

**REVENUE SHARING OF NATURAL RESOURCES IN AFRICA:
REFLECTIONS FROM A REVIEW OF INTERNATIONAL
PRACTICES¹**

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Introduction

The African continent is one of the world richest regions in oil, gas and minerals. Proven reserves have expanded and prospects improved recently making the continent an important player on the world stage. The share of natural resources in GDP is increasing rapidly. Exports of minerals and hydrocarbons account for more than a quarter of total exports in half of the sub-Saharan economies and the share of natural resources revenue (NRR) on total government revenue is expected to become dominant for an increasing number of countries.

Wealth of natural resources offers opportunities but it also brings in challenges. Natural resources have generally been linked to a series of negative outcomes like economic decline, corruption and autocratic rule (McNeish, 2010). Oil and minerals reserves are often “point source” natural resources, being usually very spatially concentrated. Their discovery becomes almost inevitably a potential source of conflict between the governments, the people of the producing areas and those of the rest of the country (Fearon and Laitin, 2003). In other words, intergovernmental sharing is a big issue that needs a solution when natural resources are discovered and exploited.

Full centralization of NNR is the exception rather than the rule, as we will observe in the paper. It is practiced for oil and gas by both autocratic regimes (such as Saudi Arabia and other Middle East countries), and fully fledged democratic systems, such as Norway and the UK. Full centralization does not imply, however, the absence of compensating mechanisms, or of indirect transfers in favor of the governments of the producing areas. In the UK, for example, Scotland receives no share of oil taxes, but is compensated with a larger share of block grants to local governments (the “Barnett formula”). Norway rewards the local governments closer to the producing areas with generous infrastructure projects, such as tunnels and bridges linking very sparsely populated areas and islands. Autocratic countries may also use repression to quench the request for a share of NRR from their producing areas.

The governments in Kenya and Uganda, for example, will have to determine how to share their new resources across different regions and levels of governments. For Kenya, the issue will be how the newly discovered hydrocarbon wealth should be distributed between Turkana (where the production will take place), the other districts, and the central government. How should Uganda distribute the wealth found in oil fields around Lake Albert between neighboring communities, the rest of the country and the central government? As an alternative, individuals could ask that the funds be directly transferred to them. Growing dissatisfaction with the frequent misuse of NRR by all levels of government make direct transfers to individuals an increasingly attractive solution.

Acute developing needs and ethnic fragmentation in a weak institutional environment may make countries in Sub-Saharan Africa even more vulnerable to an increase in risk of conflict. Urgent development needs may make savings for future generations less realistic and the need to show concrete improvements in outcome more pressing. At the same time, the ethnically fragmented nature and weak institutions create an environment of distrust with respect to the central government, leading to higher risks of conflict/secession and constraining the options of the central government in regard to natural resource-revenue sharing.

In many African countries the legal discipline that regulates the assignment of revenue from oil and gas among distinct claimants – levels of government and individuals – is still missing, however, or needs deep reform in view of the new discoveries. Most constitutions are silent or vague about NRR

assignments, and devolve the issue to ordinary legislation that is frequently missing and is replaced by government decrees that have a much lower level of transparency.

Against this backdrop, could the international experience in sharing natural resource revenue suggest options for Africa? Could some mechanisms be more workable than others in the African context? The first step in answering these questions is to review the international practices. In so doing, this paper intends to provide a contribution to NRR assignment in Africa by considering not only the merits and the problems associated with assignment of NRR to subnational governments, which is typical of the intergovernmental sharing literature, but also the issues associated with the assignment of the fiscal instruments that serve to extract and allocate NRR.

In most countries these instruments are under the control of the central government, and the issues deriving from this assignment are frequently neglected by the literature on intergovernmental sharing. This neglect is, however, a severe limitation of analysis and of policy elaboration, since the way NRR are collected can have a huge influence on intergovernmental relations. Mismanagement leading to substantial revenue losses contributes to conflict, undermines intergovernmental relations, and makes direct transfers to individuals increasingly popular.

The paper is articulated into three main sections, articulated around the two big arenas – allocation and extraction – in which the politics of NNR is fought. The first section examines the issues connected with the access of subnational governments to NRR. Its subsections summarize the normative theory of NRR assignments, and include a detailed illustration of sharing schemes used across the world and in Africa.

The main conclusions of this section are that allocation of NRR to the subnational governments of the producing areas is justified as a compensation of the damages done to their physical and socio-economic environment. As a consequence, the allocation has to reflect closely the size of these damages. Allocation to all subnational governments – including non-producing areas – is more debatable, but the strength of the main arguments against it is reduced by context-specific factors (such as corruption), and by the availability of policy instruments (such as stabilization funds against volatility of revenue), that can solve most of the problems deriving from sharing. Allocation to all areas may also contribute to reduce inequalities from exclusive allocation to producing areas thus dampening the potential of conflicts.

The second section examines, in an intergovernmental framework, the instruments used for the extraction of NRR. There is logic to this sequence: if no NRR are recognized to subnational governments there is almost no ground for an analysis of the assignment of the instruments for their extraction. The section starts with a review of the legal regimes governing exploration and exploitation of NRR and of the fiscal instruments for the extraction of the rent, and is followed by the analysis of the intergovernmental assignment. Consideration of administration skills and capacity is a strong argument for centralization of extraction (with the exception of big subnational governments). Paradoxically, to some extent, the analysis of extraction issues and in particular the recognition that corruption is possibly even higher in the extraction than in the expenditure of NRR gives strength to the argument for extending allocation of NRR to all levels of government. In this case, the increased number of stakeholders would exert greater pressure for more public scrutiny and transparency.

The third section explores the allocation of direct transfers to individuals financed out of NRR. This is a partial, and for some experts a total, alternative to intergovernmental sharing. Transfers to

individuals, in alternative to government services, could reduce poverty, stimulate public scrutiny of NRR use and improve service delivery and, consequently, the overall well-being of citizens.

1. THE ALLOCATION OF NRR AMONG LEVELS OF GOVERNMENTS

1.1. Normative arguments against subnational assignment of NRR

Why should revenues from natural resources be transferred to subnational governments? In general, economic theory stresses the potential of inefficiency in the assignment of (part of) the NRR to subnational governments, particularly to those of the non-producing areas. The arguments used refer both to the macroeconomic impact (as in the case of revenue volatility) and to the microeconomic impact (mobility of factors). The theory also focuses on the likely misspending of the rent by subnational governments and on their potential for corruption.

Volatility of revenue

This is a strong argument against assignment of NRR to subnational governments, based on higher central government capacity to face revenue fluctuations, in view of its access to a wider range of financial instruments. When their revenue diminishes abruptly, subnational units would have to resort to expenditure cuts, endangering the provision of essential services, such as education and health. During upturns in prices, subnational jurisdictions would be literally awash with money they are unable to spend efficiently, or have to enter into spending commitments that might not be sustainable in the longer run.

Another, more specific argument about the impact of volatility says that price fluctuations make non-renewable NRR an “unreliable” source of revenue. The consequence is that funding “reliable” expenditure, such as salaries and other current expenditures, with volatile revenues carries higher risk for which subnational governments are not equipped, implying higher cost.

The argument loses strength when NRR are used for investment, or debt redemption. Reliability would matter much less in those cases. As a matter of fact, a number of countries, particularly in Latin America, use constraints on the use of NRR by subnational governments, requiring in general that this revenue be used for investment. These constraints can create, however, other problems, such as rigidity and delays in spending.

Volatility can be substantially eased, however, with the introduction of stabilization funds managed either at the central, or at the local level. Administration weakness and capacity constraints suggest for developing countries central government management with subnational oversight. North America, states and municipalities in the US (rainy days funds), and provinces in Canada, provide a number of quite interesting experiences worth replication in the developed world and as capacity expands in the developing world.

Mobility of factors

This is the main efficiency-based argument against subnational allocation. A simple illustration (Boadway and Flatters, 1993) refers to inefficient migration of labor. Local jurisdictions that benefit from the allocation of substantial NRR can use them to enhance the quality of their public services, or to reduce taxes, inducing firm and individuals to move to them attracted by the higher net fiscal benefit. This would lead to an inefficient spatial allocation of labor, because this allocation is not induced by location efficiency considerations. In other words, resource rich regions could be tempted to start inefficient industry attraction policies by using their rent. The factor mobility

argument may be relevant for densely populated areas. It looks less relevant for most African countries, where natural resources are frequently located in very remote, and sometimes even inhospitable, areas.

Misspending of NRR

Substantial efficiency losses can derive from misspending originated from insufficient absorption capacity. Non-economic investments can be made, subnational bureaucracies may indulge in slack and the capacity of controlling costs may decline. Misspending includes the use of NRR for patronage and clientelistic purposes. Barma, Kaiser, Le and Viñuela (2012) provide an exhaustive review of the literature and analysis of the issues associated with four different, typical political regimes, ranking from pure patrimonial to full-fledged democracies.

In some of the literature (Kolstad and Soreide, 2009), clientelistic practices are associated with corruption, which in strict legal terms is not correct, because clientelism does not lead necessarily to the illegal appropriation of the rent by public officials. Rather, patronage and clientelism may contribute to undermining the working of political and social fabrics.² The literature on the resources curse and on *Petrostates* (Soares de Oliveira, 2007) provides a very comprehensive review with reference also to a number of African states (see also Sacks and Warner, 2001).

The normative theory stresses that the huge sums involved (particularly when local beneficiary governments are very small) and the possibility of capture of the spending mechanisms by local élites – of factions, in Madisonian terms – increase the chances of corruption at the local level. However, other strains of the literature – Bardhan and Mokerjee (2005) are the reference work on capture – argue that patronage and clientelism are not the prerogative of a distinct layer of government, depending on the distinct political and social context of each country.

This is confirmed by the empirical literature. The main indication emerging from it – surveys are provided by Bardhan and Mockerjee (2005); Lin and Triesman (2009); Rose Ackerman (1999); Shah (2006) – is that corruption is a context specific phenomenon. It depends, as in the case of patronage and clientelism, on the level of information, on the peculiarities of the political system, on administrative traditions, on the homogeneity of local jurisdictions, and on sector allocation of expenditure at the national and local level.³

While these problems are usually context-specific, meaning that the central government is not inherently superior in administering funds, the sheer size of revenue may constitute a greater challenge for smaller governments. This is especially true in developing countries with generally weak or incipient traditions of local self-administration.⁴ When the imbalance between the size of

² In this sense the reference to corruption is justified; surely, it is justified according to the original Latin root of the word, where corruption means literally getting rot.

