accurate the model is to predict growth, volatility and income distribution in Colombia and Nigeria. Then we turn to individual estimations in the two countries separately. OLS estimations allow us to estimate the effects of institutional quality. Then, SVAR methodology help us to identify for both countries the presence of Dutch Disease phenomenon, ie, the main effects of oil production and price booms on several macroeconomic variables. For these two models we use time series for the 1963-2008. Finally, we analyze macroeconomic performance of both countries during the most important oil price booms: 1972-1980 and 2003-2008.

A. Cross-Country Results

This subsection shows and discusses the impact of oil production on Nigeria and Colombia's growth, volatility and inequality, as predicted by cross-country and panel models estimated by Perry and Olivera in a previous study, using panel data for 95 countries and for the 1960-2005 period (See Annex 1). Estimated dependent variables in these models are yearly or average per capita growth rates during the period, growth rate volatility for the period and average income inequality as measured by the Gini Index. Sector variables used for the estimations include oil production (in thousands barrels per day), oil price (in US constant terms), and net oil exports (per capita or as % of GDP). Institutional variables include measures of institutional quality (as measured by The World Bank Governance Indexes, ICRG and the Fraser Institute) or the degree of political competition (as measured by the political constraints and fragmentation indexes from the University of Pennsylvania). Control variables are selected from the existing literature and include, for the growth equations, the inflation rate, the real exchange rate index, government consumption, number of crises episodes, and education attainment. For the volatility equations, controls include credit to the private sector as % of GDP and educational attainment. For the inequality equations controls include total investment, agriculture value added and education attainment.

The econometric strategy estimates first standard models of growth, volatility and income inequality and includes then sectoral variables, institutional variables, and their interaction. Main results are reported in Tables 1 to 3 in Appendix 1. Results show that the relations of oil abundance with growth, volatility and inequality depend critically on the quality of the institutions and the degree of political competition of different countries. Growth is negatively affected by oil abundance, suggesting resource curse effects though quality of institutions and political competition mitigate or reverse these effects (the effect of the interaction of these indexes with indexes of oil abundance is positive and significant). Similarly, volatility and inequality always increase with oil abundance, but these effects are significantly higher for countries with low quality of institutions or low levels of political competition.

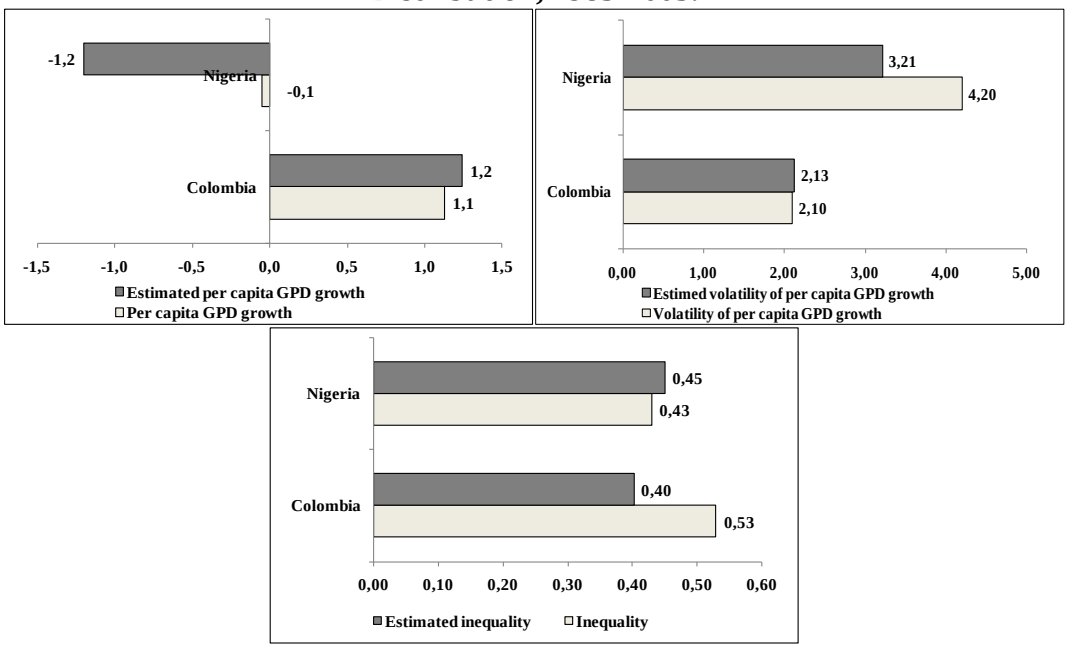
Table 4 reports the net effects of oil abundance (as measured by net exports per capita) as predicted by the model for Colombia and Nigeria, taking into account their interaction with the indexes of quality of institutions and political competition, evaluated at the average value of each variable for these countries during the period 1980-2005. Predictions suggest significant negative effects of oil abundance on growth and positive on volatility and inequality for Nigeria. They also suggest negative effects on growth and positive on volatility and inequality for Colombia, though much more modest. These differences for the two countries are driven by the much higher values of exports per capita and lower values of quality of institutions and political competition for Nigeria.

Table 4: Effects of Oil Abundance and Institutions (1980-2005)

Effects on	Institutional quality.		Political competition.	
	Colombia.	Nigeria	Colombia.	Nigeria
Per capita GDP growth.				
Institutional variable	Frazer legal sistem		Fragmentation.	
Oil exports per capita direct effect	-0.1573	-0.5566	-0.0871	-0.3082
Net efect with institutional variables	-0.09843	-0.3431	-0.02724	-0.05974
Volatility				
Institutional variable	Frazer legal system		Fragmentation of the government.	
Oil exports per capita direct effect	0.0117	0.0414	0.0429	0.1518
Net efect with institutional variables	0.007495	0.02615	0.001705	0.03838
Inequality				
Institutional variable	Frazer size of government		Fragmentation of the government.	
Oil exports per capita direct effect	0.0091	0.0322	0.0754	0.2668
Net efect with institutional variables	0.001082	0.013584	0.07001	0.25196

Model predictions for Nigeria and Colombia are based on coefficients estimated for the whole sample of countries. The results show that although the model has an adequate explanatory power, some idiosyncratic characteristics of each country should be taken into account. The fact that the overall predictions are not good for growth and volatility in Nigeria (they underestimate growth and volatility: see Figure 7) may suggest an overestimation of the negative effects of oil abundance (or of overall policies) on growth and an underestimation of the negative effects on volatility. Similarly, the fact that the overall prediction for inequality in Colombia is poor (it underestimates inequality; Figure 7) may suggest an underestimation of the effects of oil abundance (or of overall policies) on inequality.

Figure 7: Cross Country Model Predictions on GDP growth, Volatility and Income Distribution, 1985-2005.



B. OLS Models Results

This subsection presents Ordinary Least Square (OLS) results for Colombia and Nigeria estimated separately for the period 1960-2008, and discusses their statistical properties. The objective is to take into account the idiosyncratic characteristics that cannot be taken into account in the cross-section model presented above. The drawback is that we do not count with higher frequency data or long time series. Hence the explanatory power of these estimations is lower and the results are not very robust. However, these estimations complement the ones estimated using a cross-country database.

As in the cross country models, the OLS models are constructed parsimoniously, identifying first the standard model, and then adding sector variables and the interaction with institutions. All this to estimate: *(i)* the impact of the sector on the economy and if there are signs of Dutch Disease (such as negative impacts on non-oil exports); and *(ii)* the interaction between sector and institutional variables to determine if oil effects can be mitigated through improved institutions.

For both countries the same list of right hand side variables are used, including trade variables such as an openness index (excluding oil exports) and terms of trade, macroeconomic variables such as private domestic credit and the inflation rate; social variables such as years of education and homicide rates, and fiscal variables (public consumption, public expenditures, fiscal revenues or public balances). This subsection reports sector variable effects and net effects when sector variables interact with the

institutional quality index from the International Country Risk Guide (ICRG), based on estimations reported in Annex 2.[18]

Table 5 reports the most important results of (i) oil sector variable, (ii) the direct effect of institutional quality, measured with the ICRG Index, and the net effect including an interaction of both variables. The effects reported in Table 5 are estimated on the mean of each dependent variable of each country.

For Nigeria, oil production appears to affect negatively the per capita growth rate, and this effect is not mitigated by institutional quality. In Colombia oil production and net oil exports per capita affect positively the growth rate and this effect is enhanced by good institutions (Table 5). OLS estimations also show a negative effect of oil price on non-oil exports in Nigeria, an effect that is reduced with the improvement of institutions. In contrast, in Colombia none of the sector variables (oil price, oil production, and exports) appear to affect non-oil exports, even when the estimation includes only the net oil export period (1987-2008). Oil abundance measured by oil price affects positively Nigerian current account balance, and this effect is reinforced with improved institutions. In Colombia the effects are non-significant. Related to fiscal variables, revenues increase in Nigeria when oil production and exports increase, and these effects are strengthened when institutions improve. In Colombia the net effect of oil prices on fiscal revenues is also positive, the more so as institutions improve.

Table 5: OLS oil and institutions effects

	Colombia			Nigeria		
	Sector Variable	**Direct effect**	**Net effect**	**Sector Variable**	**Direct effect**	**Net effect**
GDP growth	Oil production per capita (TBPD)	0,006624	0,055936	Oil production per capita (TBPD)	-1,609278	-2,407986
	Net oil exports per capita (million dollars constant prices 2000)	0,0002307	0,027684	Net oil exports per capita (million dollars constant prices 2000)	-	-
Non oil exports (US millions 2000 constant prices)	Oil price (Dollar constant prices 2000)	-	-	Oil price (Dollar constant prices 2000)	-0,015245	-0,009147
Current acount (%GDP)	Oil price	-	-	Oil price	0,3189254	0,4183059
Tax revenues (%GDP)	Oil production per capita	-	-	Oil production per capita	0,488978	0,71831
	Oil price	-0,006098	0,009147	Oil price	-	-
	Net oil exports per capita	-	-	Net oil exports per capita	0,15192	0.48952*
Fiscal balance (%GDP)	Oil production per capita	0,008832	0,019136	Oil production per capita	0,121256	0,146298
	Oil price	-0,006098	0,005238	Oil price	-	-
	Oil production per capita *Oil price	0	0,07604212	Oil production per capita *Oil price	0,0401478	0.0401478*
	Net oil exports per capita	0,004614	0,01384	Net oil exports per capita	0,05064	0.05064*

* These interactions are not significant.

[18] Annex 2 reports only results for the sector variables with coefficients that show the expected sign from theory, even if not statistically significant. A similar procedure was followed for the models explaining other dependent variables below. As a consequence the estimations presented do not include the same independent variables for both countries.

C. SVAR models results

To analyze the effects of oil abundance or dependence on macroeconomic performance, this section estimate SVAR models to identify long run relationships between sectoral and macroeconomic variables. Estimation procedures follow Pieschacon (2009) and the technical aspects are described in detail in the Econometric Annex (Annex 3).[19] We use oil price, production and exports as exogenous oil sector variables, and GDP growth rates, fiscal expenditures, real exchange rate index (RERI) and non-oil exports as endogenous macroeconomic variables. The last two variables are intended to capture potential Dutch Disease effects.

Results for Colombia

Figure 8 show the impulse response functions to an oil production shock in Colombia. The upper left hand panel shows the impact of an oil production shock (one standard deviation) in period zero, on oil production itself in the following periods. It must be noticed that a shock does not disappear quickly: in fact, we find that it attains its full potential in period 4 and then declines but persists for about 10 periods. Such a response reflects the typical production pattern of a new oil discovery in Colombia. The remaining panels show the response of macroeconomic variables to this shock. As expected, the oil production shock induces initially an increase in the rate of growth of fiscal expenditures [20] (in the first two periods), though this effect is reversed afterwards (periods 8 to 10) as oil production shock dies out.[21] Also as expected, there is an appreciation of the RERI that lasts for six periods.[22] Growth rates increase initially (probably led by the observed acceleration in fiscal expenditures as well as by wealth effects), but the effect becomes negative from period 4 to 8, suggesting the presence of Dutch Disease effects. However, the behavior of non oil exports is not fully consistent with this hypothesis, as they tend to increase initially with the oil production shock (the effect is negative, though, around period ten). A plausible hypothesis that may explain this apparent inconsistency might be that Dutch Disease effects are indeed present and would show in a reduction of the rate of growth of the non tradable sectors as a whole (which we did not include in the model), though not initially on the rate of growth of non oil exports which might be more affected by other factors such as the behavior of international prices (for mineral and agricultural exports) and public investment.

[19] To verify the validity of the estimates we report in Annex 3 unit roots tests in each time series variable. We run three types of test: Augmented Dickey Fuller (ADF), Phillips-Perron, and Kwiatkowski-Phillips-Schmidt-Shin (KPSSS). Then, we identified the cointegrated relationship between the I(1) variables to check possible spurious relationships (i.e. relationships due to a common trend). We also report in Annex 3 the variance decomposition results.

[20] We use the rate of growth of fiscal expenditures (and not their level) in the Colombian SVAR as the fiscal expenditure series is upward trended in Colombia. See Annex 3.

[21] A variance decomposition exercise shows that up to 14% of the variance in fiscal expenditures growth can be attributed to the oil production shock by the second period. See Annex 3.

[22] Variance decomposition exercise shows that up to 32% of the variance in RERI can be attributed to the oil production shock by the fifth period.

Figure 8: SVAR impulse-response to an oil production shock for Colombia

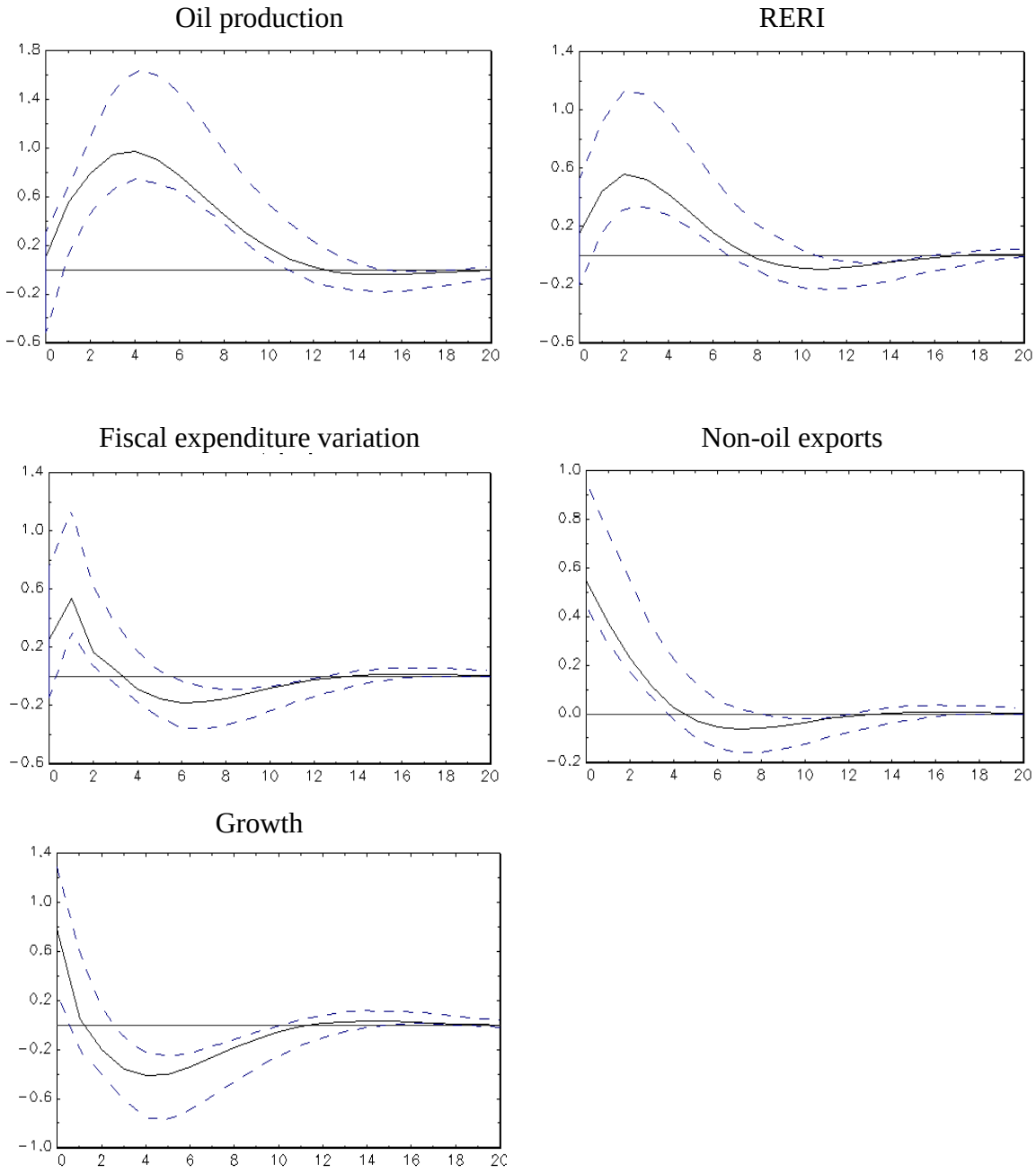
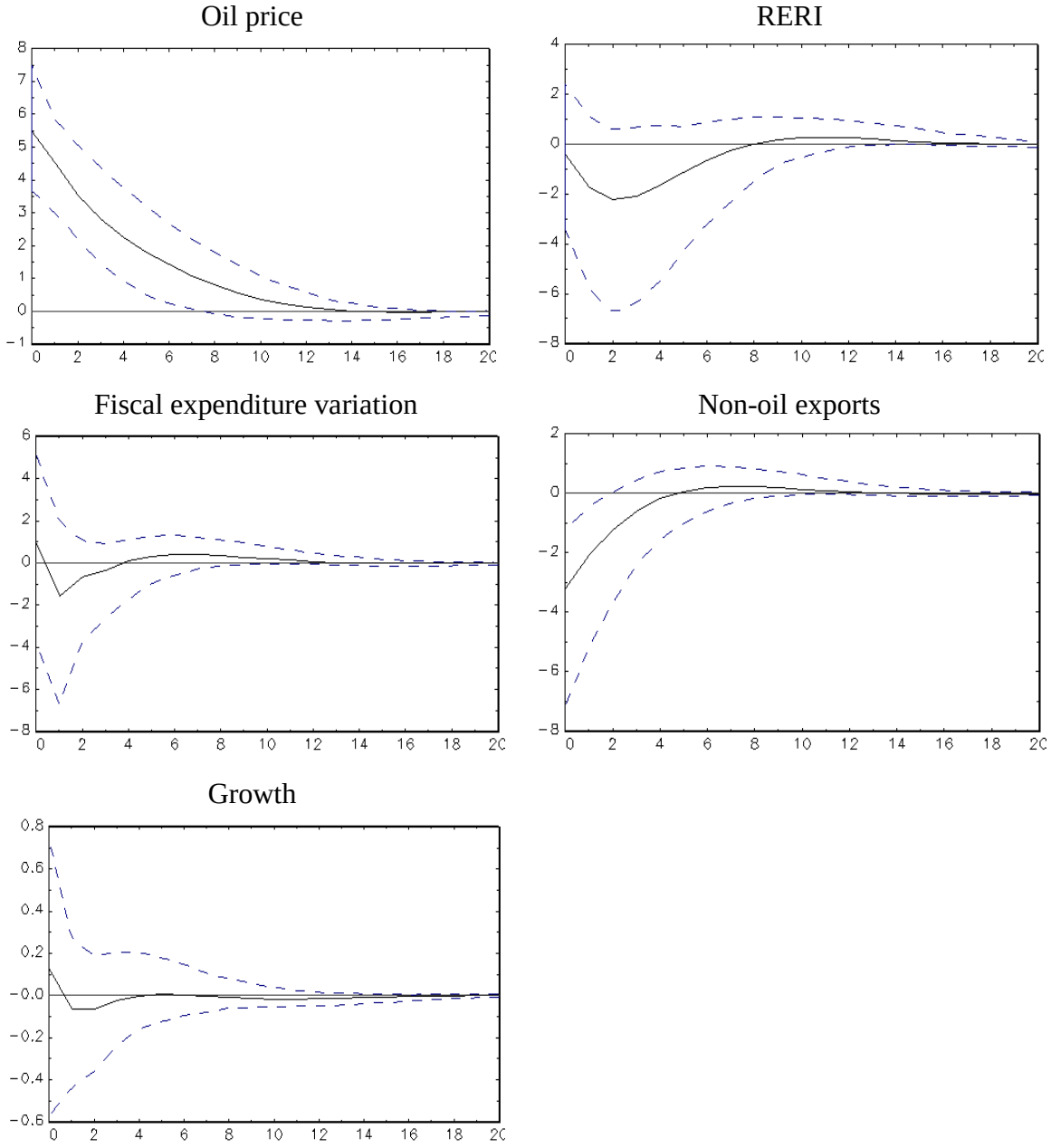