³ These indications are confirmed by a recent report by the World Bank on local development projects: "Outcomes from interventions are highly variable across communities; local inequality, history, geography, the nature of social interactions, networks, and political systems all have a strong influence. The variability of these contexts is sometimes so large, and their effect so unpredictable, that projects that function well usually do so because they have strong built-in systems of learning and great sensitivity and adaptability to variations in context." (World Bank, 2012).

⁴ A World Bank study on Casanare, one of the two Colombian oil producing departments, illustrates the risk of wasting fiscal funds when they reach huge levels in a short period of time. Casanare is one of the newest departments in Colombia. It was created in 1991. Oil royalties were negligible until 1994, and then came to represent 73 of the department total income by 1997. According to the law, local governments must invest 100 percent of royalties in high priority projects in the sectors of education, public health, sewage systems and water

the rent, which can be very large because of spatial concentration, and the administration capacity of the receiving governments is too high, corrections in the assignment are clearly needed, such as moving the allocation of NRR to higher levels of subnational government, e.g. federated states, or regions.

As a matter of fact, historically the assignment to local governments of the rent from traditional natural resources, such as water, timber and aggregates (stone, gravel and sand) has never been questioned and is the common practice in most developed and developing countries. For example, in Europe and most Asian countries local governments are allowed to levy taxes on aggregates. The rationales are the limited amount of the rent, the much dispersed spatial distribution of the resources, and the local impact of extraction operations.

1.2. The practice of intergovernmental sharing of NRR: international experience compared with African countries

Actual assignments conform only partially with the normative arguments, going from complete decentralization to overall centralization, as it can be observed in Table 1 summarizing the main characteristics of intergovernmental sharing with reference to a relative large sample of producing countries. A few salient features can be noted.

A dominant practice worldwide is the assignment of a part of NRR to subnational governments of the producing areas. The assignment is settled, particularly in the non-federal countries, not by the constitution, but rather by ordinary legislation (mostly the mining code, or the decentralization law).

Practically every African country conforms with this practice recognizing a share of NRR to their producing areas. This is the case of Cameroon for minerals and forests revenue. Uganda shares royalties on minerals, and, as Kenya, the country is still debating the issue of oil sharing. Similar schemes are used in Chad and Tanzania. Since some entitlement of the producing areas to oil seems to be granted by the existing discipline of sharing of minerals, it is likely that Uganda's ordinary legislation – and possibly also that of Kenya - will have to decide if only the producing areas, or also the non-producing ones, will have access to a share of oil and gas, and how big this share will have to be.

Coming back to the worldwide practice, in a more limited number of countries the governments of non-producing areas are also entitled to a share of the NRR. This is the case of Indonesia, Bolivia and Colombia. There are similar cases in Africa, the outstanding ones being the RDC and Nigeria.

supply. However, in 1996 expenditure in these sectors financed out of oil royalty income did amount to less than 40 percent (Davy, McPhail and Sandoval Moreno, 1999). Similar evidence for mismanagement of NNR at the very local level refers to Cameroon where local districts receiving forest fees show corrupt practices and spending for projects non demanded local people. Also and very important there is no correspondence between the amounts of NNR registered in the national budget and the amount registered in the budgets of recipient governments (Morrison, Cerutti, Oyono, and Steil, 2009).

Table 1: Assignment of NNR Among Level on Government: Legal and Fiscal Instruments

Country and system	Ownership of NRR according to Constitution	Legal regime for exploration and production	Taxes National/ Subnational	Sharing System with Subnational governments		Transfers to individuals through low fuel prices/ cash transfers	Constrains on use of NNR by subnational governments
				Based on origin	Based on derivation		
Argentina (Federal)	Oil and gas Provincial	Concession regime	Export taxes; Corporation income tax/ <i>Royalties and canon</i>	None	Included in general transfers	Fuel price through export duty	None
Australia (Federal)	Not defined in the federal constitution: States' constitutions assign to themselves	Concession regime	Off-shore: royalty, crude oil excise (often described as the crude oil levy) and petroleum resource rent tax (PRRT)/ <i>On-shore royalty and excise tax</i>	Royalty on offshore projects (shared with producing States).	Included in general transfers	None	None
Bolivia (Unitary state)	People	NOC contracts with NIOCs	IDH (32%)/ <i>Royalties (18%)</i>	11 percentage points of Royalty to Producing Departments. 12.5 % of IDH revenue to producing Departments	1 percentage point of royalties to two non-producing departments. 6% of royalties to central government. 31.25% of IDH revenue going to non producing departments and 56.25% to the Central Government	Fuel price through low domestic price of oil/ <i>Pension Fund</i>	85 percent of royalties for public investment

Brazil (Federal system)	Federal Government	Concession onshore Contractual offshore	Royalties Signature bonuses Social contribution on profits	Royalties and special contribution on profits are shared between the federal (39.4%), states (33.9%) and municipalities (26%)	A fraction of direct taxes and royalties from off-shore production is shared with all states and municipalities through a special fund	None	Local development and environmental projects
Cameroon (Unitary state)	State	Contractual regime	Sales of oil Profit tax Signature bonuses/ <i>Royalties on minerals and forests</i>	Royalties on minerals: 75% to central government 25% to local. Royalties on forests 50% to central and 50% to local government	Included in general transfers	On fuel through subsidy to price	80% for investment (but largely non-enforced)
Canada (Federal)	Not defined Oil: Provincial on onshore; Federal on offshore		Corporation income tax/ <i>Royalties</i> ; <i>Corporation income tax, signature bonuses</i>	Off-shore oil: A sharing system with the provinces of Labrador and Newfoundland is in operation.	Included in general transfers	None	None
Colombia (Unitary state with regions)	State		Corporation income tax / <i>Royalties</i>	Substantial part of royalties	Regional Compensation Fund	None	Projects in the social sectors may include current and capital expenditure, but must be vetted by special supranational boards

Ecuador (Unitary with regions)	State		Extraordinary profits tax	One dollar tax per barrel of oil extracted in the Amazon region goes to the Amazonian Development Fund	Included in general transfers	On fuel through subsidy to price	Small amount to development projects in the Amazon region (where oil is produced) –
Indonesia (Unitary with regions)	State		Corporation income tax, royalties	Forestry and mining: 20% to CG t; 16 % Provinces; 32% to Districts. For oil: 84, % to CG; 3, 1% to Provinces; 6, 2% to Districts; for gas: 69, 5% to CG; 6, 1% to Provinces; 12, 2% to Districts. For fishery: 20% to CG	For forestry and mining 32 % to Districts. For oil 6, 2 % to Districts. For gas 12, 2% to Districts... For fishery 80% to Districts.		None
Italy (Unitary with regions)	Undefined		Corporate income tax/Royalties	Onshore: royalties up to 7%: 55% to producing regions, 15% to producing municipalities, 30% to CG. Off-shore and territorial waters: Royalties of 4% are paid to coastal regions.	None	Cash: royalties of 3% go to the residents of producing regions	Regional growth, environmental protection
Mexico (Federal)	Federal	Contractual with NOC (Pemex)	Profit taxes on Pemex	None	Part of oil revenue from above budgeted price	On fuel through subsidy to price , via the excise tax	Infrastructure and equipment

Nigeria (Federal)	Federal Government		Sales of crude oil and gas. Signature bonuses, royalties, Petroleum profit tax	13 % of all NRR revenues.	Included in general transfers	Through subsidized sale of crude oil to refineries and subsidies to import	None
Pakistan (Federal)	Not specified	Concession on onshore and contractual offshore	Excise tax, royalty, gas development surcharge	Royalties and part of gas development surcharge	Included in general transfers		None
Peru (Unitary with regions)	The Nation		Royalties, signature bonus, excise and corporation income tax	Fifty per cent of income tax and royalties on minerals on oil and gas	Included in general transfers		75% or more on capital spending; at most 20% on maintenance and 5% on feasibility studies
Philippines	State	Contractual	Royalties, Corporation income tax, minimum tax/ <i>Business tax</i>	40% of all NRR are allocated to SBNGs (20% to the Province, 45% to Local governments; 35% do Barangays)	Included in general transfers		None
Russian Federation	Federation and Regions	Concession	Minerals and oil extraction tax, export duty	Mineral extraction tax and part of royalties levied with concessional agreements go to the Regions	Included in general transfers	On natural gas and electricity prices	Does not apply
South Africa (quasi federal)	State		Royalties and corporation income tax	None	Included in general transfers	None	Does not apply
U.K. Unitary with Regions	State owns oil, gas, gold, silver and coal		Resource rent tax	None	Included in general transfers	None	Does not apply

The federal system of government influences assignments favoring the producing areas. All federations, with the exception only of Mexico (and Venezuela, if this country can be classified as a federation) do this. Brazil recognizes directly a share of NRR also to its municipalities, whereas in other federations the assignment to the local governments is decided at the state level. Also highly decentralized states recognize a share of NRR to the producing regions. Hence, presence of natural resources increases the potential for inequality built in federal and/or highly decentralized systems. In general, however, federal states are better equipped for handling conflicts between their various areas than unitary/centralized states and also ready to accept wider inequalities between their constituent units.

The geographical location of the resource is a factor influencing assignments. The onshore/offshore split is a main determinant for oil and gas. With one important exception – Brazil – NRR found offshore are reserved to the central government.⁵ This can help explaining while relatively decentralized countries, such as Norway and the UK, have a full centralization of oil revenues, since their oil is extracted in the North Sea. This is an important element to note also for Africa. Offshore fields have no relations with subnational governments; hence there is no rationale for sharing with the producing areas.

The prevailing international practice is that NRR are assigned to local governments when their economic importance is small and the resources are evenly geographically distributed, as in the case of quarries. This applies also to water used for irrigation and for production of electricity. This can explain, for example, why in the UK the proceeds of oil are fully centralized, while the proceeds of taxes on aggregates, such as sand, gravel and stone, are fully decentralized. In Europe revenues from forests are typically fully assigned to the municipalities, while in tropical countries, where forests are a prominent sources of NRR, these revenues are only partially shared with subnational governments. This is again an important feature with clear indications of policy, suggesting the assignment to subnational governments of NRR of small value, while when substantial resources are at stake countries have to focus their attention on the risks of sharing.