Figure 9 shows the estimated impulse response functions to an oil price shock. The upper left hand panel indicates that price shocks tend to last for six periods, decreasing in intensity. The rest of the panels show the effect of such a shock on macroeconomic variables. As can be seen, such effects are not significant in the Colombian case, except for a negative effect on non oil exports in the first period[23], which is not associated with a

[23] The variance decomposition exercise in Annex 3 shows that up to 25% of the variance in non oil exports can be attributed to the oil price shock in the first period.

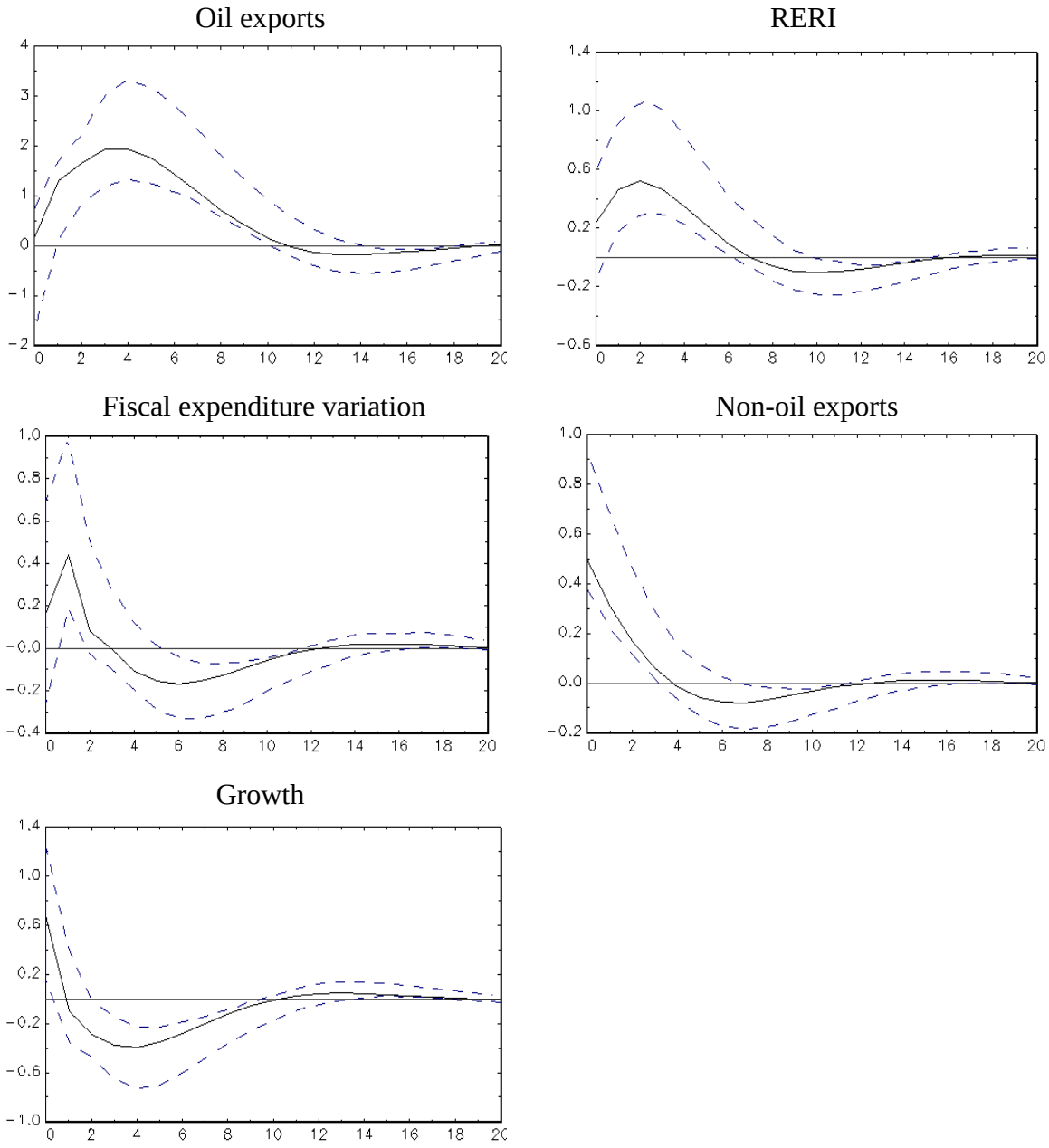
statistically significant effect on growth. Thus, contrary to what happens with a shock on oil production, there is no evidence of a Dutch Disease effect due to oil price shocks. These results might be due to several facts. First, Colombia was a net oil importer from 1974 to 1986 and thus, during this period the effects of oil prices on public finances, RERI and growth should have been of a different sign than during other periods, thus netting out in estimates over the full period. They may further reflect the stabilizing effects of the Oil Stabilization Fund from 1995 to 2006. Finally, it might be that oil price increases are seen as temporary and might then not lead to significant changes in fiscal expenditures or RERI.

Figure 9: SVAR impulse-response to an oil price shock for Colombia



We also estimated impulse response functions for a shock on oil exports, which show results similar to those for the oil production shock (See Figure 10). In summary, the impact of oil sector shocks in Colombia seem dominated by the effects of oil production shocks, while those of price oil shocks are mostly non significant, or relatively modest.

Figure 10: SVAR impulse-response to an oil exports shock for Colombia



Results for Nigeria

Figure 11 shows the impulse response functions for the Nigerian case. Again we find that an oil production shock is persistent over time, reaching its full potential in period 2 and

then declining by persisting until period 6. In addition, the oil production shock lead to a significant increase in fiscal expenditures during six periods (up to 2 standard deviations in period 2!) and a strong appreciation of the exchange rate lasting for five periods. The effect on growth is initially positive though short lived (limited to period 1) and there is evidence of a slight negative effect by period 10. As in the Colombian case, the initial effect on non-oil exports seems contrary to what would be expected by the appreciation of the RERI. The explanation suggested above, would seem even more plausible in the Nigerian case, as since the seventies non oil exports have been marginal and increased oil production may bring an increase in resources to develop these sectors through increased public spending.

Figure 11: SVAR impulse-response to an oil production shock for Nigeria

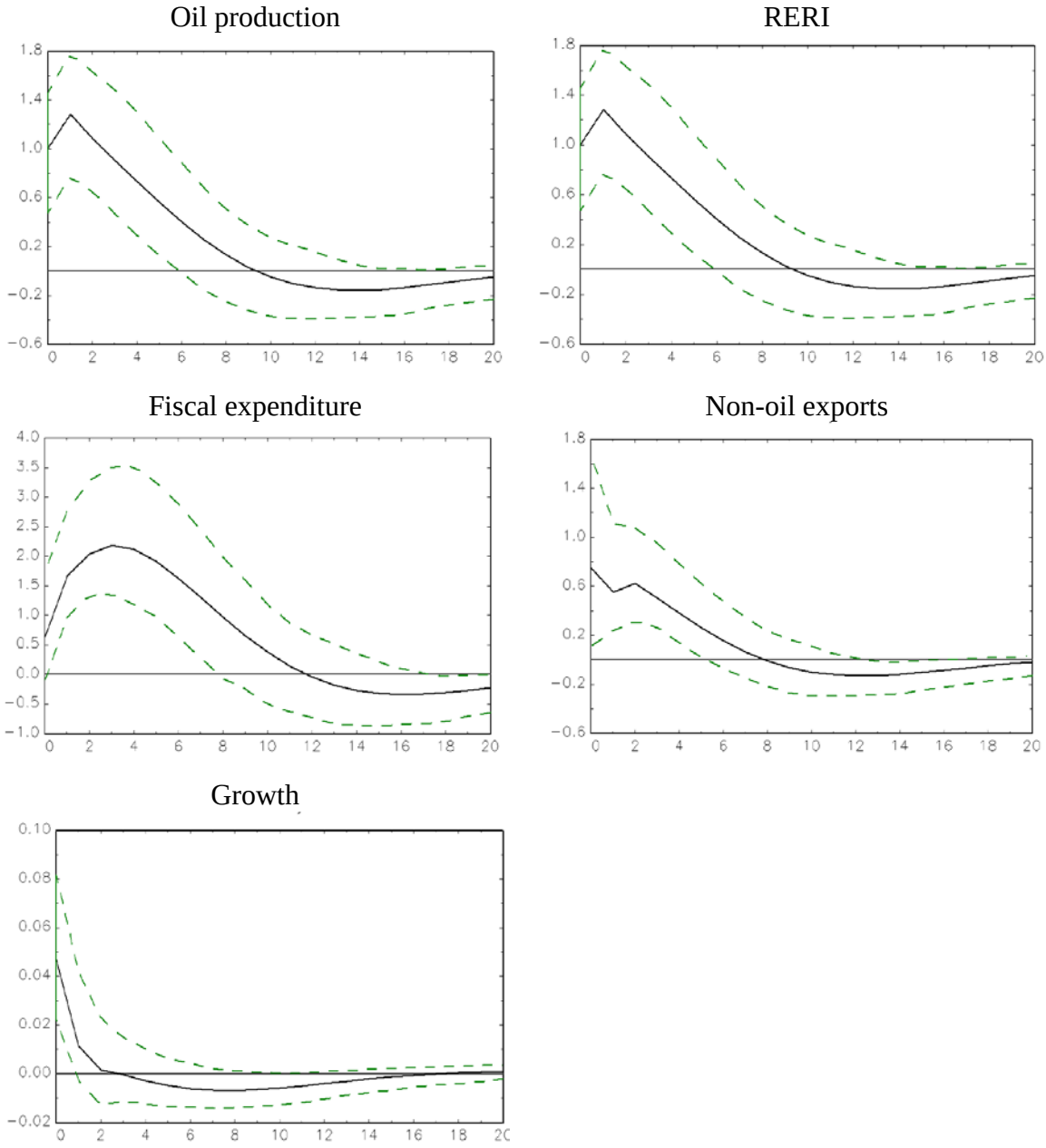
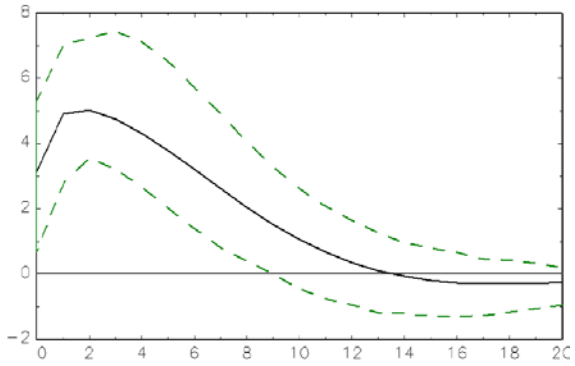


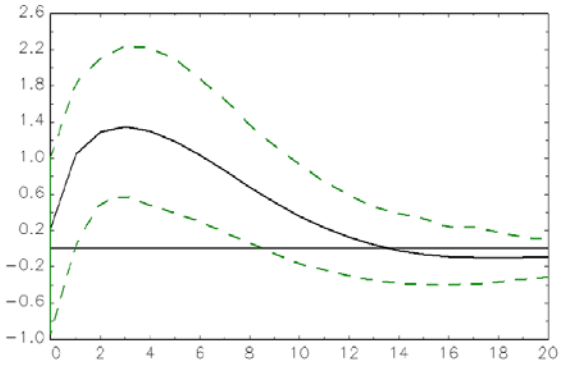
Figure 12 shows the impulse-response functions for an oil price shock in the nigerian case. Again the oil price shock is persistent over eight years, but contrary to what happens in Colombia this shock has highly significative effects on fiscal expenditures (which increase during six periods) and the RERI (which appreciates from period 2 to period 7). This difference with Colombia might be due to the fact that Nigeria has been a net oil exporter during all the estimation period and that oil production responds for a much higher fraction of fiscal revenues [24] and exports in Nigeria. Thus variations in oil prices might have had much more significant effects. However, the effect on growth is not significant and the effect on non oil exports runs, once more, contrary to dutch disease expectations.

Figure 12: SVAR impulse response to an oil price shock for Nigeria

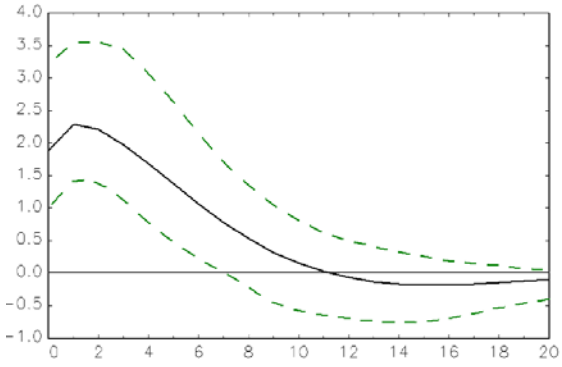
Oil Price.



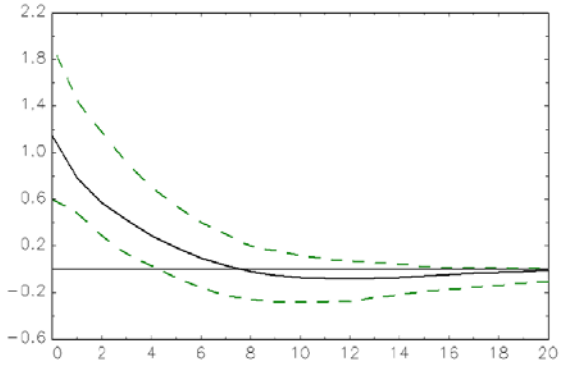
RERI



Fiscal expenditure

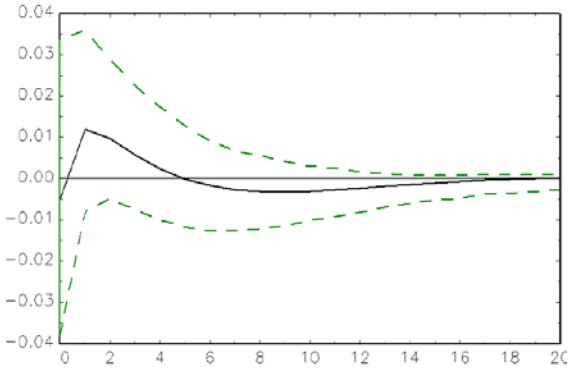


Non-oil exports



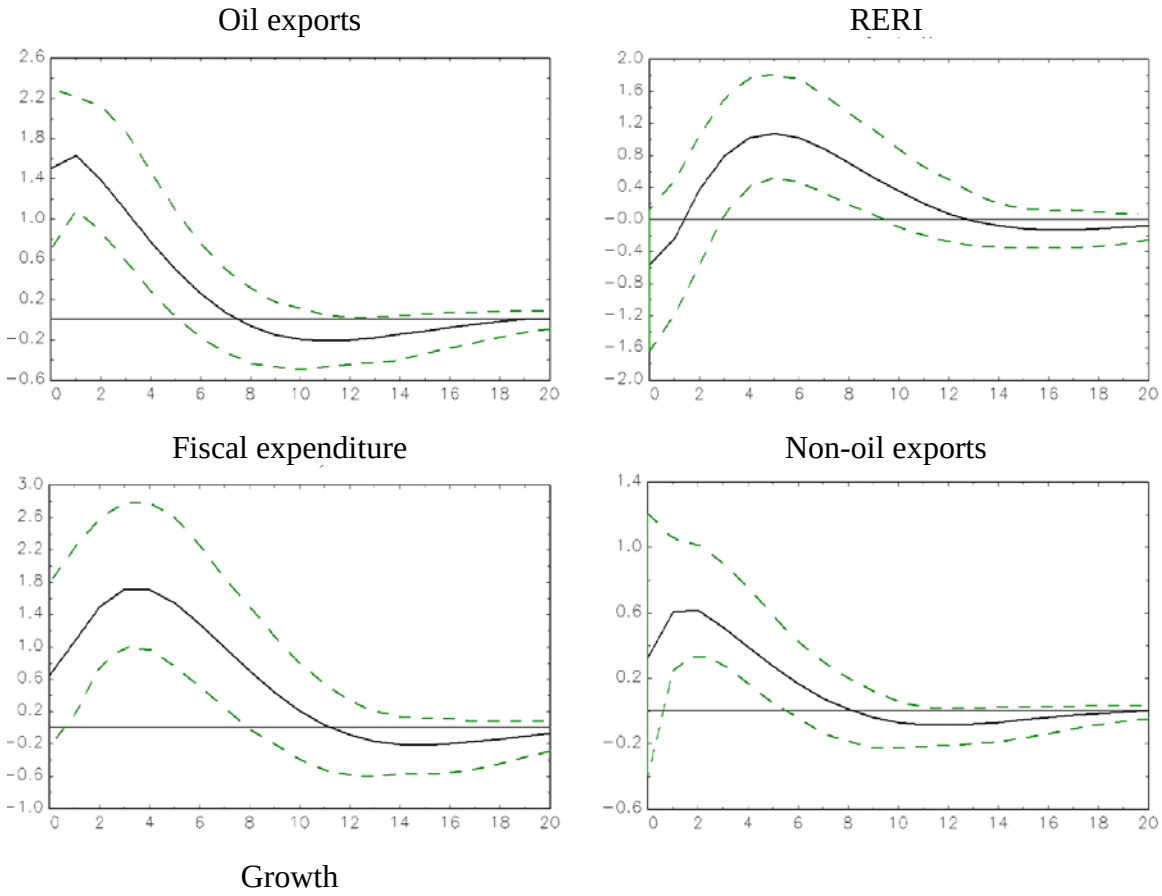
Growth

[24] It is also important to note that the stabilization effect of the benchmark rule (see previous section) affected only a few years of the estimation period and may thus not be reflected in these results.



The analysis of impulse response functions using oil exports as the exogenous variable support earlier findings (see Figure 13). There is increased fiscal spending and an appreciation of the RERI, but the effects on growth are not significant and non-oil exports show an initial increase.

Figure 13: SVAR impulse response to an oil exports shock for Nigeria



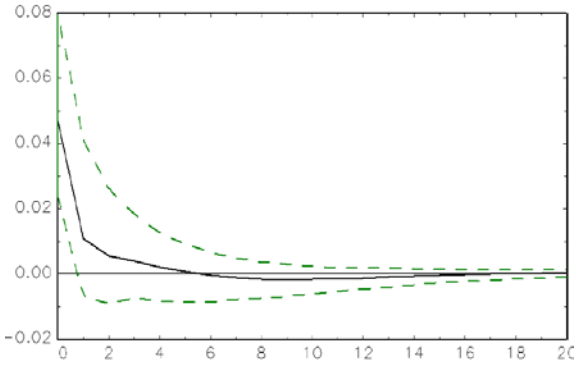


Table 6 corroborates the general results presented above: the Colombian economy is more affected by production shocks, while the Nigerian economy is more affected by oil price shocks. This is supported by results using a variety of measures: (i) the effect of a standard deviation of P and Q on the participation of P*Q on GDP, (ii) a simple regression of P and Q on P*Q, and (iii) oil revenues variance explained by P and Q. A standard deviation of production increases sector participation on GDP in Colombia 3.8 percentage points from 6.2% to 10%, while a standard deviation on P increases the participation in 3.5 percentage points, from 6.2% to 9.7%. In contrast, in Nigeria participation increases 31.6 percentage points when a standard deviation of price occurs and just 28.2 percentage points when a standard deviation of production occurs. Similarly, the correlation coefficient shows a larger correlation of oil price with the value of oil production in Nigeria, and a larger correlation of production with the value of oil production in Colombia. Finally, the variance of oil revenues is larger in Nigeria when an oil price shock occurs, while in Colombia it is larger when a production shock occurs.

Table 6: Oil Sector Participation and Correlations with Oil Production and Price

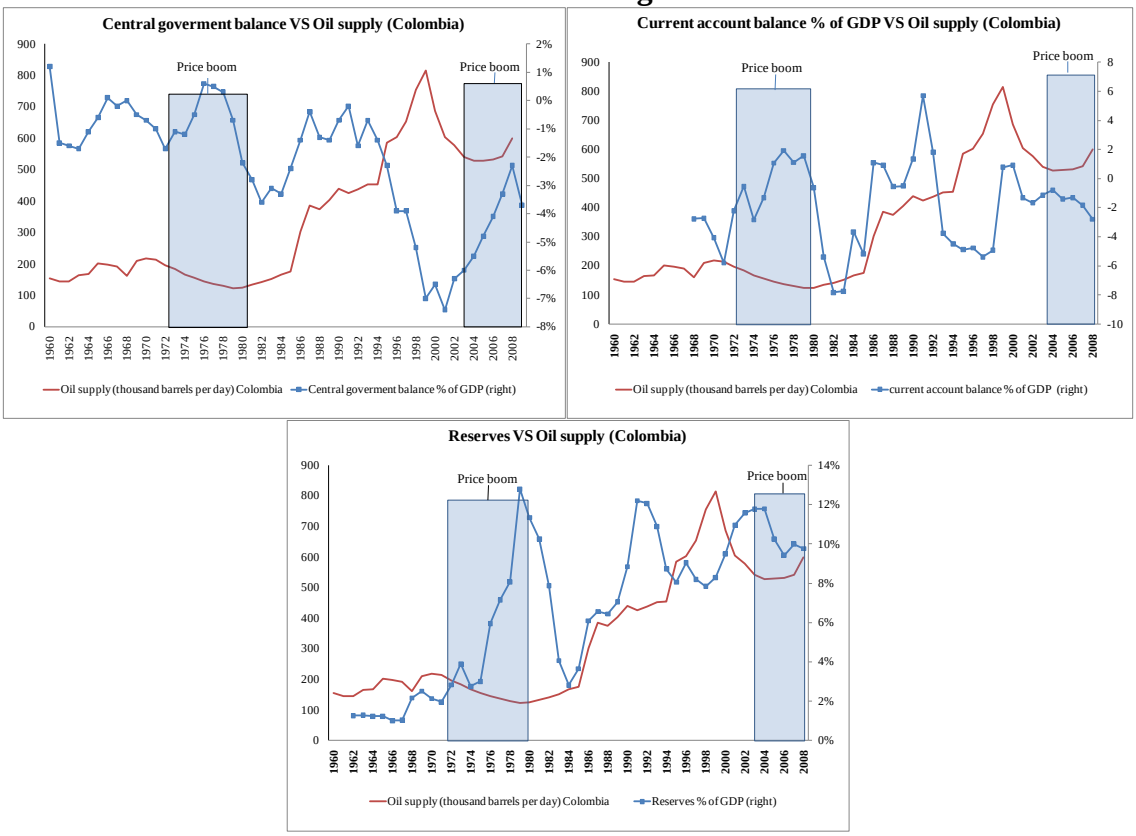
	% GDP			Correlation Coefficient		Oil revenues variance explained by	
	P*Q	(Q+desv)*P	(P+desv)*Q	P*Q with Q	P*Q with P	Q	P
Nigeria	63,3%	91,5%	94,9%	0,7106	0,9149	50,0%	80,4%
Colombia	6,2%	10,0%	9,7%	0,6765	0,5669	45,7%	31,9%

D. Macroeconomic Performance During Booms

Macroeconomic performance in both countries varied significantly during the oil price boom of the seventies and the most recent price boom (2003 to 2008). In Colombia the fiscal balance improved during the second boom, while it deteriorated at the beginning of the first one (See Figure 14). This difference in performance is associated with the fact that Colombia was a net oil importer during the first boom and because of domestic gasoline price controls international oil price increases led to a higher gasoline subsidy, while during the second boom Colombia was a net oil exporter and Ecopetrol revenues increased significantly with international oil price increases. Further, part of the increased fiscal revenues during the second boom was saved in an Oil Savings and Stabilization Fund that had been instituted in 1995, though it was considerably weakened in 2006.

The current account balance had improved during the first boom, but deteriorated during the last part of the boom as well as during the second boom. Colombia accumulated a large amount of international reserves during the first boom while during the second boom reserves decreased slightly as a percent of GDP (see Figure 14). These differences were due to a combination of the fact that the country was a net oil importer during the first boom and a net oil exporter during the second boom, but also with differences in exchange rate management during the two periods.

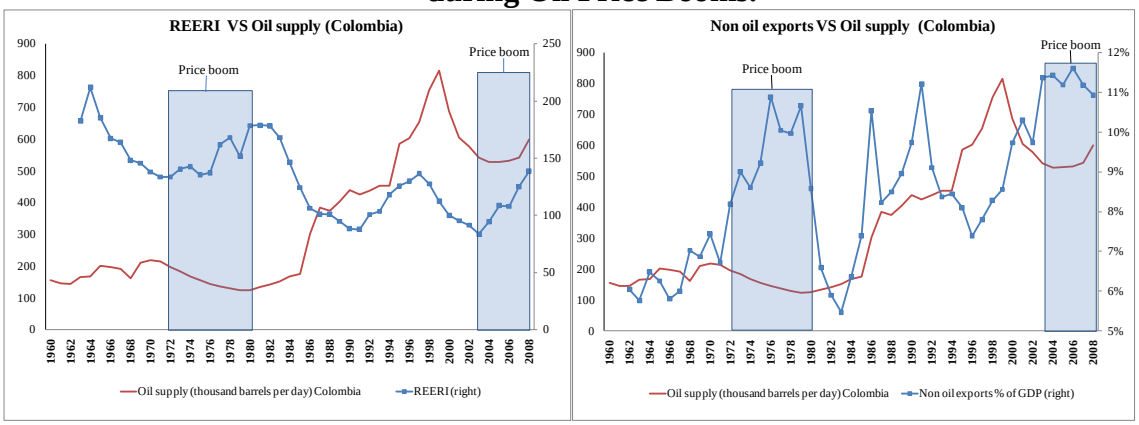
Figure 14: Colombian Fiscal Balance, Current Account Balance, and International Reserves Performance during Oil Price Booms.



The real exchange rate appreciated at the end of the first boom and during the second boom However, non-mining exports increased significantly as a percent of GDP during the first boom in Colombia, while they stagnated and then decreased at the end of second boom and (Figure 15). These differences are associated with a change in the real exchange rate regime. After a currency crisis in 1965, Colombia established capital controls and a crawling peg system and engineered a substantial depreciation in 1967. Hence the strong growth of non oil exports since that date and the improvement in the current account balance and international reserves prior and during the first boom. During the latter period of the boom (which coincided with a boom in coffee oil prices) the crawl was slowed down to control inflationary pressures, so a real appreciation took place and the current account balance deteriorated. Reserves increased also as a consequence of regaining access to international credit since 1967. During the second boom a floating exchange rate regime

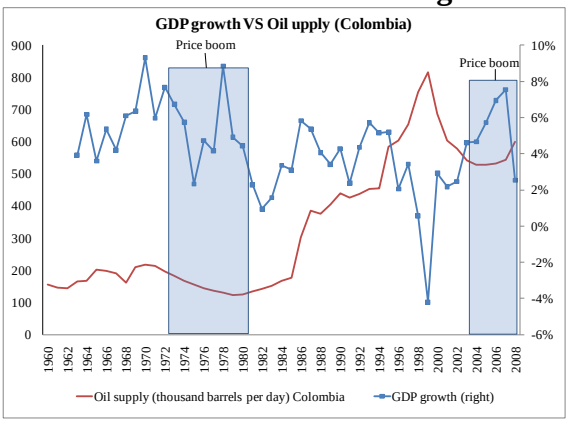
(instituted since the crisis of 1999) permitted a large real exchange rate appreciation, originated in increased foreign currency inflows due to high oil and other commodity prices and high FDI levels.

Figure 15: Colombian Non-Oil Exports and Real Exchange Rate Index Performance during Oil Price Booms.



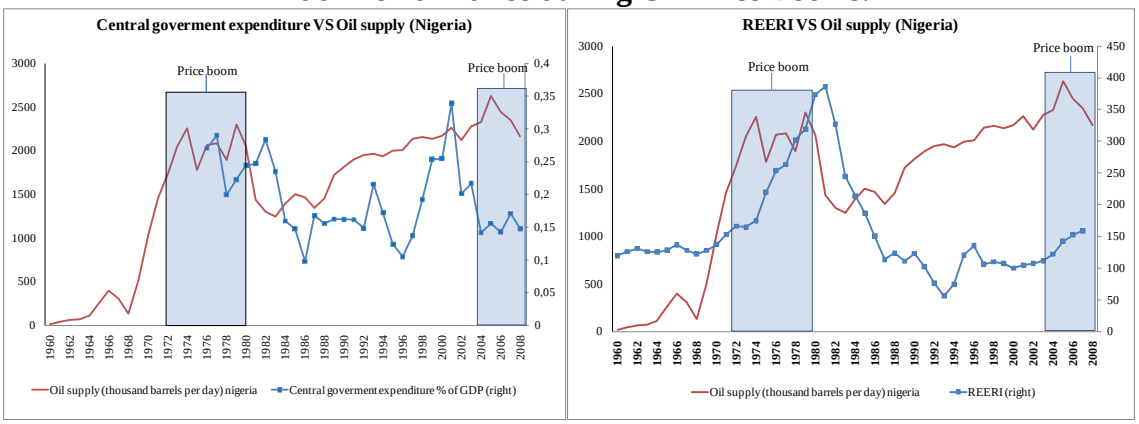
Overall, for Colombia this analysis shows how moderate oil dependence and some Dutch Disease symptoms are a recent feature, as from 1974 to 1986 the country was a net oil importer. While the Oil Savings and Stabilization Fund (FAEP) was created in 1995, after a second large oil finding (Cusiana), precisely to avoid these symptoms, the weakening of the Fund in 2003 and, especially, the effects of a free floating exchange rate system coupled with a major boom in foreign currency inflows, led to a significant real exchange appreciation and stagnation of non oil non mining exports. That said, the potential negative effects of these Dutch Disease symptoms are not apparent on GDP growth figures (Figure 16), as the period from 2003 to 2007 was characterized by strong growth, after a period of recession and slow growth from 1998 to 2002. Several factors, in addition to the direct effects of the commodity price boom (Colombia's exports of commodities include not just oil, but coal and other minerals and coffee and other agricultural products), were behind this strong recovery, according to various analysts. Among them, a volume expansion of exports fueled by rapid demand growth from major destination markets (US, Venezuela), continued increase in public expenditures (financed in part by growing oil revenues) and a strong FDI and domestic investment boom, due both to the commodities price boom and a significant improvement in security conditions.

Figure 16: Colombian GDP Growth during Oil Price Booms.



In the case of Nigeria Figure 17 shows a major fiscal expenditures increase, a huge appreciation of the exchange rate and a large deterioration of non-oil exports during the first boom. In contrast, during the latter boom, fiscal expenditures remained roughly constant, the appreciation of the currency was modest and non-oil exports increased, although from a very low base. These clear symptoms of Dutch Disease during the first price boom in Nigeria, in contrast to what happened during the second boom, are clearly reflected in GDP growth rates. The coincidence of the first price boom with increased oil production led to an initial peak in 1971/72 as shown in Figure 18. However, growth rates decreased and were highly volatile during the rest of the boom, showing negative figures in several years during the boom period. In contrast, growth remained high and stable during the second boom.

Figure 17: Nigerian Non-Oil Exports, Fiscal Expenditures and Real Exchange Rate Index Performance during Oil Price Booms.



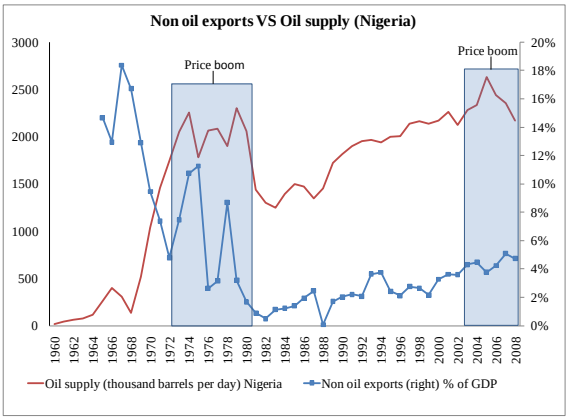
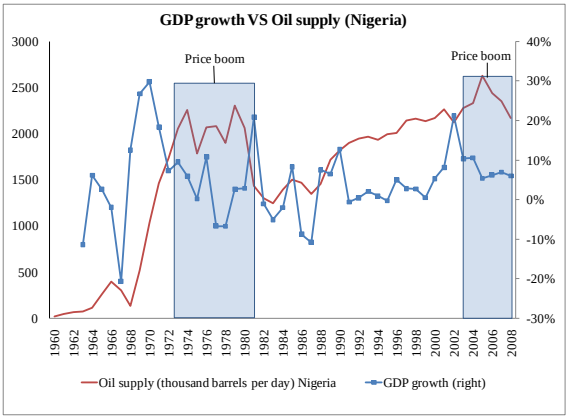


Figure 18: Nigerian GDP Growth during Oil Price Booms.



Analysts have related these significant differences in performance during the two booms to the differences in controls and rules over public expenditures during the two periods. During the first boom the use of fiscal resources by an authoritarian Government went largely unchecked: they not only increased at a rapid pace, but there is significant anectodal evidence of waste and corruption.