Political institutions also matter. Very recent constitutions, following the return of their countries to democracy, tend to replace a previous totally centralized system of allocation of NRR with a decentralized one. This is the case of Iraq and the DR Congo and could possibly also be that of Libya. The constitutional assignment of NRR to subnational governments is partly the restoration of the *status quo ante* and the reflection of the present worldwide trend towards decentralization. It can also be understood as a reaction to the previous abuses (including wars) of centralized management. Dictatorial regimes usually eliminate self-government and the allocation of NRR to them (if that was the case before) and make generally terrible use of NRR. Governments have to be conscious that with democratic institutions, and especially with enhanced decentralization, subnational governments will become more vocal and that consensus on sharing will have to be generated.

In all the systems based on three layers of government, all levels – regional as well as local – are entitled to some allocation of the rent (when NRR are allocated to subnational governments). The allocation of NRR to local governments – municipalities and even their subdivisions – reflects the intent of governments to compensate the producing areas for the negative impact on them of production. This is clearly a practice that gives indications for solving conflicts, because allocations to all levels help to smooth strident inequalities.

⁵ Offshore has, unfortunately, different meanings in different countries. Coastal waters, whose extension varies from country to country, are not considered as offshore and are typically property of adjoining local governments.

Box 1. Recentralization of NRR: a few examples

In the midst of the 2005, Bolivia introduced, on top of the existing royalty going to Provinces, a centrally administered royalty on gas and oil (IDH) with a much higher tax rate and whose revenue is shared between the central and all the local governments. With the increase of the revenues stemming from higher international prices, 30 percent of the share of IDH received by each Department and Municipality was re-assigned to fund *Renta Dignidad* (a non-contributory pension scheme). This led to a considerable recentralization of revenue.

Colombia has also recently (July 2011) increased the rates of royalties levied on minerals and oil and brought about a recentralization of the revenue from natural resources through the creation of a new fund managed at the central level. This is the Science, Technology and Innovation Fund that will receive 10 percent of those revenues. Moreover, the allocation to the already existing Fund for Pension Savings has been increased from 5 percent to 10 percent of the total amount of royalties, while the Savings and Stabilization Fund will receive up to 30 percent of revenue. The financing of these new funds will be paid by the producing departments and local governments, whose share of the royalties has entered a process of reduction that will bring it, after 2015, to 10 percent of the total down from the pre-reform one of about 25 percent.

Argentina provides a third interesting case. According to the constitution, the Provinces have ownership over the natural resources in their territory. On this basis Provinces negotiate and sign contracts with private firms for exploration and exploitation and levy royalties. At the same time, the federal government is assigned the power to: i) regulate the sector and domestic markets; ii) set internal prices; iii) has exclusive power over import and export taxes; and, iv) has control over the corporate income tax. In 2002, the federal government expanded its access to NRR by levying export taxes (*retenciones*) on oil and gas, taking advantage of the increase in their international price. *Retenciones* have a progressive tax rates schedule now reaching 100 percent when the oil price exceeds 80 US dollars and the price paid to producers exceeds 70 US dollars. The new tax has brought considerable revenue to the federal government and a ceiling on the domestic price of oil and gas, which is basically equal to the difference between the international price and the export tax, hence benefitting domestic consumers through low prices of fuels. High taxation has also presumably contributed to stagnation of oil production that in turn has worked to reduce disparities among producing and non-producing provinces.

A similar process is taking place in Brazil. Since 1997, when the oil industry was opened to NIOCs, the lion's share of royalties—around 10 percent of sales revenue—has gone to the states and municipalities where production facilities are located. The federal government gets just over a quarter (in addition to other oil taxes), with local governments elsewhere making do with less than a tenth. With the new law of November 2012, a part of which has been vetoed by the President and need further approval by Congress, the producing states and municipalities will receive no more than 35 percent of the royalties onshore, while the share of the non-producing subnational governments increase up to 25 percent. Royalties from already-auctioned fields will still be shared out according to the old rules. New concessions will pay higher overall royalties of 15 percent. Revenues derived from the exploitation of the continental platform (*pre-sal*) will be allocated with a greater share to the federal government and to the non-producing states and municipalities.

Canada's federal government has been in the 1970's a precursor of recentralization during oil price increases. More specifically, to counteract the excessive shift of fiscal revenue in favor of the province of Alberta (the owner of oil) after the first oil shock, the federal government resorted to the instruments it was allowed use according to the constitution, such as holding domestic fuel prices below market prices for the benefit of all domestic consumers; levying export taxes on foreign sales of oil (reducing the room for subnational taxes); eliminating deductions for subnational taxes and royalties in the calculation of federal income (company) taxes; and modifying the equalization transfer formula to penalize oil producing subnational governments (or those who tax more).

Some recentralization of the revenue is, however, taking place since the early years of this century.⁶ This is happening in concomitance with the increase in the international price of commodities. Higher prices lead to an increase of the economic rent on NRR and stimulate the public sector to increase the government's take. Central government ownership of most fiscal instruments explains easily the recentralization, which was done with the introduction of new taxing instruments, rather than with the increase of tax rates on existing instruments. Recentralization does not take place necessarily with a concomitant reduction of the share going to subnational governments. Bolivia, Colombia, Argentina and Brazil provide recent illustrations, reported in Box 1, of this reversal of trend. Canada has been a forerunner in the 1970s. This trend provides relevant suggestions also for Africa suggesting that the central government take can be increased without damaging subnational governments.

An also very recent pattern, of which there is evidence especially in Latin America, is towards more inclusive schemes of NRR assignment. These schemes include increases in the share going to all non-producing jurisdictions and, above all, an expanded concept of affected areas. The aim of these schemes is to compensate effectively for damages and costs.

Examples of inclusion of all subnational governments into the sharing schemes are provided by Bolivia, where, since 2006, non-producing departments have been entitled to receive a substantial share of the collections of the newly created IDH, and Colombia, where under the new system, 40 percent of total revenue will accrue to two distinct national funds, the Regional Development Fund and the Regional Compensation Fund, both to be distributed to all subnational governments. (Gaitan, Martinez, Perez, Velasquez, 2011).

Examples of use of an expanded concept of affected areas are provided by Brazil and, again, Colombia. These countries allocate a share of NRR to their subnational governments affected by transportation. Colombia recognizes a sharing rate only to municipalities, while Brazil extends the range of beneficiaries also to states and municipalities facing offshore oil fields, which may be an excessive expansion of the meaning of the concept of affected areas.

In most African countries, ownership and assignment are seldom defined in the constitution, countries preferring ordinary legislation, which is easier to change. This is not necessarily a wrong solution, but clarity of discipline is essential. This is not a frequent case in Africa, where as reported in table 2 most constitutions vest vaguely ownership in the State, meaning the national government. The constitution of South Africa exemplifies the vagueness of a constitutional mandate recognizing the entitlement of all the people of South Africa to good use of natural resources. In some cases, such as Ghana, Kenya and Ethiopia, mention is also made of the people as the owner, although usually through the intermediation of the State, or even of the President (as in Ghana).

⁶ See, for the case of oil countries, Vale Columbia Center, (2012).

Table 2: Ownership, regulation and sharing of natural resources in selected African countries

Country	Assignment of ownership in the constitution	Regulation of management and sharing in the constitution or ordinary legislation
Uganda	Ownership is vested in the “Government of behalf of the Republic of Uganda”. Art. 244.	Minerals and oil are exploited “taking into account the interest of the individual landowners, local governments and the Government”. Art. 244 of the Constitution. According to the Mining Act of 2003 the central government is entitled to 80 percent of the mining royalties, the local government of the producing areas are entitled to 17 percent and the owner of the land gets 3 percent.
Ethiopia	“...the right to ownership... to all natural resources is exclusively vested in the State and the people of Ethiopia”. Art. 40.	
Kenya	“All land in Kenya belongs to the people of Kenya collectively as a nation, as communities and as individuals”. Art. 61 (f)	“All minerals and mineral oils as defined as public made by law”. Art. 62. “The State (a) ensures sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensures the equitable sharing of the accruing benefits”. Art. 69 of the Constitution.
DR Congo	“The State has permanent sovereignty over soil, subsoil, waters, forests, airspace, lakes, rivers, sea, coastal and continental shelf”. Art. 9.	The mining law of 2002 sets the sharing rates for NRR: 60 per cent to the national government and 40 per cent goes to the provinces, from which 10 per cent is allocated to their local communities.
Ghana	“Every mineral in its natural state is under or upon land in Ghana is the property of the republic as is vested in the President in trust of the people of Ghana”. Art. 257.6	The Mineral Development Fund established in 1993 receives 20% of the mining royalty payments. Half of the fund is distributed in the mining areas for projects to mitigate the effects of mining: 25% via the district assemblies and the rest to local communities.
South Africa	All citizens have the right of to have a “secure ecologically sustainable development and use of natural resources”. Section 24.	Mineral and Petroleum Resources Development Act of 2002: “Mineral and petroleum resources are the common heritage of all the people of South Africa and the State is the custodian thereof for the benefit of all South Africans”. The Public Finance Management Act of 1999 establishes that the Minister of Minerals and Energy may determine that any community or local government may receive a payment from mining royalties. The payment goes to the Local Economic Development Fund managed by the national Department of Provincial and Local Government.
Nigeria	Federal government is owner and has “control of all minerals, mineral oils and natural gas.” Section 162,1	“The principle of derivation shall be constantly reflected in any approved formula, as being not less that 13 per cent of the revenue accruing to the Federation Account directly from any natural resources”. Section 162.2 of the Constitution.
Chad	“The state exercises its complete and permanent sovereignty over all national wealth and natural resources for the well-being of the whole national community”. Article 57.	According to the 1999 Petroleum Revenue Management Law, Eastern Logone, the country’s oil-producing region, receives 4.5 percent of the royalties.
Cameroon	Mining and natural resources are subject to national parliament legislation. Article 26.	According to the application decree of the mining code of 2002 royalties on minerals (an ad valorem tax): 75 percent to central government 25 percent to riparian local councils and communities. According to the 1999 Law of Forestry, royalties on forests are shared 50 percent to central and 50 percent to local government.
Angola	“The solid, liquid and gaseous natural resources existing in the soil, subsoil, territorial waters, in the exclusive economic zone, and in the continental shelf shall be the propriety of the State”. Article 16.	The state “shall determine the conditions for concessions, surveys and exploitation”. Article 16 of the Constitution.

At the constitutional level centralization of NRR seems to prevail over decentralization.⁷ With the exception of Nigeria, there is not a single constitution mentioning explicitly that subnational governments are entitled to receive the rent. The constitutions of Ethiopia, the other federal African country, and South Africa, a quasi-federal system, do not attribute entitlements on natural resources to their subnational governments. The constitutions of new oil-producing countries, such as Uganda and Kenya, recognize a vague entitlement of local governments to NRR. Vagueness of constitutional mandates may become a problem, by starting conflicts on their interpretation. For example, in Nigeria the share – 13 percent of all NRR – allocated to the States is net of a number of deductions that have each an economic rationale, such as the service of national external debt, but can be subject to obfuscation and improper practices.

Some countries, such as Ghana and South Africa, have a somewhat complicated system for channeling resources to their subnational governments. In both countries, part of the royalties goes to a special fund that finances projects to the benefit of local governments or implemented by them. In South Africa, there is some central government discretion in the determination of the size of the royalties; in Ghana, a given percentage of collections is used. Both countries seem to be cautious, but at the same time have put in place non-transparent systems to start the experimentation of devolution of NRR to their subnational governments.

There are also in Africa some non-statutory systems of allocation, such as the system that benefits the regions of Angola to the exclusion of Cabinda. This latter - the Angolan enclave producing more than 50 percent of national oil - has a formal arrangement allowing it to receive 10 percent of taxes on oil levied in the enclave, but it remains unclear if this is the central government spending in the region, or if it is a transfer to the Cabinda government (EITI, 2006). In non-statutory systems, the allocations are done through completely discretionary and non-transparent decisions of the executive branch. This is an expediency that can create serious problems and hence has to be avoided.

1.3. Filling gaps between prescriptions and practice: the determination of pure economic rent

The gap between normative theory and the observed reality narrows, particularly for the assignment to the producing areas, if we fully develop the implication of economic theory, particularly the theory of the remunerations of production factors (Scott, 1975, and Brosio and Jimenez, 2012, for an illustration). This theory makes a neat distinction between payments of revenue that are specific remunerations of production factors, including those provided by governments at all levels, and payments that correspond to the allocation of the pure economic rent.

In addition, the theory also allows adequate consideration of the compensation for environmental damages. If countries would follow its prescriptions, allocations to subnational government would not create the problems stressed by the normative theory because, being linked to costs

⁷ Emphasis on central government ownership reflects more the antithesis between national versus foreign ownership, than central versus subnational entitlement. Given the colonial legacy of dominance by foreign firms of the natural resources sector, it was/is deemed essential for developing and African new independent countries to stress above and first of all national ownership in their constitutions. Emphasis on State ownership also reflects the centralized system of government that has prevailed in Africa until the 1990s, but has been recently reversed, leading to high sharing rate with subnational governments. This is done, for example, in the DR Congo with the mining law that shares NRR 60/40 between the central and the producing subnational governments.

and repair of damages, they would not create problems with fluctuation, insufficient absorption and misuse.

The economic rent – which is the return on a resource whose total supply is fixed – is measured as the difference between the revenue derived from the sale of the resource and *all* the economic costs needed for its production. When total costs do not add up to the value of the production, an economic rent is generated and it accrues to the owner of the resource. To determine it, a complete and accurate identification of all costs is needed.

Production means both exploration and exploitation activities, and costs consist of remunerations to all factors of production needed. They include typically labor, material and non-material inputs and capital. The cost of capital includes also a premium for risk that in the case of mining and oil production can be substantially high, due to the uncertainties about the effective size of mines and oil fields, about trends in costs and, most of all, about fluctuations in the price of the commodities.

Costs include also the use of the environment, hence the necessity of compensating those, individuals or firms that bear the cost. The environmental consequences related to the production of oil, gas and minerals contribute to the potential for conflict. The impact on the local environment (on the producing and/or affected areas) could be very intense and immediate, as in the case of the lighting effect of gas flaring and the number of toxic substances burned and released.

In this regard, the way environmental policy is designed and implemented is crucial. When, as in most countries, the environmental policy is based on regulation – more precisely, through standards on maximum levels of allowed emissions – and it is actually implemented, the cost of complying with the regulation is borne by the producing firms and is accounted for in the remuneration they receive. Higher and implemented standards imply higher production costs and, consequently, a smaller rent. Costs also include insurance against unpredictable damages, when firms subscribe policies voluntarily, or by effect of regulation.

However, regulations may not be fully enforced and/or unpredictable damages may take place, such as oil spills. Furthermore, regulation cannot completely eliminate all environmental damage. Damages occurring despite of regulations have to be compensated to account fully for the cost of production. If the environmental impact is local, compensation is paid locally to governments and/or to individuals. If damages are nationwide, compensation is paid to the national government and/or to all residents. In all these cases, the payment of compensation does not amount to the allocation of the economic rent, but takes place during the process that leads to the determination of the rent.

The same principle applies also to costs other than environmental ones imposed by mining or oil activities on the local populations. Examples are displacement of people, disruptions in transportation, or pecuniary externalities deriving from increasing price of food and other commodities.⁸ Again, regulations can force the producing companies to pay appropriate compensation to the local population. When enforced, regulations expand the production costs absorbing another part of the value of production.

⁸ In the Tete region of northern Mozambique, a huge open field coal mine led to the resettlement of more than 1,000 local people in a far less attractive area, 40 km away, and to huge disappointment in terms of new jobs creation. International Herald Tribune 10 November 2012, *As Coal Boosts Mozambique, the Rural Poor Are Left Behind*, The Economist, *Brazil in Africa*, November 10th, 2012.

When governments provide services that contribute effectively to the production, they will be considered as additional production factors or inputs being entitled to receive compensation. Although most of the investment for the exploitation of oil and other natural resources is made directly by the producing companies, additional investment in local infrastructure is usually required. Roads to the producing mines and fields have to be built, airports and ports may have to be upgraded, and schools, health and social services have to be expanded to serve the growing population attracted to the area. To the extent to which the demand for these services exceeds the demand that would have prevailed in the absence of extraction, the governments of the producing jurisdictions are entitled, as partners in production, to have these additional costs funded.

The theory of the remuneration of production factors recognizes in economic terms the contribution of all levels of government to the production process and their entitlement, on efficiency grounds, to receive a share of these resources as compensation, and not as recognition of a property title, or of some other entitlement. In other words, subnational governments situated in the producing areas are entitled on efficiency grounds to receive a share of NRR, whose amount has to be in strict correspondence with their contribution to production.

Its implementation requires proper costing with reference to all affected areas. These areas include those affected by transportation, since transport activities may create costs not only for the environment, but also for individuals and businesses. Pipelines spoil the landscape, may generate spills, or obstruct transportation and economic activities. Transport of minerals on roads affects, through higher maintenance costs, congestion and other nuisances, an area that extends beyond the producing one. Workers employed in mining may commute from other areas and require services from the local governments situated there. Even when they are residents of the producing areas, they will affect other areas when the mine closes and they are forced to move. Workers will generate new costs to their destination governments by demanding services and thus creating a demand for new infrastructure. Sometimes, especially with open mines, extraction requires resettlement of residents to new areas whose governments will have to face an increased demand of services, as in the case of Mozambique (see footnote 7).

2. EXPLORING, PRODUCING AND APPROPRIATING NRR: THE LEGAL AND FISCAL FRAMEWORK

NRR have to materialize before being allocated and used. Oil and gas have to be extracted and minerals mined.⁹ Decisions about production are up to the owner of the resource: usually the government or, in very rare cases, a private individual.

The way the relationship between the government and the investor is shaped has a strong impact on intergovernmental relations. The choice of the fiscal regime can influence the rate of production and, as a consequence, the amount to be shared (if sharing is envisaged). Secondly, the choice of the regime is far from neutral in terms of transparency, obfuscation and corruption. Contractual regimes – particularly when implemented with the help of a national oil company – have largely discretionary components that are prone to obfuscation and may lead to suspicions that can poison intergovernmental relations.

⁹ We focus here primarily on hydrocarbons, but most arguments apply also to minerals and also renewable resources, such as forests.

2.1. The legal framework

There are two main instruments available: concession regimes and contractual regimes. A third instrument, the use of publicly owned companies (NOCs, in the case of oil and gas) is not a completely separate alternative, since NOCs can be and are used to implement both concession and contractual regimes, and the relationship between the government and the company has to be contractually defined.¹⁰

According to the concession regime, the investing firm is the owner of the resource once it is extracted and is responsible for all the decisions concerning exploration, development, production, transport and sale of the resource. It has the obligation to pay the appropriate taxes (see later). In some cases, it has the obligation to sell a share of the production on the domestic market at some agreed price.

In a contractual regime, the government is responsible for the decisions concerning the exploration and production of the resource, and it contracts an investor to implement them. There are different variants of these contracts, going from production-sharing agreements to risk service contracts. The difference lies in the range of decisions for which the government takes the responsibility.

In risk service contracts, the government takes all the decisions including those about the sale of the product and remunerates the investor with a fee, assuming all the risks itself. In the more popular production-sharing agreements, the managing of the production, including the sale, is the responsibility of the investor that is remunerated with a share of the production and fully reimbursed of all costs. The more interventionist is the contract, the more it demands in terms of capacity from the government.

Historically, concession regimes have preceded contractual regimes. They are still prevalent in the industrial countries, while developing countries tend to use mostly production-sharing instruments. These agreements were initially (i.e. at the time of independence of the countries) considered as a radical alternative to concessions, allowing the government a much closer control of production. Among African countries Angola has been a precursor in this kind of contracts and they are widely used for oil and gas in countries, such as Kenya, Niger, Nigeria and Mauritania. Concession regimes are used in most countries for minerals.

In reality, however, the demarcation between concession and contractual regimes is much weaker than thought. For production-sharing agreements include also the payment of royalties and other taxes. The difference lays mostly in the control of production. With concession regimes the investor determines the amount of production that suits him better, while the government can influence investor's decisions through taxes, since they impact on the profitability of mines and oil fields. With contractual regimes the government could restrict production or, as in the case of OPEC countries, to increase the price, or also to expand production to fund its expenditure (as it is happening with Venezuela and Iraq).