After the 'lost decades' of the 1980s and 1990s, economic growth started to pick up from the new millennium which coincided with a new boom in the oil sector and recent years have generated renewed optimism for sustainable economic growth and development in Nigeria. The country has recorded real GDP growth rates in excess of 5% for most years from 2000 to 2008. Although this recent improved economic performance has coincided with an oil boom, an interesting thing to note is that unlike the previous boom of the 1970s, this more recent boom has been triggered by a host of other factors. Firstly, Nigeria welcomed a new democratic government in May 1999 after 16 years of military dictatorship. The new democratic government introduced a number of economic reforms and transparency initiatives and this seemed to have had a positive effect on the economy as shown by improved growth rates with real GDP growing by 5.4% and 3.1% in 2000 and 2001 respectively. Secondly, starting from the mid-2004 the Nigerian government introduced a new set of economic reforms -the National Economic Empowerment and Development Strategy (NEEDS). This strategy recognizes the fact that for economic reform

to be successful it must be anchored on institutional reforms, hence the latter forms a key component of NEEDS. This marks a notable departure from earlier reform efforts.

These reforms triggered economic activity and led to the third contributory factor to Nigeria's recent economic performance: the improved performance of the non-oil sector. Starting from mid-2004 the non-oil sector has experienced higher growth rates than the oil sector: 9.6 and 9.5% in 2006 and 2007 respectively and 7.6% in 2008.

Thirdly, the fiscal balance of the federal government has improved in the last few years and this is attributable to improved fiscal policies.[25] The government has been implementing a medium-term expenditure framework (MTEF) which aims to maintain prudent expenditures and due process in public procurement. In addition to this, fiscal discipline has been enhanced with the implementation of an oil price based fiscal rule (OPFR) since 2004, where government expenditure is linked to a benchmark oil price so as to reduce the effects of volatile oil prices on revenue. This has also led to an increase in savings as the excess revenue from oil prices above the benchmark are put in an excess crude account.[26]

However the 2008 budget increased the benchmark oil price to $59 per barrel, and this, coupled with the fact that large amounts were withdrawn from the excess crude account, has sparked fears that the government would soon return to the imprudent fiscal management of the past. This was further compounded by a surge in inflation as a result of increased government expenditure in 2008 and the fall in the oil price which reached $35 per barrel in December. These facts may have informed a 'conservative' approach in the 2009 budget with a benchmark oil price of $45. The high crude oil prices, coupled with prudent management by the central bank has improved the external reserves position of the country and helped to stabilise the exchange rate against major currencies. Finally, e the external debt to GDP fell from 38.8% in 2004 to 2.1% in 2006 with the debt-relief package received from the Paris and London Clubs.

E. Conclusions

This section examined the effects of oil abundance on macroeconomic performance in Colombia and Nigeria, using different techniques. Several conclusions emerge. As expected from the stylized facts presented in Section I, all estimates show a much higher dependence of economic performance on oil abundance in Nigeria than in Colombia. Both savings, current account balances, levels of reserves, fiscal revenues and balances, non oil exports growth and GDP growth are more affected by variations in oil prices and revenues in Nigeria than in Colombia. However, the dependence has decreased in Nigeria recently , following important institutional and policy changes around 2004, and has increased in

[25] Ajakaiye and Ekpo (2009) identified and discussed three main initiatives that have contributed to the relative efficiency in the management of oil revenue as the establishment of the excess crude oil account, passage of fiscal responsibility act and passage of the public procurement act.

[26] According to the Budget Office/Federal Ministry of Finance (2008), the benchmark oil price per barrel in the 2004 budget was $27, $30 in 2005, $35 in 2006 and $40 in 2007. The realised price per barrel for crude oil in these years were $38.3 in 2004, $55.3 in 2005, and $68 in 2006 leading to substantial savings which had accumulated to over $23billion by December 2008.

Colombia since it became a net oil exporter in 1987 and introduced exchange rate flexibility since 1990.

First, using a previously estimated cross-country panel model, we predicted higher impacts of oil abundance on growth (negative), volatility (positive) and income inequality (positive) in Nigeria, due both to the fact that oil abundance (as measured by production or net exports per capita) has been significantly higher in comparison to Colombia and that the quality of institutions and the level of political competition (measured with several indicators) has been lower. However, these estimates are only indicative as the model does not take into account many country specificities (it estimates identical unitary responses for all countries) and its predictions of growth rates, volatility and inequality deviate significantly from observed values in these countries in some cases.

Second, separate OLS estimations for each country show, again, higher and more significant effects in Nigeria. They also show that improved institutional quality (measured by the ICRG index) enhance positive effects of oil production and net oil exports increases on fiscal revenues and balances in both countries and of oil price increases on current account balances in Nigeria. Further, improved institutional quality help mitigate negative effects of increases of oil production on growth and of oil price increases on non oil exports in Nigeria, while they enhance estimated positive effects of oil production and net oil exports increases on growth in Colombia.

Third, SVAR models show again higher and more significant impulse responses of most variables to oil price and production shocks in Nigeria than in Colombia. They further indicate that Nigeria's economic performance is affected by both price and production shocks (more by price than production shocks), while Colombian performance is only affected by oil production shocks. Variance decomposition analysis suggest that these differences are due to the fact that the volatility of oil revenues has been explained more by oil price volatility (than production volatility) in Nigeria, while the contrary has happened in Colombia. The main impacts of oil production or price in Nigeria show in exchange rate appreciations and increases in fiscal expenditures, and, to a lesser extent, on short run increases in growth (in the case of production shocks). In Colombia, oil production shocks also appear to cause real exchange rate appreciation and initial increases in fiscal expenditures (followed by net decreases), and an initial positive effect followed by a lagged negative effect on growth.

Finally, we observe significant changes over time of oil abundance on economic performance in both countries (not estimated econometrically). While the first oil price boom (1972-1980), which coincided with a large production increase in the early seventies in Nigeria, was accompanied by a large increase in fiscal expenditures, a major appreciation of the currency, a significant decrease in non oil exports and low and volatile growth, in the recent price boom (2002 to 2008), fiscal expenditures remained almost constant, there was no significant appreciation of the real exchange rate, non oil exports actually increased and growth was high and stable. Such huge differences in performance during the two price booms, were associated to major institutional and policy changes: the return of democracy (and thus of some social control over expenditures), budgetary

decisions based on a benchmark (and not actual) oil price, higher Central Bank intervention in the currency market and substantial structural reforms in the economy, leading to increased private sector participation in many activities.

In contrast, Colombian macroeconomic performance was not affected at all by the first price boom, but during the second boom was accompanied by an important increase in fiscal expenditures, a significant appreciation of the real exchange rate and a stagnation of non oil and non mining exports, though these effects do not seem to have had an important effect on growth (which was high during the period, mostly as a consequence of a major private investment boom caused by both good export prospects and highly improved domestic security). These differences in economic performance across the two price booms were largely due to the fact that the country was a net oil importer during the first boom (and oil revenues were not a significant fraction of fiscal revenues), while it was a net exporter during the second and oil revenues represented a significant fraction of fiscal revenues (around 25%). Further, during the first boom Colombia was following very conservative fiscal policies and the Central Bank managed the exchange rate through a crawling peg. In contrast, during the recent price boom a combination of a floating exchange rate with a major boom in capital inflows and foreign exchange earnings, and a lax fiscal policy led to the significant real exchange appreciation. The large increase in fiscal expenditures was facilitated by the partial dismantling in 2003 of the Oil Stabilization Fund and subsequent spending of the accumulated funds. Ironically, this Fund had been enacted in 1995 precisely with the purpose of avoiding fiscal policies that would amplify the volatility induced by oil price variations. It did not survive a spending-driven President with high popularity and a majority control of Congress.

IV. Regional Effects

The effects of oil abundance and the channels through which these effects are transmitted on the economy can be distributed differently in different regions. In this section we present regional case studies for the Niger Delta and the main producing regions for Colombia (Departments of Arauca, Meta, Casanare, Guajira and Santander).

A. Colombia

Casanare, Meta, and Arauca are the main oil producers departments in Colombia, and La Guajira is the main gas producer. Arauca and Casanare are cases of sudden booms in frontier regions, based on major discoveries of light oil (Arauca in 1984, Casanare in 1993), in Departments where oil production was either non-existent or very low before. In both cases oil production reached a ceiling and began declining in a few years (Arauca in 1998, Casanare in 2000). Casanare also has major gas reserves (larger than Guajira), which are being mostly re-injected to maintain pressure in oil reservoirs, but that will be available for production in the future. Guajira is also a frontier region where gas production began in 1974 and is scheduled to decline soon. It is also a major coal producer. On the contrary, Meta had oil production at low levels for a long time and is enjoying a more recent boom based on findings and development of heavy crude oils. Huila and Santander are mature oil

basins where oil production has taken place for several decades. The most important refinery is in Barrancabermeja, a Santander municipality (Figure 19).

Non-oil-non-mining Departmental GDP has been growing steadily in Meta and Santander, even during the last oil price boom (Figure 20). Arauca and Casanare present a higher Departmental GDP, but also higher volatility. Santander presents the more stable GDP.

Figure 19: Oil and Gas Production

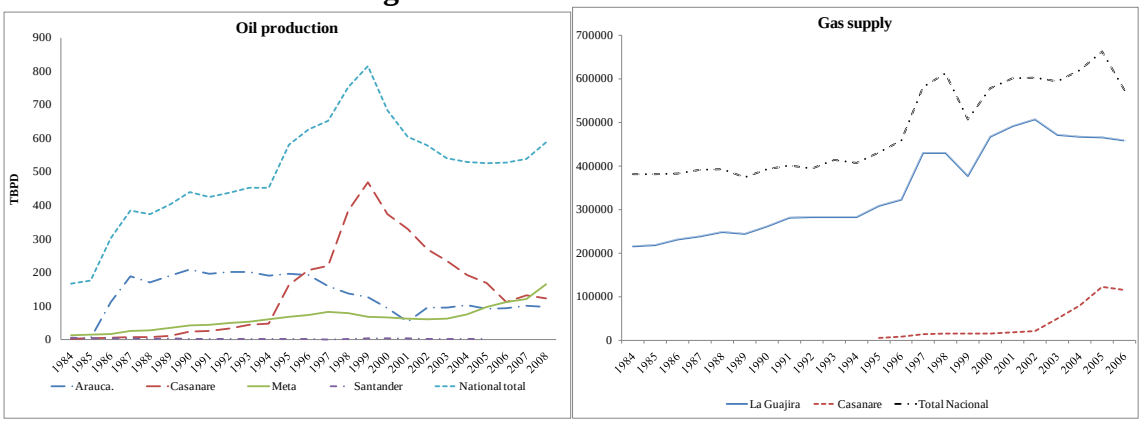
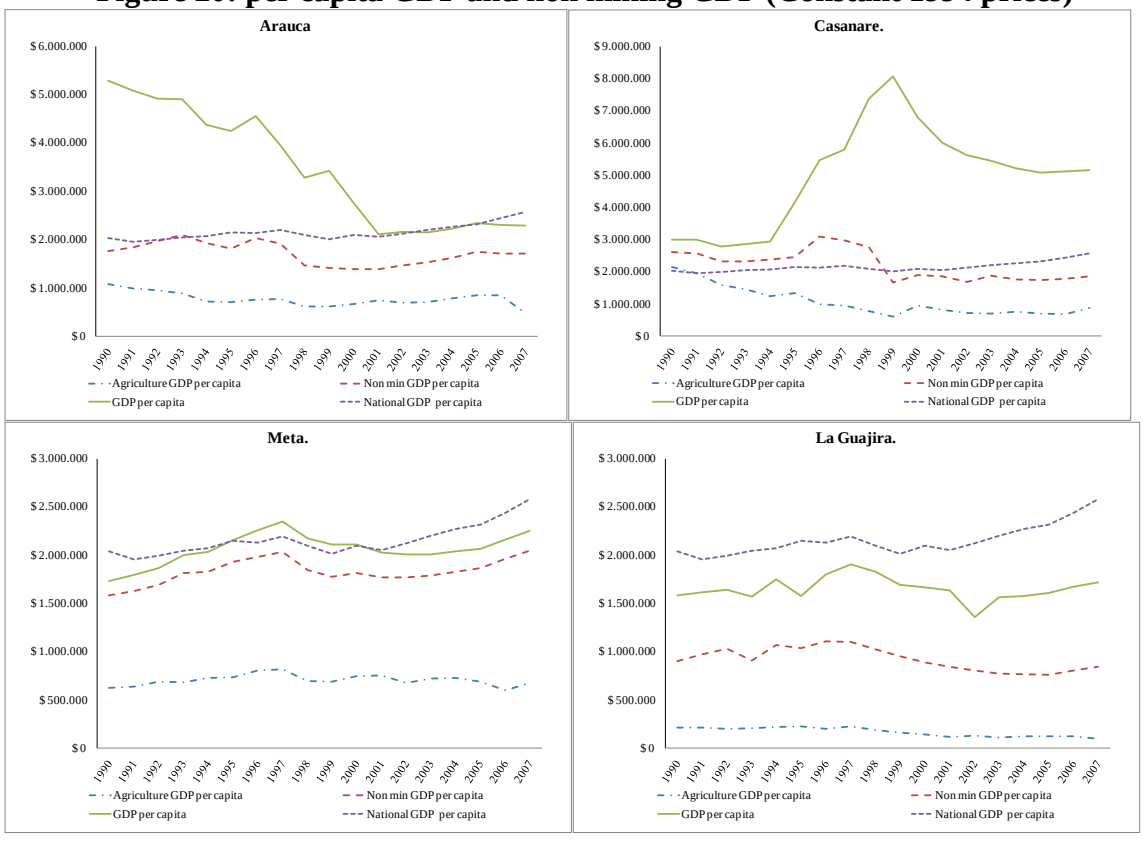
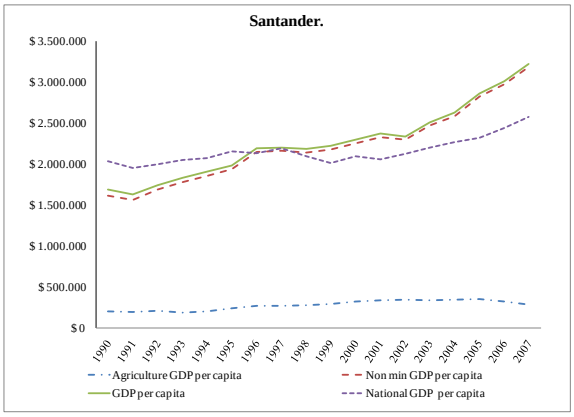


Figure 20: per capita GDP and non mining GDP (Constant 1994 prices)

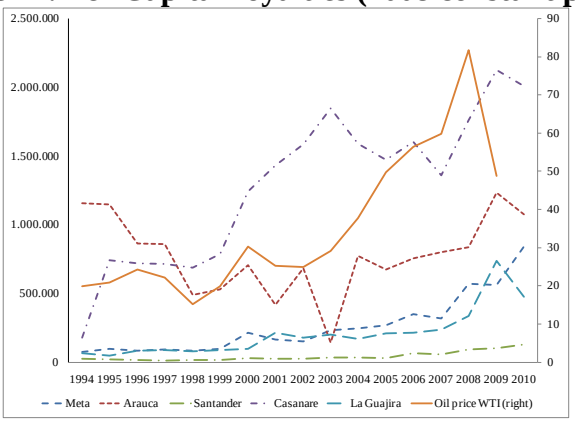




Source: DANE

Casanare, Arauca and Guajira, and more recently Meta present some signs of Dutch Disease. In Casanare, an increase in royalties (Figure 21) was related to a non-oil and agriculture GDP decrease during the present decade, although Casanare per capita GDP is more than two times higher than the national average. This tendency stabilized during the last price boom. In Arauca royalties were more volatile, and related to a steady decrease in agricultural GDP, and a decrease in total per capita GDP attaining the actual level of national per capita GDP. In La Guajira while royalties increased during last boom, non mining and agricultural GDP decreased steadily.

Figure 21: Per Capita Royalties (2008 constant prices)



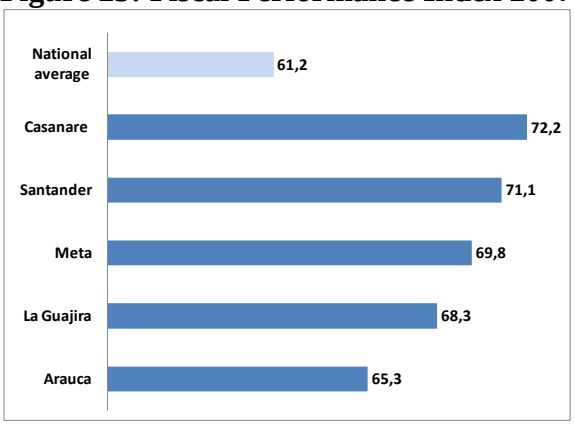
Fiscal expenditures followed closely total revenues in all cases and fiscal imbalances tended to increase overtime, especially in Arauca, Casanare and Meta. It also worth to notice that as percentage of Departmental GDP, public sector participation (measured as income or revenues) is higher in Casanare, reaching almost 50% in 2006. The opposite situation is in Santander, where public participation is below 15%. La Guajira, Meta and Santander have more balanced public finances, although in La Guajira and Meta expenditures and revenues present a clear growth tendency (Figure 22).

Figure 22: Fiscal Revenues, Expenditures Balance

Source: Authors calculation base don DNP and DANE data.

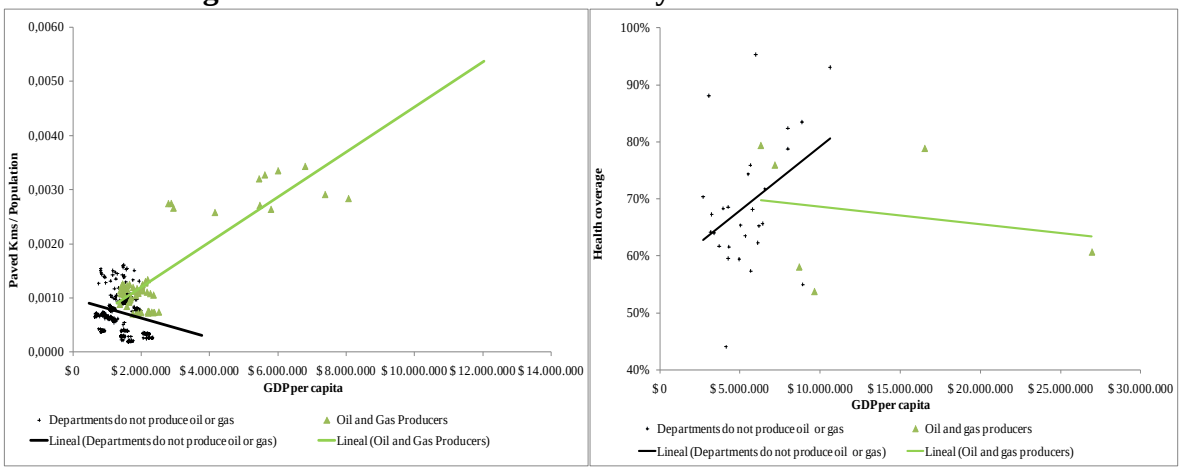
A fiscal performance index calculated by the National Planning Department (DNP), a central government agency, ranks Casanare with the best fiscal stance among the 5 departments, followed closely by Santander. The index includes public debt, current revenues as percentage of current expenditures, decentralization transfers as percentage of total revenues, tax revenues as percentage of total revenues, public investment as percentage of total expenditures, and current savings. In the last position is Arauca, followed by La Guajira (Figure 23). These five oil-gas producing Departments perform better than the average of the 32 Colombian departments.

Figure 23: Fiscal Performance Index 2007



Use of royalties is more flexible than the use of decentralization transfers.[27] Looking at fiscal outcomes, although the amount of paved roads in oil producing departments is higher than in the rest of departments -the relationship between paved roads and GDP is positive and statistically significant- health coverage presents the opposite: the relationship between health coverage and GDP is positive in non-oil producing departments, and negative in oil-producing departments (Figure 24).

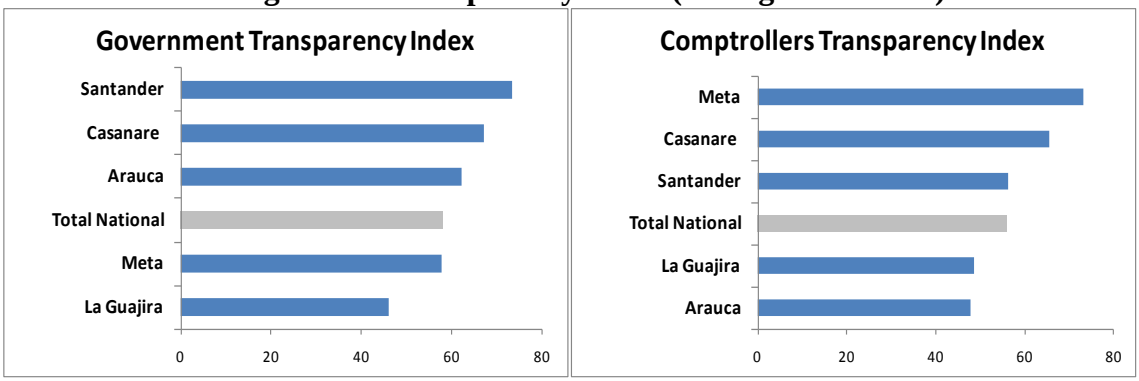
Figure 24: Fiscal Outcomes and Royalties: Roads and Health



Is this related to institutions performance? Figure 25 shows for the 5 cases a Transparency Index for the departmental government (ITDG) and for the comptroller office (ITDC).

[27] While 96% of decentralization transfers from Central Government are earmarked for education, health and water and sanitation (Law 1176 of 2007), royalties should be used for priority investment projects (Law 756 of 2002).

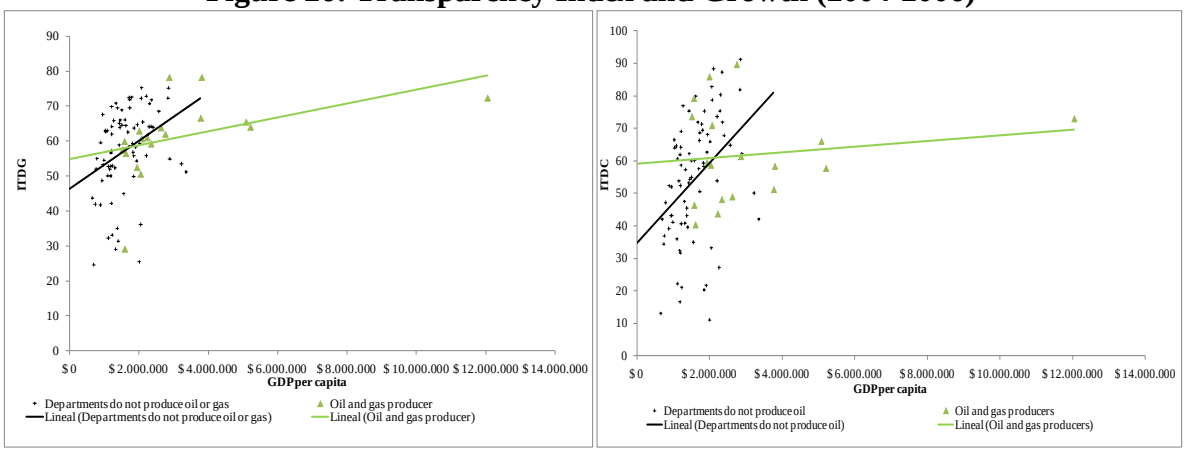
Figure 25: Transparency Index (average 2004-2006)



Although each index shows a different situation, Santander and Casanare are always above the national average, while la Guajira is below. Central government in Arauca performs better than comptroller's office, while the opposite happens with Meta, where comptroller's office performs better than central government.

Figure 26 shows a scatter plot between these two indexes for all departments and years (2004-2006) and per capita GDP for each department, separating the 5 resource abundant departments studied in this section from the remaining 27 Colombian departments.

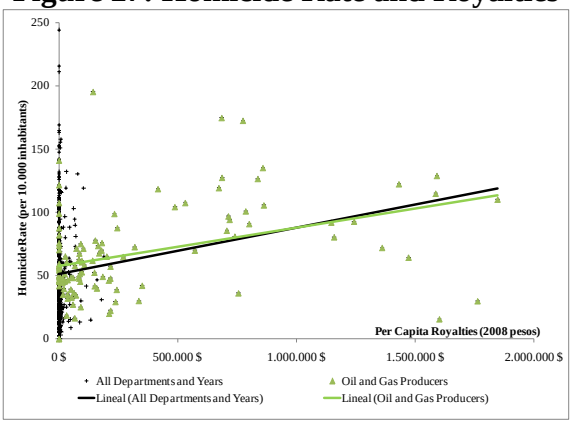
Figure 26: Transparency Index and Growth (2004-2006)



For both indexes, in oil-producing departments the tendency line has a lower trend, although for the Government Transparency Index (Figure on the left), most of the oil departments-year cases are above the line, suggesting that in fact oil departments in general have good institutions. However, the opposite case happens when the Index is related to comptroller´s office. In sum, although economic performance show signals of Dutch Disease in 3 out of 5 departments studied, this evidence suggest that it is not only due to lower institutional quality. For government index, department-year cases are Meta, but also Arauca and Casanare, while for the Comptroller´s office the department-years cases above the trend line are Meta and Santander, but also Casanare.

Finally, the higher the royalties earned, the higher the conflict (measured in this case with homicide rate, see Figure 27), suggesting that violent conflicts are related to natural resource abundance. However, in other departments higher homicide rates suggest that the conflict is not related only to oil abundance.

Figure 27: Homicide Rate and Royalties



In sum, this section presents five departments that have been abundant in natural resource, in particular, oil. The comparative analysis shows that the frontier departments that have been benefitted with sudden large booms such as Casanare, Arauca and Guajira, are the ones that show more signs of Dutch Disease in terms of non oil (non mining) GDP growth. None of the oil producing departments have saved fiscal revenues above to what they are compelled to by law.[28] Rather most of them show a recent deterioration of balances Finally, these results are not related especifically to institutional quality, measured by a Transparency Index, and seems more related to fiscal policies.

Under a different lens, Colombian regional data suggest that this abundance is associated with higher conflict. Finally, in terms of social expenditures, the use of public resources is not adequate, and that institutions are in a better shape in departments such as Santander and Meta where oil production has taken place for a longer time, but also Casanare, where the boom is more recent. Although it is difficult to identify if good institutions existed before the boom, this section shows that the more natural resource abundant departments have worst institutions, with the exception of Casanare.

The analysis presented here is studied econometrically by Perry and Olivera (forthcoming). The authors use econometric techniques for the 32 Colombian departments and find that oil abundance (measured with production variables or with royallties) has negatvie effects on growth, and that good institutions (measured with the two index presented above) helps to

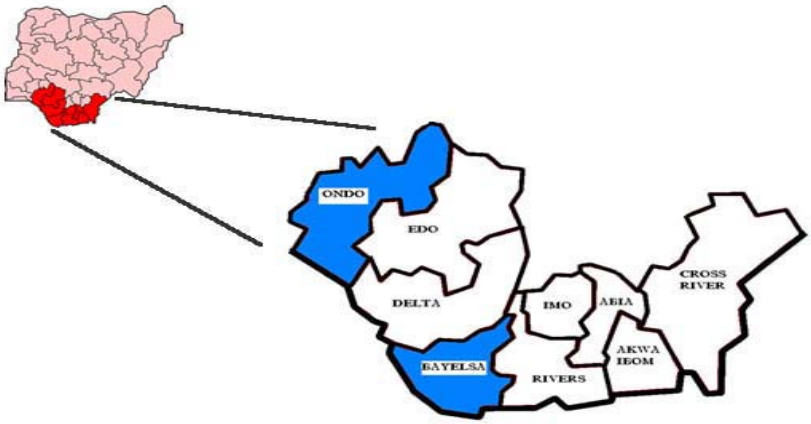
[28] In 1995 the Oil Savings and Stabilization Fund (FAEP) was created to stabilized currency income from oil exports to isolate its effect on the exchange rate; avoid Dutch Disease phenomenon related to the displacement from tradable goods toward oil and non tradable goods, and avoid inflation increases and unemployment" (Contraloría General de la República, 2000). A savings formula was imposed for the three levels of government -departments, municipalities and the central government- based on a basic income plus the moving average in the previous months. FAEP resources where invested by the central bank abroad.

mitigate this effect (See Annex 4). The data show also that royalties, a non-earned resource, affect negatively public investment.

B. Nigeria

Nigeria's oil production is concentrated in the Niger Delta which lies to the south of the country and currently comprises of nine states: Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Imo, Ondo and Rivers (see Figure 28). Although oil is produced in all nine states, three states (Bayelsa, Delta and Rivers) dominate production and account for about 75% of crude oil produced. The Niger Delta covers about 75000 square kilometres and is described as the fan-shaped area where the River Niger empties into the Atlantic ocean. The Niger Delta is bordered on the east by the Imo River, to the west by the Benin River, to the south by the Atlantic ocean. The nine states of the Niger Delta are further sub-divided into 186 local government councils with a population of about 25 million people.

Figure 28: Nigeria's Niger Delta



Source: www.ng.undp.org

At independence in 1960, Nigeria was divided into three regions: Northern, Southern and Eastern regions and the Niger Delta was part of the Eastern region. In 1964 the mid-Western region was created and this effectively separated the Niger Delta from the non-oil producing region (mid-Western region). In 1967, regions were abolished and 12 states were created with the Eastern region divided into 3 states: East-Central State, South-Eastern State, and Rivers State. Thus, at the commencement of the first oil boom, the Niger Delta was divided into 3 states. On the governance level, prior to the oil boom, governments of the Eastern region which included the Niger Delta had substantial revenue to undertake expenditure because they were entitled to 50% of all oil proceeds (derivation). In 1970 the Federal government made the distinction between onshore and offshore production and appropriated all revenue from offshore activities to the federal government thereby cutting the share accruable to oil-producing states. In addition to this, in 1975 the federal government reduced the derivation from onshore activities from 50% to 20% thereby stifling the Niger Delta states of revenue.

The Niger Delta Development Board (NDDB) was established in 1961 in order to address the deficiencies of education, infrastructure, and poor health identified in the Willink's

Commission Report of 1957. The NDDB failed in its core mandate to solve the problems of the Niger Delta and this resulted in the establishment of the Niger Delta Basin Development Authority (NDBDA) in 1976. The NDBDA did not fare any better than the NDDB and ultimately failed in its objective of fostering development in the Niger Delata. One of the key problems of the NDBDA was a lack of commitment and belonging of its members as a body which was established specifically for the Niger Delta did not have a single member of its board from the Niger Delta (UNDP, 2006). The Oil Mineral Producing Areas Development Commission (OMPADEC) was established in 1992 and its mandate was to facilitate economic development and enhance environmental cleaness of oil producing states. This was to achieved through OMPADEC collecting the allocation of oil producing states from the federation account, a figure which varied between 3% and 6% of the federation account. OMPADEC has earned the reputation of being a completely inept, profligate and wasteful organisation. OMPADEC received about $135million between 1993 and 1997 but this was completely wasted on over-valued contracts which the commission was eventually unable to pay, thereby resulting in a lot of abandoned projects, thus, the commission's impact was not felt by the people of the Niger Delta (UNDP, 2006). With the advent of democracy in 1999 the new civilian administration created the Niger Delta Development Commission (NDDC) and this body effectively took over the responsibilities of OMPADEC but the NDDC also encountered similar problems as those faced by OMPADEC. Between 2001 and 2004 NDDC received $341.1million and the commission had awarded contracts for over 600 projects at a cost of over $271.3million, but despite this huge capital outlay, education, health and physical infrastructure in the Niger delta were still poor and belied the huge millions spent on contracts (UNDP, 2006).

Despite the fact that institutions were created for development of the region and the region at least until 1975 received 50% of revenue from all onshore oil production, the population of the Niger Delta did not witness any significant improvement in their standard of living and so it can be inferred that they did not reap the benefits of the oil boom. This can be attributed to a number of factors which include the following:

i. The institutions established for development of the region failed to provide the required investment needed for the development of the Niger Delta due to organizational problems and the lack of will to carry out their mandates
ii. The institutions also had the problem of commitment because most members of the boards were not from the Niger Delta and were therefore more interested in the emoluments and benefits of being on the board, rather than development of the Niger Delta.
iii. Despite the fact that the Niger Delta States received 50% of oil revenue when the boom started until the mid-1970s, governance problems relating to corruption and mismanagement of resources led to slow economic growth and compounded developmental problems.
iv. The difficult terrain and landscape of the Niger Delta served to discourage and limit investment.
v. The Niger Delta has been subject to environmental degradation and pollution which has weakened human and material development.

Despite the fact that the percentage of derivation to the Niger Delta has been reduced over time, this region, on average, received more federal government allocation than other states in the country. Between 1980 and 2003 the average federal government allocation received by the Niger Delta was higher than the average received by all states in 20 years.[29] Thus the region has received higher revenue than other states of the country. Based on the revenue received, one would have expected that the region would have invested most of the revenue on capital projects to enhance economic development. The contrary seems to have been the case. On the average, capital expenditure for the Niger Delta consistently falls below the average for all the states of the country. In the 24 years between 1980 and 2003, average capital expenditure for the Niger Delta was above the figure for all states in only 11 years. Democracy seems to have played an important role as a democratic government was in place for 8 out of the 11 years in which average capital expenditure of the Niger Delta exceeded the average of the all states of the Federation. Another observation from this Table is that recurrent expenditure was higher in the Niger Delta in 21 of the 24 years. This implies that investment in infrastructure and institutions, which are capital expenditures, have not been a central focus of governments in the Niger Delta.

The poor governance and administration of revenue by the Niger Delta state governments is further highlighted when we examine figures for some basic infrastructure. In 2001 the average number of primary schools in the Niger Delta was 1094 while the average figure for all states of the country was 1340. This disparity had not changed significantly by 2005 when there were on average, 1300 primary schools in the Niger Delta and 1628 for the whole country. Although the number of schools has increased in the Niger Delta, the number of schools has also increased in other states and the Niger Delta is clearly lagging behind in terms of this measure of human capital. In terms of communication, in 2002, there was an average of 12,180 connected telephone lines in the Niger Delta while the average for the whole country was 19,500 lines. A similar scenario is found for health. In 2004 the average number of public health care facilities in the Niger Delta was 296 while for the whole country this figure was 387. The Niger Delta States fared better in terms of private health care facilities where their average number of 304 exceeded that of the whole country which was 250. These figures give an indication of the failure of the Niger Delta governments, despite the oil wealth, to develop appropriate institutions and infrastructure.

C. Conclusions

A common pattern emerges from the experience in the major oil producing regions in both countries. When a large inflow of rents take place in regions without a previous significant development of other economic activities, local institutions and social controls, resources tend to be captured and wasted and fuel or exacerbate violent conflict.

In the case of the Nigger Delta exploration and development of oil reserves was actually impaired during several years by civil and political strife over the control of oil resources and their potential rents. When the war ended, production was significantly increased around 1970 and the first price boom took place, rents flew generously into the Delta states. Neither growth nor coverage of basic services were above the average of the country

[29] For data, see Table 7 Annex 5.

indicating large waste of resources. Latter on the Central Government reduced the direct flow of rents to these States, but largely compensated with generous allocations of the central Government budget. Still, neither economic activity nor indexes of coverage of basic services improved much.

In Colombia, the three larger producers of oil or gas, and consequently the larger receivers of royalties in recent decades, which are three previously frontier regions, Casanare, Arauca y Guajira, also showed subpar performance and clear Dutch Disease effects with respect to their peers in either growth terms or most indexes of social services. This is in sharp contrast with a much better performance of Departments in which the oil bonanza was not so large or sudden and in which other economic activities, government institutions and social controls were more developed when the oil boom took place. Such appeared to have been the case in Santander and Huila, and more recently in Meta, which became gradually the largest oil producing region today.

V. Policy Recommendations

This paper analyzed in a comparative way the development of oil production, policies and institutions, and their effect on economic performance in Colombia and Nigeria, as well as in their main producing regions. Several major conclusions emerged in the previous sections and lay the basis for our policy recommendations that are summarized in this section.