¹⁰ As a matter of fact, NOCs operate, and have even a big role, under both concession regimes (as in Norway, Ryggvik, 2010) and under production sharing agreements, as in most of African countries, Brazil and Venezuela.

From the point of view of the producing countries no regime has an evident superiority on the other. The choice should depend, technically, on the administration capacity of the government; or, more in general, on the governance structure. For example, service contracts, where the investor acts under instructions of the government and is remunerated with a fee, require a much higher administration capacity and acceptance of risk than concession regimes. Governments have to rely more heavily on their NOCs for the implementation of these contracts. This creates problems, since NOCs managers are faced with different incentives than those facing civil servants. The international practice shows, however, a different, paradoxical, trend. Developed countries that have more administration capacity tend to rely mostly on concession regimes, while developing countries use contractual regimes that are more difficult to manage.

2.2. Fiscal instruments to extract NRR

There are five main sets of fiscal instruments for collecting NRR. They are presented in table 3. To a substantial extent they complement and substitute each other. Governments in the real world use a combination of them.

A distinction is between *ex ante* instruments and *ex-post* instruments. With *ex ante* instruments the government collects the NRR before the starting of the exploration and exploitation. In other words, *ex ante* instruments are targeted to collect expected NRR, while *ex post* instruments will collect realized, actual NRR. Typical *ex ante* instruments are auctioning of rights and payment of fixed fees and bonuses for exploration and development.

Table 3: Main methods for collecting rent from natural resources

	Ex ante instruments		Ex post instruments		
Method	Auctioning Exploration and Exploitation Rights	Concession fees, signature fees and bonuses	Government equity in project	Production Sharing and other contracts	Taxation Instruments
<i>Advantages and problems</i>	Allows, when properly done, the government to obtain a substantial up-front payment. Requires, however, a fully competitive setting, this might be difficult to ensure.	Administrative simplicity. Possible obfuscation and corrupted deals through lowering of fees	Allows the government to share any upside of the projects (e.g., transfers of technology). It is likely to be a source of conflict of interest: government as a shareholder versus government as a regulator.	Contracts for sharing of production can be relatively simple, but their implementation is a demanding activity in terms of information and control.	There is choice of instruments, but even simple taxation schemes present implementation and control difficulties.

Auctioning exploration and exploitation rights with cash payments bidding

This is a development of the more traditional instrument consisting of imposing a fixed fee – called signature fee, or bonus – for exploration and/or exploitation. Auctioning consists of asking

firms to submit cash payment bids and choosing the procedure for the selection of the best bid.¹¹ Potential investors will make their own evaluation.

The literature considers generally auctioning of rights as the potentially preferable system for capturing rent.¹² It serves a dual function: a) to allocate the right to the most efficient bidder; and b) to capture efficiently the expected value of the rent. It is also neutral on extraction choices, since the winner's decision during the development of the resource will not be influenced by the up-front payment.¹³

In the real world, auctioning is never a complete substitute of taxes and other instruments, but rather complements them. Auctioning is used in concession regimes for the assignment of ownership of fields and mines and replaces other ex ante tax instruments, such as signature bonuses. Investors will then pay royalties and other taxes. In contractual regimes, auctioning refers to a share of production – profit oil – attributed to the investor: the best bid is the lowest one. In Africa, Libya and Nigeria have made use of this instrument in the framework of production sharing agreements, auctioning the share of production left to the investor. However, the procedures followed in the practice have been frequently quite distant from those needed to insure the results expected from the mechanism.¹⁴ A frequent practice of improper auctioning is the use of “right of first refusal”. This is the right for the winning company to sell (at a much higher price) the concession to another, more capable, company. The first one is usually linked to officials and does not possess the capacity for exploration/exploitation.

Acquisition of equity in mining and oil enterprises

This system is used in many developing and industrial economies. It is typically a central government instrument, although in principle subnational government could also use it if they have the ownership of natural resources. Its impact on NRR collections depends on the terms under which the equity is acquired by the government, *i.e.* paying the corresponding share of the cost, or without charge.

In the first case, the government contributes to a given share of the total cost of the investment in return of an equivalent share of the flow of revenues. This system is used in Nigeria, where the national oil company (NNPC) has set up joint ventures with a small number of foreign firms for the exploration and the production of oil onshore. To pay its share of investment (and operation) costs, NNPC takes loans from its partner companies and repays them in kind (*i.e.* with oil). The profits from the venture, made of residual oil, are shared between NNPC and its partners. These partners pay their taxes – royalties, signature bonuses and the profit tax – to the government. This system is complex and prone to obfuscation.

¹¹ In fact, bids may refer, in addition to cash payments, to work programs, royalties and shares of profits (see Sunnevåg, 2000).

¹² The main contributions are: Boadway and Flatters (1993, Heaps and Helliwell (1985), Garnaut (1995), Garnaut and Ross (1975 and 1983), Nellor (1987), Otto, (1995); Sunley and Baunsgaard (2001), Sunley, Baunsgaard and Simard (2003).

¹³ Some authors (Garnaut and Ross, 1975) raise doubts on the effectiveness of the instrument and consider it inferior to ex post instruments, particularly to a resource rent tax (see below). This is because of the risk aversion of investors, who have limited information on the value of the project and may be deterred from bidding because of sovereign risk. This is the risk that the government will renegotiate the terms, or take arbitrary action against the investor (“second bite of the cherry”). Moreover, in the case of large mineral/oil fields the huge scale of costs and the large up-scale payment, that will be required to equal ex-post taxes, will limit the number of real bidders.

¹⁴ For the case of Nigeria, see Barma, Kaiser, Tuan Minh and Viñuela (2012).

In the second case, the government obtains a share of equity for free and is entitled to receive a certain share of the net revenues of the investor. This amounts to a tax on the investor's return on capital or to a tax on the resource rent. For example, if the government acquires fifty per cent of the equity, it will appropriate fifty percent of investment returns and fifty per cent of the resource rent. The vehicle used for the acquisition of the government's share is usually a NOC. In addition to the provision of revenue, acquisition of equity allows the government to control directly the mining or oil operations. It is also considered as an instrument to gain experience in running enterprises.

Africa provides a number of examples. In Angola, Sonangol (the local NOC) is entitled by law to acquire free a share of all contracting projects, once they have reached the production phase. This means that foreign companies bear the costs of exploration, while Sonangol enters safely in the projects, regulated by production sharing agreements, once the exploration stage is completed (AUPEC, 2009).

There are, at the same time, also disadvantages with acquisition of equity that can lead to a reduction of the rent. In particular, when the government holds an important equity, it can be tempted to use its power to influence corporate decisions according to its political needs and orientations (for example, to overstaff the company or to accelerate the extraction rate beyond the optimal one). A second, potentially relevant, disadvantage derives from the assignment, quite frequent especially in developing countries, of regulatory powers to NOCs and from the possible conflict of interest between NOC managers and government goals. Overlapping of regulatory powers with direct operations of NOCs in Cameroon and Nigeria are illustrated in Table 4.

Production sharing arrangements

Under this very popular arrangement, a company is contracted to extract the resource and is first refunded of all costs sustained (cost oil). The remaining product (profit oil) is shared between the government and the company. Very often, a ceiling is imposed on the share of production returned to the company to recover the cost in order to ensure that the government is able to collect its revenue as soon as production is started. Non-recovered costs are carried over to subsequent years with an interest factor.

In its simplest form, which consists of paying a fixed proportional share of the physical output, a production sharing agreement has virtually the same effects of a specific royalty (see below). If the share is calculated on the value of output, the sharing agreement has the same effects of an *ad valorem* royalty.

Frequently, complex sharing contracts are used. For the contract could specify that the investor retain a portion of the production to recover capital and exploration cost. Usually also the company has to pay royalties and income tax. Royalties are deducted from production before the sharing, while the income tax impinges on the share of the production received by the company.

Table 4: Example of NRR regulatory and fiscal frameworks: Cameroon and Nigeria

	Cameroon			Nigeria		
Regulatory agencies	The Ministry of Energy and Water and the Ministry of Industry, Mines and Technological Development are responsible for the issuance of titles for the extraction of minerals and oil. SNH has also wide regulatory powers			Ministry of Petroleum oversees NNPC and formulates policy. President used to be minister of petroleum. Department of Petroleum Resources (within the Ministry of Petroleum) allocates oil block concessions, collects royalties, and enforces regulations (the environmental ones included).		
National Oil Company	SNH participates in joint ventures with total equity share of 60%. It has overall responsibility for management of the sector and for the commercialization of the government's share of crude oil. The State has a 20% share.			NNPC main operator. Has six joint ventures with IOCs, with a controlling share between 55 and 60 %. Commercializes the government's share of crude oil.		
Fiscal regimes	Joint ventures between SNH and IOCs offshore. IOCS have to sign PSAs.			Joint ventures between NNPC and IOCs onshore. NNPC provides its share of investment. Production sharing contracts off shore		
Main sources of revenue instruments	Sale of crude oil. Land royalties and flat fees. Corporate income tax with rate of 57.5%. Production royalties with tax rate of 12.5%.			Sales of crude oils and gas. Signature bonuses, royalties, Petroleum profit tax with a tax rate of 85% (65,75% in the 5 first years of production)		
Estimates of missing revenues	Around US\$10.7 billion or fifty-four percent of oil rent have not been disclosed or transferred to the budget and privately appropriated by oil companies and government officials during 1977 - 2006. (Gauthier and Zeufac, 2009).			For the 2002-2011 period: 4,6 billion US\$ are missing from oil sales; 560 millions from signature bonuses; 3,027 US\$ from royalties (Ribadu Report, 2012).		
Structure of revenue (millions of dollars)		2008	as %		2008	as %
	Total tax revenues	321,281	17.8	Royalties	5,478,000	9.1
	<i>of which: Corporate income tax</i>	278,357	15.4	Profit tax	10,961,400	18.2
	<i>Royalties and other</i>	42,923	2.4	Signature bonuses	28,200	0.00
	Direct transfers from SNH	1,225,909	67.8	Sales of oil	41,217,000	68.3
	Other transfers from SNH	259,618	14.4	Other taxes	2,680,300	4.5
	<i>Total revenue</i>	1,806,809	100,00	Total revenues	60,364,500	100.0

Tax instruments

Fixed fees, called also signature fees, or bonuses, are, as mentioned before, *ex-ante* instruments and consist in charging a fixed amount of money to the investor, independently of the outcome of the investment, or even of the making of the investment. When the government has no idea of the value of the actual rent and/or is totally risk averse, fixed fees could be attractive. Hence, these fees are more appropriate for the sale of exploration rights, rather than of exploitation rights. Fixed fees are very easy to administer, ensure an upfront payment in the earliest phase of the production process, but raise the difficult issue of determining their appropriate amount. This suggests that auctioning fees might be appropriate.

Fixed fees, being one-time payments and being determined at the discretion of the government, present a high potential for corruption. In most countries, they are not considered and reported as taxes and are managed and collected by the competent sector ministry – oil and/or mines – but

not by the ministry of finance. Their management suffers from a considerable amount of obfuscation.¹⁵ The practice in the DRC and Nigeria shows, for example, that the level of fees asked for exploration blocks of similar size and potentiality can be hugely different, leading to suspicions of mismanagement and corruption (International Crisis Group, 2012; and Michelsen Institute, 2009).¹⁶

Specific, or *ad valorem*, *royalties* are the most popular form of taxation of natural resources. Specific royalties are levied at a constant monetary value (for example, x dollars) per unit of output. *Ad valorem* royalties are determined as a constant percentage of the value of the output. By increasing the unit costs of extraction, royalties have distorting effects, which do not allow the maximization of revenue for the beneficiary government.

The main advantage of royalties, and the reason for their popularity, is early timing of payments – as soon as the production starts – and simplicity of administration. It is easy to determine the volume of the output (for specific royalties). *Ad valorem* royalties require knowledge of the market price. This can be difficult and has to be approximated, e.g. with the use of some formula. Royalties are levied almost everywhere. Only the UK and Norway, and to some extent Canada, have eliminated them by subsuming royalties in the income/rent taxes, as advance and deductible payments. However, even royalties are not fraud proof: measuring physical production can be easily subject to manipulation: meters can be tempered, and losses can take place between the oil well or the mine and the shipping point (EITI, 2006).

Levying an income/profit tax with a higher-than-normal rate is less distorting than royalties. In countries where an income tax is already established, tax administration can build on this tax to impose an additional levy on natural resources. The higher than normal rate can be adapted, in principle, to the specificity of the project; as a consequence, it can generate greater revenue than fees, or royalties. In practice, however, the determination of the rate raises problems. If it is too high, the tax rate will deter investments. If too low, the government will unnecessarily forgo revenue.

The progressive income/profit tax amounts to tax, at additional rates, additional profits calculated as a percentage of the value of the accumulated investment.¹⁷ The burden of the progressive profit tax can be adapted to the profitability of the project better than with the previous instruments, thus generating larger revenue for the government. Also in this case the tax can be superimposed on the existing profit tax, using the same rules for determining the taxable income and the existing tax administration. It requires, however, the definition of the accumulated investment.

The resource rent tax aims at capturing the total rent of project. There are different versions of rent taxes, proposed by scholars and implemented in the real world. For each period, the value of the current rent is the value of the production sold less all the opportunity costs incurred by the firm. Cost is both current and capital. Current costs refer to inputs that are used in the same

¹⁵ The DRC provides an amazing example of mismanagement of natural resources using upfront payments. According to research carried out the African Progress Panel, among the mining assets that were sold to offshore companies during 2010-12 USD 1.26 billion were lost to the public purse. This is equivalent to USD 27 per inhabitant and to the twice the national public expenditure in education and health.

¹⁶ The frequent mentioning of these countries is due mostly to the large availability of data and not necessarily to their worst practices.

¹⁷ For example, a rate of 30 percent is levied on taxable profits that amount up to 20 percent of the accumulated investment. Profits in excess of this threshold are taxed at a rate of 40 percent.

period in which they are purchased. Capital costs refer to inputs that extend their use beyond the period of acquisition. While costing of current inputs presents relatively minor problems, capital inputs raise conceptual issues in attributing total capital costs to each period. Capital costs consist of three different sorts: depreciation, financing costs and capital losses. Some of these costs raise problems in the case of natural resources. To value depreciation one has to measure the present value of future rents, which requires specifying the time-horizon and choosing a proper discount rate.

To solve the difficulties of costing capital inputs, the theory proposes *a cash flow tax*. The structure of the tax can be better illustrated when the tax is assessed with reference to a single project, rather than to a firm. In each period of the project, the cash flow is the net value of all real transactions of the project and is calculated by subtracting from cash receipts from sales all expenses made for the purchase of inputs (both operating and capital). It means, for example, that all capital costs are deducted immediately from cash receipts in the period the capital items are purchased. There is no need to calculate depreciation, cost of finance and capital losses.

If the resulting amount is positive, a tax is levied. If the cash flow is negative, the loss is carried forward to the next period at a rate of interest, until a cumulative positive value is attained. Positive cash flow is taxed at the specified tax rate. Should cash flows become negative in the future, losses are offset against future tax liabilities. Typically, with a cash flow tax there will be no tax liability for the project (or the firm) for several years after the commencement of the project, due to the necessary investment outlays. The cash flow tax reduces the risk to investors, but it increases the revenue risk to government.

Administration capacity should be given a high weight in the selection of the appropriate tax instruments, as illustrated in the next subsection 2.3. Income and resource taxes are difficult to collect in developing countries, whose tax administration has to deal on unequal conditions with international companies with huge experience in tax-erosion practices. However, the actual practice is frequently at odds with these considerations, with developing countries using complex tax instruments (see Barma, Kaiser, Tuan Minh and Viñuela, 2012). The more complex is the tax, the lesser the transparency surrounding the operation of the tax administration and the greater the opportunities for corrupted deals.

When production sharing agreements or other contractual instruments are used, the proceeds from the sale of the share of oil, gas, and minerals going to government dominate in terms of size of revenues, as reported in Table 4 with reference to Nigeria and Cameroon. Sale of oil is a relatively simple instrument. It requires an agency, usually the national oil company, able to organize the transport and the sale of the resources. In practice, however, sales may be made without transparency and becomes a vehicle for theft of funds as illustrated in sub-section 2.5.

2.3. Systems for sharing revenue from natural resources among layers of government

When countries recognize the entitlement of their subnational governments to receive a share of NRR, they have to select the instrument for the allocation. A number of overlapping fiscal systems are available for intergovernmental sharing. Most of them apply to the producing areas only, being applications of the origin principle.

Ideally, all rent collecting instruments are available to any level of government. The central government is viewed, however, as better equipped to use most of them than subnational government units. This is because of problems of capacity that in turn derive from size. Hence

the literature suggests to extract the rent at the central level and to make it available to sub-national governments, when it is the case, through transfers or revenue sharing schemes (see, for example, Ahmad and Mottu, 2003).

Separation of (own) taxes. With this system the national and the subnational governments are entitled to levy separate (own) natural resources taxes on firms or projects located within their jurisdiction. For example, royalties might be assigned to subnational governments, whereas profit, or resource rent taxes are assigned to the central government. This system is typical of federal states and it is found in the US, Argentina, Brazil, Canada and Australia. In Africa, separation of taxes is practically unknown since the centralization of tax instruments on natural resources is the dominant pattern.

Concurrence of taxes (tax-base sharing). The difference between this instrument and the previous one is that in this case two, or more, levels of government use the same tax instrument. A typical case is local surcharges on royalties. In federal countries the tax bases and the tax rates of the surcharges can, usually, be determined freely, while in non-federal decentralized states the tax base is nationally determined, while sub-national tax rates can be fixed within nationally determined brackets. Again, this instrument is not in use in Africa.

Concurrency of natural resource taxes brings in vertical externalities, meaning that the overall burden of a tax assigned concurrently to different layers of government is greater than the burden that would arise, if the tax instrument were assigned to one level of government only. There is a common worry in the literature that concurrency of taxes could lead to an excessive government take – the share of the rent appropriated by the public sector – and that this could lead to a retrenchment of investors and hence to a decrease of production. The argument is valid mostly for royalties that are levied jointly by the central and the subnational government in a number of countries (Otto, 2001).

Tax revenue sharing. In this system, the tax bases, the tax rates and the revenue shares are determined by the central government and the revenue are allocated according to the principle of origin. What each region receives is a nationally determined share of the total revenue of the tax collected within its jurisdiction. Sharing of sales of oil has very similar characteristics, since it is done under central government responsibility, while the proceeds can be shared among all (or a fraction of) local government units. Nigeria provides an example of both tax and sale of oil revenue sharing, whereby not less than 13 per cent of all revenue from natural resources has to be allocated to the producing states (Wumi and Suberu, 2011), while all subnational governments benefit from a varying share of oil, and non-oil, proceeds (after the deduction for producing states).

In-kind revenue sharing (infrastructure tax credit schemes). According to this system, subnational governments have access to a share of NRR generated within their jurisdiction via the provision of infrastructure and services by the companies that exploit these resources, and on the basis of an explicit national regulation.¹⁸ This is not to be confused with the common practice followed by the producing companies of providing, on a voluntary basis, infrastructure and services to the areas affected by their operations in order to alleviate the problems created by

¹⁸ The most quoted example is the “Infrastructure Tax Credit Scheme” of Papua New Guinea, whereby up to 2 percent of a developer’s total tax obligation can be spent on infrastructure within the province in a given year, providing the infrastructure is approved by the Department of Mining and Petroleum, the Provincial Government and the Taxation Office (Andrews-Speed and Rogers, 1999).

their activity and to promote better relations with local communities and local governments.¹⁹ In kind revenue is provided by firms both in developing and industrial countries and frequently it replaces delayed or missing action by the government.²⁰ Revenue in kind is in principle suited to very small size governments and local informal communities, with weak administrative capacity.

In practice, however, there are frequently information problems. The provision of revenue in kind is regulated in the framework of the production sharing agreements or similar contracts that are usually signed between the firms and the central governments. In some cases, as in the DRC, the central government does not provide the relevant information with the consequence that local governments are not involved in the decision-making process and cannot monitor the execution of projects (International Crisis Group, 2012).