First, we showed that in both countries discoveries and price booms motivated increases in governement control and the government-take, leading to a decrease in exploration and reserves. Such decreases prompted new sets of reforms that enhanced incentives for exploration and private sector participation, leading again to increases in reserves and production. It is of extreme importance that these countries avoid following again into such a cycle. In Colombia, the recent institutional reforms (separation of regulation and allocation of areas –in the hands of ANH- and the conversion of Ecopetrol into a public-private company, more independent from day to day Governement interference, may reduce, but not eliminate, the probability of a change that might again reduce current high incentives for exploration. In Nigeria the return to democracy might also reduce the probability of adverse changes, but the institutional structure seems less protected than in Colombia against changes in political mood or orientation. Building political consensus about the importance of stability and predictability of the rules of the game seem absolutely key in both countries.

Second, the analysis of the impact of oil abundance, and specifically of oil production and price variations, on economic performance show the critical role of institutions and macroeconomic policies. Estimates suggest that improved institutions (and political competition) either enhance positive effects (on fiscal revenues and balances, current account balances and accumulation of international reserves) or mitigate adverse effects on volatility, real exchange rate appreciation and non oil exports. Net growth effects depend largely on the quality of institutions and macro policies. The first price boom led to a major spending frenzy, Dutch disease effects and low and volatile growth in Nigeria, while the

second one did not affect much the level of expenditures or the real exchange rate, non oil exports continued to grow and overall growth rates were high and stable. Such a striking difference in performance was closely associated with institutional improvements (related to the return to democracy) and policy reforms throughout the economy, but especially in the fiscal front and. (the use of a benchmark Oil Price Rule in the budget and the introduction of a Medium Term Expenditures Framework). It was also associated with purposeful Central bank currency stabilization efforts. In contrast, Colombia was not affected by the first price boom but showed some signs of Dutch Disease in the second boom. This difference was largely due to the fact that it was a net oil importer during the first boom and a net oil exporter during the second, but also to differences in policies. In the first period fiscal prudence and a crawling peg system prevailed, while during the recent price boom a combination of a floating exchange rate (vis a vis high capital inflows and foreign currency earnings) and a large increase in fiscal expenditures (exacerbated by the dismantling and use of the Oil Stabilization Fund), led to a significant real appreciation and stagnation of non-mining non oil exports. It is extremely important for Nigeria to further institutionalize these policy improvements, especially as there are recent signs of potential relaxation. As for Colombia, it is key to take advantage of the emerging political consensus around the need to institute a "structural fiscal rule", similar to that of Chile, that would require to save in good times and permit orderly counter cyclical fiscal policies in bad times (both the current Government and most presidential candidates have expressed their conviction about the need of such an institutional change). It is also convenient to discuss if the Central Bank should "lean against the wind" in a somewhat more decided fashion during periods of high inflows of foreign currency in order to limit excessive real exchange rate appreciations and their potential negative effects on volatility and non oil non mining exports. Finally, in both countries we found that large and sudden oil rent inflows in institutionally and economically weak regions tend to generate significant waste of resources and Dutch Disease symptoms. It would seem prudent, then to limit the growth of such inflows in accordance to local institutional and absorptive capacities and for Central Governments to actively help them develop such capacities.

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Annex 1: Cross Country Estimations

Table 1 Annex 1: Cross Country Growth Estimations

	1	2	3	4	5	6	7
Net exports per worker	-0,0198	-0,0174	-0,0121	-0,005	-0,0055	-0,004	-0,0067
	(2.1952)**	(2.2111)**	(2.8519)***	(2.3044)**	(2.0369)**	(2.2103)**	(3.3027)***
Frazer index	0,3419						
	(1.9949)**						
Fraser index * Net exports per worker	0,0028						
	(2.0441)**						
Frazer Regulation		0,2257					
		(1,4578)					
Frazer Regulation*Net exports per worker		0,0026					
		(1.9985)**					
Frazer legal system			0,3439				
			(3.6688)***				
Frazer legal system* Net exports per worker			0,0014				
			(2.8328)***				
Governance index				0,2822			
				(2.7296)***			
Governance index * Net exports per worker				0,0016			
				(2.3160)**			
Political Constrains III					0,6993		
					(0,6239)		
Political Constrains III * Net exports per worker					0,0099		
					(1.7216)*		
Polarization						0,2441	
						(1,6504)	
Polarization * Net exports per worker						0,002	
						(2.1940)**	
Fragmentation							0,7196
							(0,9349)
Fragmentation * Net exports per worker							0,0082
							(2.8149)***
Constant	3,32	3,6003	4,6435	5,6505	5,7252	5,9423	4,7806
	(1,3367)	(1,4429)	(2.5548)**	(2.6860)***	(3.0238)***	(3.1083)***	(2.5093)**
Observations	86	86	86	81	85	80	88
R-squared	0,5888	0,5833	0,6409	0,606	0,5481	0,5837	0,5504

Notes: 1.Absolute value of t statistics in parentheses 2. * significant at 10%; ** significant at 5%; *** significant at 1% 3.all estimates contain the following control variables: Initial GDP per capita (in log), Inflation (in log), secondary education (in log), Exchange Rate Index, Gross capital formation (% of GDP)

Table 2 Annex 1: Cross Country Volatility Estimations

	1	2	3	4
Net exports per worker	0,0007	0,0009	0,0041	0,0033
	(1.8780)*	(2.1006)**	(1.592)	(1.7338)*
Frazer size of government	0,0279			
	(0.3741)			
Frazer size of government * Net exports per worker	-0,0001			
	(1.7798)*			
Frazer legal system		-0,0077		
		(0.0933)		
Frazer legal system* Net exports per worker		-0,0001		
		(2.0277)**		
Fragmentation			-0,9502	
			(1.7002)*	
Fragmentation* Net exports per worker			-0,0058	
			(1.7516)*	
Fragmentation of the government				-1,1639
				(1.5178)
Fragmentation of the government * Net exports per worker				-0,0107
				(1.9213)*
Constant	2,6001	2,8291	2,7863	2,6071
	(3.6860)***	(3.8770)***	(3.9912)***	(4.1597)***
Observations	95	95	97	97
R-squared	0,2974	0,3046	0,1569	0,1582

Notes: 1.Absolute value of t statistics in parentheses 2. * significant at 10%; ** significant at 5%; *** significant at 1% 3.all estimates contain the following control variables: Initial GDP per capita (in log), secondary education (in log), private domestic credit (% of GDP)

Table 3 Annex 1: Cross Country Income Distribution Estimations

	1	2	3	5	6	7	8
Net exports per worker	0,0064	0,0045	0,0083	-0,0131	-0,0071	0,0058	0,0007
	(2.0770)**	(1,2717)	(2.9131)***	(2.2295)**	(4.1803)***	(2.2203)**	(1.6901)*
Control of corruption	-0,2853						
	(1.5025)						
Control of corruption * Net exports per worker	-0,0034						
	(2.1535)**						
Rule of law		-0,5698					
		(1.7548)**					
Rule of law *Net exports per worker		-0,0027					
		(1.298)					
Quality of regulation			-0,2348				
			(1.2854)				
Quality of regulation *Net exports per worker			-0,0047				
			(3.0572)***				
Political Constraints V				-0,6379			
				(0.7419)			
Political Constraints V * Net exports per worker				0,017			
				(2.1634)**			
Political Constraints III					-1,1348		
					(1.0785)		
Political Constraints III * Exp. Netas por trabajador					0,0146		
					(4.0387)***		
Fragmentation of the government						-0,0391	
						(0.3533)	
Fragmentation of the government * Net exports per worker						-0,0014	
						(2.3417)**	
Frazer size of government							-0,0299
							(0.2605)
Frazer size of government*Net exports per worker							-0,0001
							(1.9169)*
Constant	6,6422	6,7429	7,1611	8,0938	8,9495	10,456	10,1731
	(2.3889)**	(2.5283)**	(2.7528)***	(2.8995)***	(3.9060)***	(4.0204)***	(3.7048)***
Observaciones	87	87	87	84	85	86	86
R-squared	0,1692	0,175	0,1813	0,3658	0,3773	0,3728	0,3638

Notes: 1.Absolute value of t statistics in parentheses 2. * significant at 10%; ** significant at 5%; *** significant at 1% 3.all estimates contain the following control variables: Initial GDP, education (log), Exchange Rate Index, Gross Capital Formation.

Annex 2: OLS Results

This Annex reports OLS results for Nigeria and Colombia. Regressions highlighted are the ones used for Table 6 in the paper.

Table 1 Annex 2: OLS Estimation Results on GDP Growth (%)

	Colombia.						Nigeria.	
	1	2	3	4[1]	5[1]	6[1]	7	8
ICRG	0.014	-0.0531	-0.034	0.0093	-0.0241	-0.0185	-0.0004	0.8362
	(2.4268)**	(1.8883)*	(1.8165)*	(0.1142)	(0.4041)	(0.5852)	(0.0164)	(1.8296)*
Oil production per capita (TBPD)		0.0018		-0.0185	-0.0121			-0.2442
		(0.6880)		(2.6499)**	(0.9077)			(1.9824)*
Net oil exports per capita (million dollars constant prices 2000)			0			-0.0007		
			(0.2933)			(0.1518)		
Oil production per capita * ICRG		0.0134			0.0070			-0.1212
		(2.4350)**			(0.5659)			(1.8602)*
Net oil exports per capita * ICRG			0.0006			0.0003		
			(2.5725)**			(0.7429)		
Constant	0.0347	0.023	0.032	0.0798	0.0532	0.0406	0.1779	1.9041
	(2.1840)**	-(1.3142)	(2.0889)**	(2.2989)**	(0.9012)	(0.1256)	(2.6974)**	(2.2327)**
Observations	43	43	43	19	19	19	36	36
R-squared	0.4989	0.5699	0.5841	0.6351	0.6446	0.7385	0.1448	0.3008

Notes: 1.Absolute value of t statistics in parentheses 2. * significant at 10%; ** significant at 5%; *** significant at 1% 3.All estimates include the following statistically control variables :for Colombia inflation rate , fiscal balance(%GDP) and world GDP growth rate; For Nigeria: total debt(% of GDP), REERI,and non oil openness [1] this model is estimate for the net exporter period 1987-2008.

Table 2 Annex 2: OLS Estimation Results on Non-Oil Exports

	Colombia.		Nigeria.	
	1	2	3	4
ICRG	-437.4352	280.4791	0.0036	-0.0022
	(1.1416)	(0.5811)	(0.5965)	(0.1182)
Oil price (Dollar constant prices 2000)		-11.1905	-0.0008	-0.0005
		(0.6319)	(3.2124)***	(0.5731)
Oil price * ICRG				0.0002
				-(0.3359)
Constant	17,334.51	3,342.63	0.0641	0.0529
	(5.0487)***	(1.8911)*	(3.0801)***	(1.3352)
Observations	37	37	36	36
R-squared	0.9251	0.8781	0.4777	0.4797

Notes: 1.Absolute value of t statistics in parentheses 2. * significant at 10%; ** significant at 5%; *** significant at 1% 3.All estimates include the following statistically control variables for Colombia: external debt (% GDP), REERI, world GDP growth rate, coffee prices; for Nigeria: total debt (% of GDP), fiscal expenditure(% of GDP) and REERI.

Table 3 Annex 2: OLS Estimation Results on Current Account Balance

	Colombia.			Nigeria.			
	1	2	3	4	5[2]	6[2]	7
ICRG	0.0092			-1.9598	-15.8536	-16.2192	0.558
	(0.9659)			(0.8326)	(2.3739)**	(2.4546)**	(0.1652)
Oil price (Dollar constant prices 2000)		0.0001			1.046	1.2968	
		(0.3817)			(2.2496)**	(4.2277)***	
Oil production per capita *Oil price			0				
			(1.3125)				
Net oil exports per capita (million dollars constant prices 2000)							-0.0036
							(0.1028)
Oil price * ICRG		0.0002			0.4031	0.4368	
		(0.5290)			(2.3500)**	(2.6677)**	
Oil production per capita *Oil price *ICRG			0				
			(0.9698)				
Constant	-0.2183	-0.1008	-0.1331	-6.8815	-40.2996	-45.4952	5.8214
	(3.4482)***	(2.3499)**	(2.8635)***	(1.3411)	(2.7386)**	(3.5721)***	(0.5499)
Observations	37	37	37	36	36	36	36
R-squared	0.2626	0.1369	0.177	0.555	0.6276	0.6212	0.1111

Notes: 1.Absolute value of t statistics in parentheses 2. * significant at 10%; ** significant at 5%; *** significant at 1% 3.All estimates include the following statistically control variables for Colombia: non oil openness, terms of trade and external debt (%GDP) ; for Nigeria: terms of trade, total debt(% GDP) [2]Equation 5 was estimated all the control variables while equation 6 was estimated by omitting terms of trade

Table 4 Annex 2: OLS Estimation Results on Tax Revenues (% of GDP)

	Colombia.							Nigeria.				
	1	2	3	4	5	6	7[1]	8	9	10[2]	11[2]	12
ICRG	-0.0011	-0.0128	0.0012	-0.0189	-0.0002	0.002	-0.0053	-0.0147	-0.2298	-0.0048	-0.0148	-0.1446
	(0.5247)	(1.7338)*	(0.6123)	(2.0817)**	(0.1196)	(0.9763)	(0.6096)	(1.4754)	(2.2718)**	(0.4514)	(1.5176)	(1.5519)
Oil production per capita (TBPD)								0.0084	0.0742			
								(2.7402)***	(2.4870)**			
Oil price (Dollar constant prices 2000)		-0.0002	-0.0002				-0.0003					
		(2.9949)***	(3.7121)***				(0.1125)					
Oil production per capita *Oil price				0	0	0						
				(1.8891)*	(2.2270)**	(3.7086)***						
Net oil exports per capita (million dollars constant prices 2000)										0.0002	0.0003	0.002
										(2.2143)**	(2.9915)***	(1.7004)*
Oil production per capita * ICRG									0.0348			
									(2.2428)**			
Oil price *ICRG		0.0005					0.0002					
		(1.9144)*					(0.6133)					
Oil production per capita *Oil price *ICRG				0								
				(2.1050)**								
Net oil exports per capita *ICRG												0.0009
												(1.5097)
Oil price *FAEP			0.0004									
			(2.3032)**									
Oil production per capita *Oil price *FAEP						0						
						(2.8541)***						
Constant	-0.0034	0.0023	0.0111	-0.0073	-0.007	-0.0021	-0.0071	-0.0349	-0.4081	0.0283	-0.0221	-0.2343
	(0.3797)	(0.2812)	(1.2537)	(0.8894)	(0.8157)	(0.2650)	(0.1865)	(0.6576)	(2.0395)**	(0.4585)	(0.4622)	(1.2717)
Observations	42	42	42	42	42	42	18	37	38	38	37	38
R-squared	0.9534	0.9656	0.967	0.9636	0.959	0.9667	0.9681	0.5476	0.4289	0.3477	0.5635	0.391

Notes: 1.Absolute value of t statistics in parentheses 2. * significant at 10%; ** significant at 5%; *** significant at 1% 3.All estimates include the following statistically control variables :For Colombia : GDP (t-1), non oil openness and inflation rate; for Nigeria: GDP (t-1), non oil openness and inflation rate [1] these model is for the net exporter period 1987-2008[2]Equation 10 was estimated with all the control variables, equation 11 was estimated without non oil openness

Table 5 Annex 2: OLS Estimation Results on Fiscal Balance (% of GDP)

	Colombia.					Nigeria.				
	1	2	3	4	5	6	7	8	9	10
ICRG	0.0123					0.0243	0.0232	-0.0027		
	(3.5465)***					(2.9520)***	(2.7495)***	(0.2089)		
Oil production per capita (TBPD)		0.0024				0.0112			0.0184	
		(1.3693)				(2.7117)**			(3.4973)***	
Oil price (Dollar constant prices 2000)			-0.0002							
			(1.3081)							
Net oil exports per capita (million dollars constant prices 2000)				0.0001			0.0003			
				(1.5317)			(2.2279)**			
Oil production per capita *Oil price					0			0		0
					(0.4446)			(2.1583)**		(2.7530)***
Oil production per capita * ICRG		0.0028							0.0038	
		(3.7699)***							(2.9811)***	
Oil price *ICRG			0.0004							
			(3.5368)***							
Net oil exports per capita *ICRG				0.0002						
				(4.1096)***						
Oil production per capita *Oil price *ICRG					0					0
					(3.4032)***					(0.0462)
Constant	0.0504	0.0355	0.0483	0.0398	0.0496	-0.0079	0.021	0.0061	-0.0549	0.0107
	(3.6490)***	(2.2420)**	(3.2252)***	(2.8549)***	(3.4068)***	(0.2675)	(0.8629)	(0.2089)	(1.7011)*	(0.5505)
Observations	42	42	42	42	42	38	38	38	38	38
R-squared	0.8234	0.8333	0.825	0.8403	0.821	0.4282	0.3931	0.3883	0.4305	0.3875

Notes: 1.Absolute value of t statistics in parentheses 2. * significant at 10%; ** significant at 5%; *** significant at 1% 3.All estimates include the following statistically control variables for Colombia: GDP (t-1), inflation rate and REERI; for Nigeria: REERI

Annex 3: Econometric Annex

This econometric annex presents the unit root tests, SVAR methodology compared to the traditional VAR model, and Time series OLS Results.

Unit Root Tests

Three methodologies are used to implement the Unit Root Tests: Augmented Dickey Fuller (ADF), Phillips-Perron (PP), and Kwiatkowski-Phillips-Schmidt-Shin (KPSSS). All the statistics generated for the test were contrasted with the tabulated values for a 95% of confidence. Tables 1 and 2 of the Annex reported below show the results for Colombia and Nigeria, respectively. For both countries variables are classified in two groups; the first group includes macroecoconomic variables related to Dutch Disease hypotheses, the second oil sector variables.

For Colombia the tests find that for the first group economic growth and Real Exchange Rate Index (RERI) series are stationary. Only the Phillips and Perron test indicates that RERI is not stationary. In the second group, oil price is stationary in all the tests. For Nigeria economic growth is stationary in all tests.