Table 5: Instruments for sharing NRR with subnational levels of government

Method	Separation of tax bases (Own taxes)	Concurrence of taxes (Sharing of tax bases)	Sharing of tax and oil revenue	Sharing of revenue in kind	Intergovernmental transfers out of NRR
Determination of the tax base	Sub national	National	National	Mostly national	National
Determination of the tax rates	Sub national	Sub national (within limits)	National	Mostly national	National
Administration	Sub national	Mostly national	National	By the producing firm	Mostly national
Criterion for determination of the beneficiary jurisdiction	Origin	Origin	Origin	Origin	Need, equity or Other

Share of equity of the national oil company. With this system a share of the equity calculated with reference to the incidence of the local reserves on total national reserves is attributed to the local governments of the producing areas. Local governments will then be entitled to receive the corresponding share of dividends. This system is infrequently used: an example is provided by Brazil before the constitution of 1988, when States and Municipalities were entitled to receive a share of equity of *Petrobras* corresponding to 8 percent and 2 percent of the estimated value of newly discovered reserved of oil and gas (article 10 of Law 2.044/53).

Intergovernmental transfers based on the revenue from natural resources revenue. In a number of countries, such as Bolivia and Colombia, a share of revenue from natural resources goes to a national fund used for allocations to all local jurisdictions (including the producing areas). Specific systems for transfers of revenue from natural resources to indigenous communities have also been set up.

¹⁹ Illustrations are provided by Filer (1995) and Labonne (1995).

²⁰ Sometimes, even the replacement, *i.e.* revenue in kind from firms is, sometimes, missing and/or delayed, as shown by the dismal experience of the Delta River in Nigeria and of the DR Congo (World Bank, 2008).

2.4. Intergovernmental sharing and the rate of exploitation of NRR

The impact of intergovernmental sharing on production is a crucial issue that is very hard to answer in general terms. The skeptical view about sharing of NRR with subnational governments may reflect the preoccupation, particularly popular in consumer countries that the sharing will result in a higher government take leading to reduction in investment and production. But this is not granted.

An excessive government is likely to result, at least according to theory, only with concurrence of taxes and other extraction instruments between the central and the local governments. In such a setting, concurrence will lead to vertical externalities, each level of government taking into consideration only its needs when setting the tax rates.

When, as in Canada and other federal states, the constituents units of the federation have the power of determining the production rate through their choice of fiscal instruments, the level of production will depend on the difference between the discount rates of the concerned governments. For example, if Alberta is richer than the rest of Canada, its discount rate will, quite likely, be lower than that of Canada, leading to lower production. The booming production of shale oil and gas in North Dakota and other American states may reflect the opposite situation, where subnational autonomy leads to more production.

At the same time, production rates are part of national oil and mineral strategies, where the central government has the main responsibility in all systems and where it can act to foster national interests by using the panoply of policy instruments available to it, going from taxation, to foreign trade and all kinds of regulatory powers. Possibly legal and fiscal regimes may matter more than intergovernmental sharing. The concession regime used for extraction of oil in the UK has led to a very rapid depletion of reserves, despite the full centralization of extraction and the level of wealth of the country.

The case of indigenous communities (and of their opposition to exploration and exploitation of natural resources) is quite different and should not be confused with intergovernmental sharing. Here, geological hazards may really create problems, as where an exploration area overlaps with a sacred area. But the problem will remain the same, whether a subnational government, such as a province or a region, or the central government is legally entitled to determine the exploration/exploitation policy.

2.5. Corruption in the extraction of the rent

We focus in this sub-section on the risks of corruption during extraction. Corruption is one of the biggest public policy problems associated with the extraction and not only the spending of NRR. Contractual regimes are more prone to corruption than concession regimes. To understand this one has to think to their idiosyncratic character, being they intended to extract to the profit of the government the maximum share of the rent that is compatible with the achievement of other policy objectives, contractual regimes are necessarily tailored to the characteristics of individual oil fields and mines. More specifically, the two main components of production sharing agreements - the determination of cost oil and the payment of profit oil - are prone to corruption on a day-by-day basis. Table 6 provides a comparison of corruption potentials built into the two different schemes and in tax instruments.

Cost oil determination should be based on rules similar to those used for tax purposes, but usually production-sharing agreements impose specific rules. Determination of these rules and

the daily control of their compliance impose an additional burden on the usually scarce administration resources available to producing countries, especially in the developing world. They also open avenues for corruption in consideration of the huge amount of resources involved.²¹ Huge corruption possibilities reside also in the profit oil component. Not specifically in the determination of the share, since it is the complement to cost oil, but rather corruption opportunities reside, as illustrated above, in the selling of oil and channeling the proceeds to the Treasurer (usually through the central bank, since most of profit oil is sold abroad). Proceeds of sales and hence revenue depend on: a) the measurement of quantity (where the point of measurement is of strategic importance); b) the determination of the price applied to individual selling operations and, c) the exchange rate applied to the transactions: oil is priced in dollars, but revenues are labelled in the national currency.

Corruption in rent extraction has a big potential of conflict generation, also from an intergovernmental point of view, particularly when NRR are shared with the producing, but also with the non-producing subnational governments. Corruption creates potential of conflicts also when NRR are reserved to the central government, being concentrated to the benefit of small circles of politicians, civil servants and public managers.

As in any other field, corruption can be kept in control by appropriate governance institutions, starting from complete transparency over government operations. International and non-governmental agencies have developed considerable activities in this respect in the recent years, such as EITI or the Kimberly Process. It is crucial to have a system of checks and balances, where there is no exclusivity of assignments in revenue extracting operations, but where, rather, the operation of an agency is subject to control by another agency. For example, the ministry of oil and mine cannot operate sales of crude oil and, at the same time, be responsible for their control. One relevant implication of this argument, for example, is that the potential for corruption originated by concentration of responsibility for extraction in only one level of government can be mitigated by the simultaneous allocation of NRR to more than one level of government, because this allocation creates a divergence of interests between inside the public sector that stimulates control.

²¹ For example in Nigeria, oil companies pay the cost of training abroad of employees of the NNPC that will tasked also of controlling compliance and of determination of the rules. (Ribadu Report, 2012).

Table 6: Where corruption takes place in the extraction of NRR

Stages	Legal frame work	Fiscal Instruments	Corruption potential	Intergovernmental impact
Exploration	Awarding of license: establishes area and duration of process and environmental constraints	Signature bonuses	Very high because of discretion of authorities	Decentralized governments have higher stakes in the process, particularly on environmental issues. But may lack skills and suffer from local capture. Information at the local level may be higher, than when bonus for a remote area is paid in the capital city.
		Signature bonuses	Very high because of discretion of authorities concerning their size.	Same as before.
		Auction bids	Relatively low, if government has the appropriate skills and knowledge and uses appropriate procedures.	Lack of skills, mostly associated to small size, is a big obstacle to local government organization of bids.
Production	Concessionary regimes	Signature bonus	High because of discretion of government.	Same as for exploration.
		Corporate income tax	Relatively high, when preferential regime may be granted	Lack of skills, mostly associated with small size of government, may facilitate corruption.
		Royalties	Quite high especially in determination and payment.	Skills are somewhat less determinant.
		Other taxes	Same as before.	Depends on complexity.
	Production sharing agreements	Cost oil	Very high, given the stakes, the use of specific rules and the disparity of information between firms and government. Becomes even higher when NOCs are involved in joint ventures.	Lack of skills, mostly associated to small size of government, may facilitate corruption.
		Profit oil	Very high. Done usually by NOCs, sometimes with help of private traders. Fostered by obfuscation in prices and exchange rates.	Same as for cost oil.
		Taxes	As with concessionary regimes.	Same as for concessionary regimes.
	Joint ventures/equity share	Sharing of production	Same as with profit oil in, or even higher considering possible collusion between NOCs and foreign firms.	Same as with production sharing agreements.
		Sharing of cost	Same as with cost oil in production sharing agreements, or even higher considering possible collusion between NOCs and foreign firms.	Same as above.

3. TRANSFERS TO INDIVIDUALS

Replacing governments with citizens as beneficiaries of NRR through the distribution of direct cash transfers to them is an increasing popular suggestion by experts, especially with reference to African countries (Gelb, 2011; Moss, 2011; Segal, 2011, Devarajan and Giugale, 2013). A specific literature that started with Sala i Martin and Subramanian (2003) is emerging. Actual practice is still quite small and includes only a very few cases: Alaska, Italy and Bolivia among them. This section will review the arguments in favor and against such a proposal, and discuss the experience of the few existing cases.

3.1. Some arguments

Some proponents of direct allocation of NRR to individuals claim that it is grounded on a universally recognized entitlement. Wenar (2008) argues: “The fact that the people of a country own its natural resources is part of a common-sense understanding of today’s world. It is therefore no surprise to find that the nations of the world have embedded this fact deep within international law” (page 15). He quotes a few constitutions, such as in Bolivia and Iraq, prescribing that NRR “pertain to the people” and the major treaties on human, civil and political rights which have perfectly analogous principles.²² Other proponents advance political and economic reasons.

Accountability

Cash transfers are viewed as a mechanism for addressing government failures and even improve the equity of the tax/expenditure combination (Devarajan and Singh, 2012). To be more precise, these transfers would be non-conditional, at least according to all proposals and the current limited practice of implementation. They would provide revenue to individuals, or families, that would then decide how to allocate them between public and private services and goods.

According to many proposals (Moss, 2011, Devarajan, Le, and Raballand, 2010) transfers to individuals would be liable to income tax, as ordinary income. This would force the central, or the local governments in the case the transfer are paid directly by them, to build a tax administration in order to collect part – according to the established tax rates – of the NRR transferred. Henceforth, the state would be forced to show the (good) use of these resources and to become more accountable to citizens. There is a huge recent literature starting with the work of Moore (2007) on earned revenue that tries to demonstrate how the need of relying on tax revenue improves the working of the public sector. Recent research on African countries shows that when governments ask new taxes to their citizens and/or firms and are resisted because taxpayers cannot see the benefits of their payments, the same governments are forced to improve service delivery (Institute for Development Studies, 2010; Bodea and LeBas, 2013).