To estimate SVAR (and OLS) it is necessary to transform the non-stationary series from levels to differences, but this implies a difficult interpretation of the results. For this reason the strategy used is to include a time trend and run the unit root test again. For Colombia all series were used as stationary including time-trend, except fiscal expenditures. Specifically the tests find that non-oil exports series is stationary in a quadratic trend, while oil production and oil exports are stationary in a linear trend. For Colombian data the estimates include also a dummy variable for the status change from importer to exporter since 1987, dummy variable to include the 1999 crisis, and, for both countries, a dummy to model periods when oil price was higher than US$ 60 per barrel. In Nigeria, all series are considered stationary.

Table 1 Annex 2: Unit Root Test Result for Colombia

			Unit Root Test		
		Degree of integration	ADF	PP	KPSS
Group #1	1. Economic growth	I(0)	Stationary	Stationary	Stationary
	2. Non-oil exports	I(1)	Non-stationary	Non-stationary	Non-stationary
	3. Fiscal expenditure	I(1)	Non-stationary	Non-stationary	Non-stationary
	4. RERI	I(0)	Stationary	Non-stationary	Stationary
Group #2	1. Oil production	I(1)	Non-stationary	Non-stationary	Stationary
	2. Oil price	I(0)	Stationary	Stationary	Stationary
	3. Oil exports	I(1)	Non-stationary	Non-stationary	Stationary

Table 2 Annex 2: Unit Root Test Result for Nigeria

			Unit Root Test		
		Degree of integration	ADF	PP	KPSS
Group #1	1. Economic growth	I(0)	Stationary	Stationary	Stationary
	2. Non-oil exports	I(1)	Stationary	Non-stationary	Non-stationary
	3. Fiscal expenditure	I(1)	Non-stationary	Non-stationary	Stationary
	4. RERI	I(1)	Non-stationary	Non-stationary	Stationary
Group #2	1. Oil production	I(1)	Non-stationary	Non-stationary	Stationary
	2. Oil price	I(0)	Stationary	Stationary	Stationary
	3. Oil exports	I(1)	Non-stationary	Non-stationary	Stationary

Structural Vectors Autoregressive (SVAR)

The Vectors Autoregressive (VAR)[30] is a multivariate analysis methodology, i.e. a technique that allows indentifying the performance of several time series simultaneously. For example, the of three equations with three variables, x_t, y_t and z_t is:

$$x_t = \delta_1 + \alpha_{11}x_{t-1} + \cdots + \alpha_{1p}x_{t-p} + \beta_{11}y_{t-1} + \cdots + \beta_{1p}y_{t-p} + \gamma_{11}z_{t-1} + \cdots + \gamma_{1p}z_{t-p} + u_{1t}$$
$$y_t = \delta_2 + \alpha_{21}x_{t-1} + \cdots + \alpha_{2p}x_{t-p} + \beta_{21}y_{t-1} + \cdots + \beta_{2p}y_{t-p} + \gamma_{21}z_{t-1} + \cdots + \gamma_{2p}z_{t-p} + u_{2t}$$
$$z_t = \delta_3 + \alpha_{31}x_{t-1} + \cdots + \alpha_{3p}x_{t-p} + \beta_{31}y_{t-1} + \cdots + \beta_{3p}y_{t-p} + \gamma_{31}z_{t-1} + \cdots + \gamma_{3p}z_{t-p} + u_{3t}$$

Each variable in the system is then explained by lags of all the variables included and an error term u_{it}. In matrix form the system of equations is:

$$\begin{bmatrix} x_t \\ y_t \\ z_t \end{bmatrix} = \begin{bmatrix} \delta_1 \\ \delta_2 \\ \delta_3 \end{bmatrix} + \begin{bmatrix} \alpha_{11} & \beta_{11} & \gamma_{11} \\ \alpha_{21} & \beta_{21} & \gamma_{21} \\ \alpha_{31} & \beta_{31} & \gamma_{31} \end{bmatrix} \begin{bmatrix} x_{t-1} \\ y_{t-1} \\ z_{t-1} \end{bmatrix} + \cdots + \begin{bmatrix} \alpha_{1p} & \beta_{1p} & \gamma_{1p} \\ \alpha_{2p} & \beta_{2p} & \gamma_{2p} \\ \alpha_{3p} & \beta_{3p} & \gamma_{3p} \end{bmatrix} \begin{bmatrix} x_{t-p} \\ y_{t-p} \\ z_{t-p} \end{bmatrix} + \begin{bmatrix} u_{1t} \\ u_{2t} \\ u_{3t} \end{bmatrix}$$

$$\Rightarrow \quad X_t = \Phi_0 + \Phi_1 X_{t-1} + \cdots + \Phi_p X_{t-p} + \boldsymbol{u_t} \qquad \textbf{(1)}$$

where

$$X_t = \begin{bmatrix} x_t \\ y_t \\ z_t \end{bmatrix} \qquad \Phi_0 = \begin{bmatrix} \delta_1 \\ \delta_2 \\ \delta_3 \end{bmatrix} \qquad \Phi_1 = \begin{bmatrix} \alpha_{11} & \beta_{11} & \gamma_{11} \\ \alpha_{21} & \beta_{21} & \gamma_{21} \\ \alpha_{31} & \beta_{31} & \gamma_{31} \end{bmatrix} \ldots \Phi_p = \begin{bmatrix} \alpha_{1p} & \beta_{1p} & \gamma_{1p} \\ \alpha_{2p} & \beta_{2p} & \gamma_{2p} \\ \alpha_{3p} & \beta_{3p} & \gamma_{3p} \end{bmatrix} \boldsymbol{u_t} = \begin{bmatrix} u_{1t} \\ u_{2t} \\ u_{3t} \end{bmatrix}$$

This system can be estimated using Ordinary Least Squares. Then, it is possible to construct impulse-response functions to estimate the effects of a shock of any variable of the system on the remaining variables in the long run, without imposing any causality condition.

[30] This presentation is based in the Hamilton exposition (see Hamilton,1994) and an application showed by Melo and Hamann (1998)

The possibility to explore the causality relationships between variables is very attractive, and makes this methodology very popular. However, estimation of impulse-response functions requests a set of identification restriction in the system. First, the researcher must establish the order of exogeneity, and impulse-response functions are sensitive to different specifications of this order. Second, the impulse-response matrix must be lower-triangular, assuming than some reactions are null:

$$\begin{bmatrix} \frac{\partial x_t}{\partial u_1} & \frac{\partial x_t}{\partial u_2} & \frac{\partial x_t}{\partial u_3} \\ \frac{\partial y_t}{\partial u_1} & \frac{\partial y_t}{\partial u_2} & \frac{\partial y_t}{\partial u_3} \\ \frac{\partial z_t}{\partial u_1} & \frac{\partial z_t}{\partial u_2} & \frac{\partial z_t}{\partial u_3} \end{bmatrix} \rightarrow \begin{bmatrix} \frac{\partial x_t}{\partial u_1} & 0 & 0 \\ \frac{\partial y_t}{\partial u_1} & \frac{\partial y_t}{\partial u_2} & 0 \\ \frac{\partial z_t}{\partial u_1} & \frac{\partial z_t}{\partial u_2} & \frac{\partial z_t}{\partial u_3} \end{bmatrix}$$

where x_t is the most exogenous variable, then y_t, and z_t is the more endogenous one.

A drawback of this type of models is that order of exogeneity is in fact exogenous to the model. A second critic is the non inclusion of contemporaneous relationship between variables.

Both drawbacks are solved in the Structural Vector Autoregressive (SVAR) methodology. First, the order is endogenous in the model, dictated by economic theory relationships. Second, an SVAR allows the inclusion of contemporary relationships:

$$\begin{aligned} \varphi_{xx}x_t = \rho_1 &+ \varphi_{xy}y_t + \varphi_{xz}z_t + \pi_{11}x_{t-1} + \cdots + \pi_{1p}x_{t-p} + \tau_{11}y_{t-1} + \cdots + \tau_{1p}y_{t-p} \\ &+ \omega_{11}z_{t-1} + \cdots + \omega_{1p}z_{t-p} + \varepsilon_{1t} \\ \varphi_{yy}y_t = \rho_2 &+ \varphi_{yx}x_t + \varphi_{yz}z_t + \pi_{21}x_{t-1} + \cdots + \pi_{2p}x_{t-p} + \tau_{21}y_{t-1} + \cdots + \tau_{2p}y_{t-p} \\ &+ \omega_{21}z_{t-1} + \cdots + \omega_{2p}z_{t-p} + \varepsilon_{2t} \\ \varphi_{zz}z_t = \rho_3 &+ \varphi_{zx}x_t + \varphi_{zy}y_t + \pi_{31}x_{t-1} + \cdots + \pi_{3p}x_{t-p} + \tau_{31}y_{t-1} + \cdots + \tau_{3p}y_{t-p} \\ &+ \omega_{31}z_{t-1} + \cdots + \omega_{3p}z_{t-p} + \varepsilon_{3t} \end{aligned}$$

The system can represent in a matrix form as:

$$\begin{bmatrix} \varphi_{xx} & \varphi_{xy} & \varphi_{xz} \\ \varphi_{yx} & \varphi_{yy} & \varphi_{yz} \\ \varphi_{zx} & \varphi_{zy} & \varphi_{zz} \end{bmatrix} \begin{bmatrix} x_t \\ y_t \\ z_t \end{bmatrix} = \begin{bmatrix} \rho_1 \\ \rho_2 \\ \rho_3 \end{bmatrix} + \begin{bmatrix} \pi_{11} & \tau_{11} & \omega_{11} \\ \pi_{21} & \tau_{21} & \omega_{21} \\ \pi_{31} & \tau_{31} & \omega_{31} \end{bmatrix} \begin{bmatrix} x_{t-1} \\ y_{t-1} \\ z_{t-1} \end{bmatrix} + \cdots + \begin{bmatrix} \pi_{1p} & \tau_{1p} & \omega_{1p} \\ \pi_{2p} & \tau_{2p} & \omega_{2p} \\ \pi_{3p} & \tau_{3p} & \omega_{3p} \end{bmatrix} \begin{bmatrix} x_{t-p} \\ y_{t-p} \\ z_{t-p} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix}$$

$$\Rightarrow \quad \boldsymbol{\varphi} X_t = \Omega_0 + \Omega_1 X_{t-1} + \cdots + \Omega_p X_{t-p} + \boldsymbol{\varepsilon}_t \qquad \textbf{(2)}$$

Where:

$$\boldsymbol{\varphi} = \begin{bmatrix} \varphi_{xx} & \varphi_{xy} & \varphi_{xz} \\ \varphi_{yx} & \varphi_{yy} & \varphi_{yz} \\ \varphi_{zx} & \varphi_{zy} & \varphi_{zz} \end{bmatrix} \qquad \Omega_0 = \begin{bmatrix} \rho_1 \\ \rho_2 \\ \rho_3 \end{bmatrix} \quad \Omega_1 = \begin{bmatrix} \pi_{11} & \tau_{11} & \omega_{11} \\ \pi_{21} & \tau_{21} & \omega_{21} \\ \pi_{31} & \tau_{31} & \omega_{31} \end{bmatrix} \ldots \quad \Omega_p = \begin{bmatrix} \pi_{1p} & \tau_{1p} & \omega_{1p} \\ \pi_{2p} & \tau_{2p} & \omega_{2p} \\ \pi_{3p} & \tau_{3p} & \omega_{3p} \end{bmatrix}$$

$$\boldsymbol{\varepsilon}_t = \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix}$$

Comparing traditional VAR and SVAR there exists a relationship between the error terms:

$$X_t = \boldsymbol{\varphi}^{-1}\Omega_0 + \boldsymbol{\varphi}^{-1}\Omega_1 X_{t-1} + \cdots + \boldsymbol{\varphi}^{-1}\Omega_p X_{t-p} + \boldsymbol{\varphi}^{-1}\boldsymbol{\varepsilon}_t \qquad \textbf{(3)}$$

$$\Rightarrow \qquad \Phi_0 = \boldsymbol{\varphi}^{-1}\Omega_0, \quad \Phi_1 = \boldsymbol{\varphi}^{-1}\Omega_1, \ldots, \Phi_p = \boldsymbol{\varphi}^{-1}\Omega_p, \qquad \boldsymbol{u}_t = \boldsymbol{\varphi}^{-1}\boldsymbol{\varepsilon}_t$$

To estimate the SVAR it is necessary, first, to estimate the traditional VAR in order to estimate the matrix $\boldsymbol{\varphi}$ among all the relationships between all variables but including also theoretical restrictions.

Variance Decomposition Results

Table 3 Annex 2: Percentage of variance due to oil production movements for Colombia

Period	RERI	Fiscal expenditure variation	Non-oil exports	Growth
1	3%	3%	71%	23%
2	13%	14%	68%	21%
3	23%	14%	66%	21%
4	29%	14%	64%	23%
5	32%	14%	63%	27%
6	33%	14%	62%	29%
7	33%	15%	62%	31%
8	33%	16%	62%	32%
9	33%	17%	62%	33%
10	33%	17%	62%	33%

Table 4 Annex 2: Percentage of variance due to oil price movements for Colombia

Period	RERI	Fiscal expenditure variation	Non-oil exports	Growth
1	0%	0%	25%	0%
2	2%	1%	23%	1%
3	4%	1%	22%	1%
4	5%	1%	21%	1%
5	6%	1%	21%	1%
6	6%	1%	20%	1%
7	6%	1%	20%	1%
8	6%	1%	20%	1%
9	6%	2%	20%	1%
10	6%	2%	20%	1%

Table 5 Annex 2: Percentage of variance due to oil exports movements for Colombia

Period	RERI	Fiscal expenditure variation	Non-oil exports	Growth
1	6%	1%	59%	17%
2	16%	9%	54%	16%
3	24%	8%	51%	18%
4	28%	8%	48%	21%
5	29%	9%	47%	25%
6	29%	9%	47%	27%
7	29%	10%	47%	28%
8	28%	11%	48%	28%
9	28%	11%	48%	28%
10	28%	12%	48%	28%

Table 6 Annex 2: Percentage of variance due to oil production movements for Nigeria

Period	RERI	Fiscal expenditure	Non-oil exports	Growth
1	0%	6%	19%	28%
2	2%	26%	25%	26%
3	11%	41%	31%	25%
4	24%	52%	35%	24%
5	35%	58%	36%	24%
6	43%	62%	37%	24%
7	49%	64%	36%	24%
8	52%	65%	36%	25%
9	54%	65%	36%	25%
10	55%	65%	36%	25%

Table 7 Annex 2: Percentage of variance due to oil price movements for Nigeria

Period	RERI	Fiscal expenditure	Non-oil exports	Growth
1	1%	39%	42%	0%
2	12%	51%	49%	2%
3	22%	57%	51%	3%
4	29%	60%	51%	3%
5	34%	61%	51%	3%
6	37%	61%	50%	3%
7	39%	61%	50%	3%
8	41%	60%	49%	3%
9	41%	60%	49%	3%
10	41%	59%	49%	3%

Table 8 Annex 2: Percentage of variance due to oil exports movements for Nigeria

Period	RERI	Fiscal expenditure	Non-oil exports	Growth
1	7%	5%	4%	28%
2	5%	11%	14%	25%
3	5%	19%	22%	24%
4	9%	28%	26%	24%
5	14%	34%	28%	24%
6	19%	39%	29%	24%
7	24%	41%	29%	24%
8	27%	43%	29%	24%
9	28%	43%	29%	24%
10	29%	43%	28%	24%

Annex 4: Panel Regressions Results on Departmental GDP Growth Rate, 1990-2008

	1	2	3	4	5	6	7	8
Initial GDP 1/	0.0096	0.0056	-0.0006	-0.0058	0.0043	0.0043	0.0004	-0.0162
	(0.0139)	(0.0178)	(0.0187)	(0.0172)	(0.0171)	(0.0172)	(0.0173)	(0.0246)
Education 2/	0.1526	1.5605	1.4065	1.3781	1.1293	1.1823	1.7808*	4.3765*
	(0.0928)	(1.0377)	(1.0456)	(1.0404)	(1.0428)	(1.0968)	(1.0450)	(2.1905)
per capita Royalties	0.0042	-4.3033***	-3.1825**	-2.8345**	-4.1097***	-3.9719***	-3.3880***	-0.8557***
	(0.0254)	(0.8854)	(1.3582)	(1.2655)	(0.8781)	(1.1971)	(1.1556)	(0.3172)
per capita Central Government Transfers	0.0124	0.0395	0.0544	0.0602	0.0716	0.0683	0.0313	-0.1292
	(0.0469)	(0.1764)	(0.1767)	(0.1757)	(0.1737)	(0.1763)	(0.1772)	(0.2603)
			ITDG 3/			**ITDC 4/**		**ITDC 5/**
Institutional variables		0.0043	0.0023		0.0048**	0.0045		-0.0198*
		(0.0027)	(0.0032)		(0.0022)	(0.0028)		(0.0112)
Interactions between institutional variables and royalties			0.0074	0.0102*		0.0000	0.0000	0.0000***
			(0.0068)	(0.0057)		(0.0000)	(0.0000)	(0.0000)
Constant	-0.0805	-1.3014	-1.0796	-0.8999	-1.1069	-1.1348	-1.2601	-1.8033
	(0.0704)	(0.7904)	(0.8150)	(0.7733)	(0.7595)	(0.7834)	(0.7904)	(1.2136)
Observations	401	90	90	90	90	90	90	90
R^2	0.077	0.584	0.593	0.589	0.600	0.600	0.582	0.064

Robust standard error in parenthesis

*** p<0.01, ** p<0.05, * p<0.1

1/ In 1994 constant pesos

2/ Students registered in public education as % of the 5-18 years old population

3/ International Transparency Index of Comptroller offices

4/ International transparency Index of Departmental Governments

5/ Regression with instrumental variables

Annex 5

Table 1 Annex 5: Evolution of Revenue Allocation in Nigeria

Year	Fiscal Commissioners	Recommendations	Accepted Principles
1947/48	Sir Sydney Phillipson and S.O. Adebo		a. Derivation b. Even progress
1952/53	Prof. J.R. Hicks, Sir Sydney Phillipson and D. Skelton		a. Derivation b. Need c. National interest
1954/58	Sir Louis Chick		a. derivation b. Fiscal independence
1959/60	Sir J. Raisman and Prof. R.C. Tress		a. Derivation b. National unity c. Fiscal independence
1964/67	Mr H. Binns	a. Regional financial comparability b. Continuity of service c. Minimum responsibilities	a. derivation b. Fiscal independence c. National interest East 30% North 42% Mid-West 8% West 20%
1968	Chief O. Dina	a. Minimum national standard of basic needs b. Population c. Tax efforts d. Financial prudence e. Fiscal adequacy f. Balanced development g. Independent revenue h. derivation i. National interest	a. Equality of States 50% b. Population 50% c. Derivation
1975/76	Federal Military Government		a. Equality of states b. Population c. derivation
1977	Prof. A.O. Aboyade	a. Equality of access to dev. opportunities (25%) b. National minimum std. for national integration (22%) c. Absorptive capacity (20%) d. Independent revenue and minimum tax effort (18%) e. Fiscal efficiency (15%) Federal 57% States joint a/c 30% Local government 10% Special grants a/c 30%	a. Equality of access to dev. opportunities (25%) b. National minimum std. for national integration (25%) c. Absorptive capacity (20%) d. Independent revenue and minimum tax effort (18%) e. Fiscal efficiency (15%) Federal 60% States joint a/c 30% Local government 10% Special grants a/c 0%
1979	Dr Pius Okigbo		Declared ultra vires by the Supreme Court
1981	Federal Government Revenue Act of 1981/82		Federal 53% States 35% Local government 10% Sharing of states'

			allocation Minimum responsibility Equality of states Population Social development Internal revenue effort Derivation Ecology
1988/89	Gen. T.Y. Danjuma	Vertical allocation: Federal govt. 47% State govts. 30% Local govts. 15% Special funds 8% Special fund: FCT 1% Stabilization 0.5% Savings 2% Derivation 2% OMPADEC 1.5% Dev. of non-oil 0.5% Gen. Ecology 0.5% Horizontal allocation: Equality of states 40% Population 30% Social dev. factor 10% Land mass & terrain – Int. rev. effort 20%	Vertical allocation: Federal govt. 50% State govt. 30% Local govt. 15% Special funds 5% Special funds: FCT 1% Stabilization 0.5% Savings – Derivation 1% OMPADEC 1.5% Dev. of non-oil – Gen. ecology 1% Horizontal allocation: Equality of states 40% Population 30% Social dev. factor 10% Land mass & terrain – Int. rev. effort 20%
1999	Federal Military Government		Fed. Govt. 48.5% State govts. 24% Local govts. 20% FCT 1% Gen. ecology 2% Stabilization 0.5% Derivation (MR) 1% OMPADEC 3%

Source: Agiobenebo(1999)

Table 2 Annex 5: Revenue and expenditure in Bendel State[1], 1980-2003 (Nmillion)

Year	Revenue			Expenditure		
	Federal Government Allocation	Internally Generated Revenue	Total	Recurrent	Capital	Total
1980	372.00	50.00	422.00	244.30	206.80	451.10
1981	309.00	32.40	341.40	358.70	626.10	984.80
1982	232.60	44.20	276.30	365.10	416.70	781.80
1983	225.60	53.60	279.20	419.20	330.60	749.80
1984	212.90	149.60	362.50	365.50	102.60	468.10
1985	228.10	162.70	390.80	396.70	67.10	463.80
1986	198.20	103.20	301.40	323.00	51.10	374.10
1987	415.80	113.90	529.70	393.60	84.30	477.90
1988	520.40	190.40	710.80	489.40	155.90	645.30
1989	676.30	93.10	769.40	521.00	342.40	863.40
1990	961.40	185.43	1185.00	217.10	198.10	415.20
1991	513.40	113.20	626.60	167.40	336.40	503.80
1992	1172.70	483.30	1656.00	1249.30	873.80	2123.10
1993	1719.70	617.20	2336.90	2200.30	608.10	2808.40
1994	1619.60	1095.50	2715.10	2337.70	588.80	2926.50
1995	2707.00	2497.60	5204.60	3906.70	1260.80	5167.50
1996	2552.80	4906.00	7600.70	2830.80	1730.10	4560.90
1997	3278.10	4130.10	7411.70	3734.50	2330.20	6064.70
1998	3877.00	5248.20	9125.20	4523.00	4883.80	9406.80
1999	6027.00	5790.30	11817.30	7611.00	4562.20	12173.20
2000	12192.20	3595.20	39058.90	19684.10	18559.00	38243.10
2001	42410.00	2000.00	61737.20	25671.90	35625.30	67672.30
2002	38453.20	8148.30	46601.50	30805.60	32142.50	62948.10
2003	63083.30	18810.70	82299.00	53423.00	27579.90	84440.60

Sources: Central Bank of Nigeria Annual Report and Statement of Accounts, various years

Note: [1]Following state creation, from 1991 the figures for Bendel State are additions of Edo and Delta States

For 2001 - 2003 the figures for total expenditure include extra budgetary expenditure

Table 3 Annex 5: Revenue and expenditure in Cross River State[2], 1980-2003 (Nmillion)

Year	Revenue			Expenditure		
	Federal Government Allocation	Internally Generated Revenue	Total	Recurrent	Capital	Total
1980	227.40	22.60	250.00	273.20	247.60	520.80
1981	198.00	27.50	225.50	330.70	325.20	655.90
1982	175.40	40.80	216.20	256.60	250.30	506.90
1983	172.50	54.80	227.30	276.10	289.80	565.90
1984	154.30	61.60	215.90	227.10	83.20	310.30
1985	170.50	64.20	234.70	288.10	16.70	304.80
1986	144.80	49.90	194.70	252.40	5.40	257.80
1987	375.40	54.80	430.20	302.40	51.90	354.30
1988	571.00	61.30	632.30	435.80	197.20	633.00
1989	741.80	79.70	821.50	460.00	390.90	850.90
1990	1114.00	181.20	1295.20	981.40	682.10	1663.50
1991	1460.40	473.30	1933.70	1207.70	1250.20	2457.90
1992	1606.20	819.10	2425.30	1125.60	1283.20	2408.80
1993	1710.30	483.00	2193.30	1569.10	1228.40	2797.50
1994	1798.60	921.80	2720.40	1777.50	1048.10	2825.60
1995	2759.80	997.50	3757.30	2474.80	1140.60	3615.40
1996	2521.80	1858.60	4380.40	3397.00	923.10	4320.10
1997	2886.20	2157.80	5044.00	3373.30	1775.70	5149.00
1998	3375.30	3205.40	6580.70	4198.60	2713.70	6912.30
1999	5947.50	3267.00	9214.50	5679.70	3435.50	9215.20
2000	12763.60	3978.10	16741.70	8935.40	7374.60	16310.00
2001	34636.20	6677.00	41313.20	18713.90	20091.30	42126.10
2002	28799.40	16422.50	45221.90	29065.50	25123.20	54188.70
2003	43092.30	14280.70	57373.00	42225.80	23933.00	71279.60

Sources: Central Bank of Nigeria Annual Report and Statement of Accounts, various years

Note: [2]Following state creation, from 1987 the figures for Cross River State are additions of Cross River and Akwa Ibom States

For 2001 - 2003 the figures for total expenditure include extra budgetary expenditure

Table 4 Annex 5: Revenue and expenditure in Imo State[3], 1980-2003 (Nmillion)

Year	Revenue			Expenditure		
	Federal Government Allocation	Internally Generated Revenue	Total	Recurrent	Capital	Total
1980	269.40	71.70	341.10	339.50	620.80	960.30
1981	229.30	51.00	280.30	337.20	408.70	745.90
1982	195.60	90.00	285.60	349.80	282.10	631.80
1983	197.30	123.00	320.30	417.60	391.80	809.40
1984	151.10	114.40	265.50	307.50	108.00	415.50
1985	185.80	139.00	324.80	365.10	36.40	401.50
1986	152.60	179.60	332.20	370.50	43.10	413.60
1987	358.20	137.90	496.10	463.60	33.50	497.10
1988	469.60	155.10	624.70	534.70	168.20	702.90
1989	574.40	192.00	766.40	446.10	248.70	694.80
1990	806.60	185.43	1047.90	1828.60	198.50	2037.10
1991	1128.00	453.40	1596.40	1325.60	527.00	1852.60
1992	1517.40	571.90	2340.50	1682.90	1109.70	2792.60
1993	1641.10	389.20	2130.10	1553.50	829.40	2382.90
1994	1672.40	885.00	2557.40	1778.50	1236.70	3015.20
1995	2307.20	1180.50	3565.50	2825.90	1445.00	4270.90
1996	2188.90	1369.80	3711.90	2774.80	1390.00	4164.80
1997	2415.60	1177.80	3593.40	2441.30	814.80	3256.10
1998	2986.90	2134.40	5121.30	3111.60	2583.60	5695.20
1999	4795.00	2128.80	6998.80	4317.10	2702.00	7019.10
2000	11865.70	6052.60	17918.30	13415.50	4864.00	18279.50
2001	19145.90	13197.10	32343.00	17080.80	11345.90	33035.30
2002	22902.70	15527.00	38494.20	16655.50	19894.30	37064.70
2003	26754.10	9079.80	35833.90	29485.00	12866.00	48197.50

Sources: Central Bank of Nigeria Annual Report and Statement of Accounts, various years
Note: [3]Following state creation, from 1991 the figures for Imo State are additions of Imo and Abia States
For 2001 - 2003 the figures for total expenditure include extra budgetary expenditure

Table 5 Annex 5: Revenue and expenditure in Ondo State, 1980-2003 (Nmillion)

Year	Revenue			Expenditure		
	Federal Government Allocation	Internally Generated Revenue	Total	Recurrent	Capital	Total
1980	181.20	88.60	269.80	249.10	251.50	500.60
1981	171.10	37.50	208.60	299.20	337.80	637.00
1982	115.80	68.90	224.70	257.90	284.60	542.50
1983	152.30	108.70	261.00	264.00	277.40	541.40
1984	119.20	82.30	201.50	229.60	152.00	381.60
1985	136.90	47.30	184.20	176.00	34.40	210.40
1986	106.30	42.50	148.80	162.40	37.20	199.60
1987	266.00	137.00	403.00	200.40	93.70	294.10
1988	355.90	244.70	600.60	293.60	122.70	416.30
1989	433.60	32.50	466.10	440.50	149.30	589.80
1990	674.50	120.20	794.70	489.40	215.30	704.70
1991	664.10	80.10	744.20	505.90	257.90	763.80
1992	664.10	72.30	736.40	794.20	476.10	1270.30
1993	995.90	87.90	1083.80	381.00	244.40	625.40
1994	1052.20	437.60	1489.80	1398.00	813.50	2211.50
1995	1304.60	1366.20	2670.80	1613.40	1181.00	2794.40
1996	1201.10	1625.60	2826.70	1850.70	1052.20	2902.90
1997	1580.90	492.30	2073.20	1046.80	254.20	1301.00
1998	1267.90	1632.60	2900.50	1613.40	1148.70	2762.10
1999	2621.20	1428.40	4049.60	2681.30	1260.50	3941.80
2000	5603.70	1913.80	7517.50	4056.10	3303.60	7359.70
2001	13926.40	7297.70	21224.10	9125.80	7252.50	21215.40
2002	10150.30	3767.00	13917.30	14785.50	5287.30	20072.80
2003	15114.50	15413.50	30528.00	16252.30	21719.00	38834.40

Sources: Central Bank of Nigeria Annual Report and Statement of Accounts, various years
Notes: For 2001 - 2003 the figures for total expenditure include extra budgetary expenditure

Table 6 Annex 5: Revenue and expenditure in Rivers Srtate[4], 1980-2003 (Nmillion)

Year	Revenue			Expenditure		
	Federal Government Allocation	Internally Generated Revenue	Total	Recurrent	Capital	Total
1980	346.00	45.40	391.40	373.30	380.40	753.70
1981	300.70	53.20	353.90	333.90	533.60	867.50
1982	226.20	n.a.	n.a.	n.a.	n.a.	n.a.
1983	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1984	202.70	87.30	290.00	286.90	77.00	363.90
1985	208.20	77.60	285.80	322.10	44.80	366.90
1986	171.00	86.00	257.00	286.00	10.20	296.20
1987	384.00	66.40	450.40	299.90	79.30	379.20
1988	490.20	94.30	584.50	397.80	249.40	647.20
1989	618.50	26.30	644.80	476.80	195.70	672.50
1990	926.10	88.60	1014.70	569.70	51.70	621.40
1991	790.50	148.80	939.30	634.90	119.00	753.90
1992	1308.70	551.90	1860.60	840.90	420.30	1261.20
1993	1234.30	1190.70	2425.00	1425.10	1234.10	2659.20
1994	1011.20	1351.20	2362.40	1538.10	982.20	2520.30
1995	1511.80	3098.10	4609.90	1621.30	1306.80	2928.10
1996	1777.40	5376.20	7153.60	4133.20	3047.70	7180.90
1997	2359.90	3172.60	5532.50	3843.00	1906.70	5749.70
1998	3608.40	6513.30	10121.70	4808.60	4696.50	9505.10
1999	5862.90	6455.30	12318.20	6711.00	4791.70	11502.70
2000	15711.50	6529.30	22240.80	11509.30	10661.60	22170.90
2001	45893.00	6236.50	52129.50	23454.50	22768.00	51811.80
2002	36540.90	23902.10	60443.00	29236.70	16551.50	49860.30
2003	54052.30	34995.40	89047.70	48567.30	30375.40	83596.30

Sources: Central Bank of Nigeria Annual Report and Statement of Accounts, various years
Note: [4]Following state creation, from 1996 the figures for Imo State are additions of Imo and Abia States
For 2001 - 2003 the figures for total expenditure include extra budgetary expenditure

Table 7 Annex 5: Average Revenue and Expenditure of Niger Delta and all States in Nigeria

YEARS	STATE	REVENUE			EXPENDITURE		
		FG STATUTORY ALLOCATION	INTERNALLY GENERATED REVENUE	TOTAL	RECURRENT	CAPITAL	TOTAL
1980	Niger Delta	279.20	55.66	334.86	295.88	341.42	637.30
	All States	217.29	69.88	287.17	223.89	247.21	471.11
1981	Niger Delta	241.62	40.32	281.94	331.94	446.28	778.22
	All States	201.35	58.29	256.58	260.26	363.87	624.13
1982	Niger Delta	189.12	60.98	250.70	307.35	308.43	615.75
	All States	168.74	73.10	240.88	262.99	330.37	593.36
1983	Niger Delta	186.93	85.03	271.95	344.23	322.40	666.63
	All States	164.36	76.16	240.52	293.45	323.82	616.16
1984	Niger Delta	168.04	99.04	267.08	283.32	104.56	387.88
	All States	147.32	93.27	244.49	255.72	134.67	390.39
1985	Niger Delta	185.90	98.16	284.06	309.60	39.88	349.48
	All States	171.62	83.37	254.99	253.85	57.44	308.27
1986	Niger Delta	154.58	92.24	246.82	278.86	29.40	308.26
	All States	149.67	83.55	233.22	230.02	59.03	289.05
1987	Niger Delta	359.88	102.00	461.88	331.98	68.54	400.52
	All States	317.17	103.23	420.40	283.75	102.89	386.64
1988	Niger Delta	401.18	124.30	525.48	358.55	148.90	507.45
	All States	387.87	103.75	493.34	342.54	170.72	513.26
1989	Niger Delta	507.43	70.60	578.03	390.73	221.17	611.90
	All States	471.42	76.30	547.72	387.65	230.20	617.84
1990	Niger Delta	747.10	185.43	889.58	681.03	224.28	906.98
	All States	759.23	189.74	910.31	607.12	255.04	862.64
1991	Niger Delta	569.55	237.00	730.03	480.19	311.31	791.50
	All States	640.11	244.00	796.77	522.19	336.34	858.53
1992	Niger Delta	783.64	547.79	1127.35	711.61	520.39	1232.00
	All States	790.90	417.04	1062.35	662.77	523.43	1186.20
1993	Niger Delta	912.66	559.23	1271.14	891.13	518.05	1409.18
	All States	893.71	474.37	1184.41	841.24	476.98	1318.22
1994	Niger Delta	894.25	614.25	1480.64	1103.73	583.66	1687.39
	All States	885.89	847.50	1535.21	1004.64	622.59	1627.20
1995	Niger Delta	1323.80	1344.17	2476.01	1555.26	791.78	2347.04
	All States	1247.66	1100.26	2193.58	1753.76	781.45	2567.47
1996	Niger Delta	1138.00	1947.84	2852.59	1665.17	904.79	2569.96
	All States	1125.04	1657.47	2427.09	1490.34	784.71	2276.41
1997	Niger Delta	1391.19	1269.44	2628.31	1604.32	786.84	2391.17
	All States	1377.37	1335.14	2586.54	1607.58	896.41	2503.99
1998	Niger Delta	1679.50	2087.77	3761.04	2028.36	1780.70	3809.06
	All States	1771.41	2137.74	3836.57	2014.33	1727.62	3741.95

1999	Niger Delta	2805.96	2233.26	4933.16	3000.01	1861.32	4872.44
	All States	2801.55	2062.20	4553.61	2775.41	1633.27	4411.38
2000	Niger Delta	6459.63	7191.16	11497.47	6400.04	4973.64	11373.69
	All States	6488.52	3778.72	9177.34	5191.94	4076.77	9268.71
2001	Niger Delta	17334.61	8234.94	23194.11	10449.66	10787.00	23984.54
	All States	10921.46	5494.79	15501.30	7957.82	6357.88	16133.96
2002	Niger Delta	17105.81	8707.10	25584.74	15068.60	10999.87	28016.83
	All States	11422.14	8712.33	19700.52	12360.72	7661.43	21194.30
2003	Niger Delta	22455.17	10651.27	32786.84	21105.93	12941.48	36260.93
	All States	14866.11	9183.39	24583.25	14887.39	9000.55	25327.70

Sources: Central Bank of Nigeria Annual Reports and Statement of Accounts, various years
Notes: Niger Delta comprises of all oil producing states in the Niger Delta Region
All States comprises of all states in the Federation (i.e., oil producing and non oil producing)