²² For example, the *International Covenant on Civil and Political Rights*, says at article 2: “All peoples may, for their own ends, freely dispose of their natural wealth and resources”. Similarly, Article 2 of the African Charter on Human and Peoples’ Rights States: “All peoples shall freely dispose of their wealth and natural resources. This right shall be exercised in the exclusive interest of the people. In no case shall a people be deprived of it.” Article 2 of the other major human rights treaty, the *International Covenant on Economic, Social, and Cultural Rights*, is identical. Similarly, Article 21 of the African Charter on Human and Peoples’ Rights states: “All peoples shall freely dispose of their wealth and natural resources. This right shall be exercised in the exclusive interest of the people. In no case shall a people be deprived of it.”

Possibly, there could be some overstatement in the argument of increased accountability of turning oil revenue into earned revenue via the income tax. In developing countries, usually only a minority of taxpayers actually fill a tax return. This means that a majority of citizens will receive from the state a transfer net of tax without much possibility of checking the amount withheld and the transfer.

Other authors argue, however, that direct cash transfers by themselves would give citizens enough of an incentive to increase transparency in the management of NRR. Even if they are not taxed, citizens as direct beneficiaries would be more interested to monitor carefully the various steps through which the NRR are allocated to them starting from payment of taxes and royalties from extracting companies to the final disbursement to them.²³

Devarajan and Giugale (2013) provide a basic model – that pioneers the analytical literature on allocations to citizens – that clarifies the incentive role that direct transfers play for citizens inducing them to scrutinize the use of NRR by governments. According to this model, once individuals receive transfers they become better conscious of the existence of NRR and are stimulated to oversee the provision of public goods with the aim of controlling diversion by politicians. When NRR are substantial, direct transfers can increase the total well-being of people, while reduced diversion can result in the provision of the same quantity of public good, as before, while allowing at the same time for the transfers.

A similar argument has been advanced in Canada for starting the distribution of cash transfers from the Alberta's Heritage Fund. According to Warrack (2007), for instance, the distribution would have enhanced public scrutiny of the management of the Fund that – in his view – had been rather disappointing. The main goal – saving for future generations – had been practically put aside in favor of distributions to the provincial government. Direct distribution to citizens of the income of the Heritage Fund, as it is made with the Permanent Fund of Alaska, would have made the advantages of the instrument clearer, and given new strength to its original purpose, i.e. saving for future generations.

Poverty reduction

Cash transfers could have an immediate and significant economic impact on poor households and for economic development. For example, estimates for Uganda show that with an oil production amounting to 10 percent of GDP, a full and uniform distribution of the rent would provide 50 US\$ per year per capita. Such an amount could double the income of large families at the bottom of the income scale. This would make a huge difference for these households, allowing their members to increase investment in nutrition, health, education and even set up microenterprises (Gelb and Majerowicz, 2011). The poverty reduction power of direct transfers is constrained by the size of a country's population. Devarajan and Giugale (2013) show that this would be the case for Tanzania, while in Angola, Gabon and the Republic of Congo direct transfers could be quite effective in reducing poverty, given the importance of NRR compared to the population.

²³ One has also to consider, as a partial counter argument, the development, under the impulse of a group of governments and of NGOs of the *Extractive Industries Transparency Initiative* (EITI) aimed at insuring transparency in all the management stages of the NRR, whose performance is considered to be satisfactory in a number of countries and reduces the need of direct popular watch.

Neglect of future generations

If NRR were to be transferred directly to individuals of the present generation, one could argue that this could be at the detriment of future generations. One could also argue that direct cash transfers are likely to be spent only for consumption with full neglect of investment. These objections have clearly some ground *per se*, but they have to be evaluated with reference to the alternative: channeling NRR through public budgets. Here evidence does not provide cases for the superiority of public budgets.

Hamilton, Ruta and Tajibaeva (2006), for example, compare the investment behavior in both NRR rich and non-rich countries, and show that investment is not the dominant pattern in the former. Their analysis is based on the estimate of what would have happened to their capital stock if NRR rich countries had constantly followed the Hartwick rule by using their NRR for physical investment.²⁴

Sayne and Gillies (2011) provide Nigeria context-specific arguments against direct allocation to individuals. They argue that cash transfers are a low value policy option for the Niger Delta, for two main reasons. First, “while cash transfers might generate some marginal developmental gains—especially over the weak record of current spending—structural obstacles to growth in the region would limit their positive effects”. Second, “introducing transfers poses risks, above all of violent conflict and heightened rentier politics”. However, the authors do not provide a convincing analysis and evidence in support of their arguments, particularly on the heightened rentier policy argument. As a matter of fact, it is hard to imagine how rentier politics could become worse in the Niger Delta area.

Volatility

Volatility of transfers can become a serious problem in poor countries. If households become dependable on transfers, sharp and unexpected reductions could impact heavily on their well-being. This could also raise political problems, as it would be difficult to explain/justify

²⁴ The evidence they provide shows that no country with resource rents higher than 15 percent of GDP has followed the rule. In many cases the differences are huge. For example, Nigeria, a major oil exporter, could have had a year 2000 stock of produced capital five times higher than the actual stock. The authors also remark that, if these investments had taken place, oil would play a much smaller role in the Nigerian economy of today, with likely beneficial impacts on policies affecting other sectors of the economy. Venezuela, another big producer, could have four times as much produced capital. Use of NRR for consumption rather than for investment is common in resource-rich countries, with few exceptions to the trend. This is the case of Indonesia, China, Malaysia stand out in the group of consumption-oriented countries, while Chile and Mexico have effectively followed the Hartwick rule in the aggregate – growth in produced capital is completely offset by resource depletion over a 30-year span. Some countries, such as Madagascar, Cameroon, and Argentina, have invested more than their resource rents, but have failed to maintain constant genuine investment levels of at least 5 percent of 1987 GDP (the initial year of the observed period). Hartwick rule-non-compliant countries include also industrialized economies, such as Sweden could that have a stock of capital 36 percent higher if it had maintained constant genuine investment levels at the specified target. The corresponding difference for Norway is 25 percent, and for Denmark 22 percent. The generally low capital accumulation and resource depletion level in the Nordic countries could be surprising. It shows that the Scandinavian countries have traded off inter-generational equity against intra-generational equity, which is reasonable to do in view of likely higher level of future GDP. Developing countries may have even more inter-generational equity arguments than the Scandinavian countries to weigh more the present than the future generations, although this would never imply that they are free to squander their NRR as it too frequently happens.

downward changes. This issue suggests the need for the creation of a stabilization fund before the distribution starts.

3.2 Some Evidence

Alaska

The better-known scheme is the *Permanent Fund of Alaska*, where dividends from this oil fund are distributed annually to Alaska residents. The dividend is paid in equal amounts to every resident who indicates an intention to remain in the state, regardless of age. Parents receive dividends in trust for their children. The total annual dividend is calculated as the five-year average of the net income to the Fund. This total is then divided by the number of eligible applicants.

For part of the 1980s, a different system was in place, according to which citizens received an annual payment from the earnings of the fund, with the size of the payment based on the length of residence in Alaska up to a maximum of 25 years. A one-year resident was entitled to one share; a two-year resident to two shares, and so forth. Hence, since the size of each payment depended upon how long a person had lived in the state, it was both an incentive to stay in the state and a reward for long-term residents, addressing the problem of high population turnover. The old system also gave a larger share of the wealth to older Alaskans, with a view to arriving at an appropriate intergenerational distribution of wealth.

This previous arrangement was, however, turned down by the Supreme Court, as discriminatory. The new policy has helped garner support for the oil fund, but has also created a strong constituency against any reforms to Alaska's rigid oil revenue management framework. In fact, the fund has to receive at least 25 percent of oil revenue inflows no matter what (Goldsmith, 2002).

Despite the recourse to a five-year average in calculating the dividends, their volatility and their size have been substantial, particularly for income of rural families. Annual dividends distributed – reported in Table 7 – have ranged in the thirteen years of this century from a minimum of USD 845 in 2005 to a maximum of USD 3'269 in 2008, when a special allocation of USD 1'200 was added to the ordinary one of USD 2'060 (Alaska Department of Revenue).

For a family of modest means of four, USD 5'000 in the form of four dividend checks represent the equivalent of two or three months of regular income. Hence, one of the main impacts of the dividend has been reduction of poverty and inequality of income distribution. As a matter of fact, Alaska has the second lowest Gini coefficient among the American States.

Since there are no studies about how households spend their dividends, nothing much can be said about the effect of this volatility or about the type of goods households tend to purchase with their dividends. The timing of payments could also influence the choice between consumption and investment. With 12 monthly payments spread over the course of the year, households may be more tempted to use the proceeds for non-durable goods, while the present annual payment could encourage their use for durable goods.

Table 7: Annual per capita dividends from the Alaska’s Permanent Fund. 1982-2012

1982	\$1,000.00	1993	\$949.46	2004	\$919.84
1983	\$386.15	1994	\$983.90	2005	\$845.76
1984	\$331.29	1995	\$990.30	2006	\$1,106.96
1985	\$404.00	1996	\$1,130.68	2007	\$1,654.00
1986	\$556.26	1997	\$1,296.54	2008	\$2,069.00
1987	\$708.19	1998	\$1,540.88	2009	\$1,305.00
1988	\$826.93	1999	\$1,769.84	2010	\$1,281.00
1989	\$873.16	2000	\$1,963.86	2011	\$1,174.00
1990	\$ 952.63	2001	\$1,850.28	2012	\$878.00
1991	\$931.34	2002	\$1,540.76		
1992	\$915.84	2003	\$1,107.56		

Source: *Alaska Permanent Fund Corporation*

Mongolia

A Human Development Fund (PDF) financed by mineral revenue has been set, aimed at funding a universal child benefit scheme. In the end, however, and in response to political pressure, the universal benefit was extended to the whole population and the HDF had to “borrow” from the budget, as there was not enough mineral revenue to cover those transfers.

Bolivia

Bolivia is the only country in Latin America to have a universal non-contributory pension. Introduced in 1996, the *Bonosol* was a social program resulting from the privatization of Bolivia’s utility companies. It provided an annual pension of Bs1800 (then US\$220) to every man and woman over the age of 65. Even though the amount was small and the money was paid only once a year, it had a substantial impact on the quality of the lives of the elderly. The *Bonosol* is also credited to have helped generate economic activity, contributing to the incomes of entire families, especially vulnerable children in the care of their grandparents.

The rapidly shrinking resources of the privatization fund left Bolivia no choice, however, but to make changes to the *Bonosol*. In November 2007, Bolivia’s government introduced the *Renta Dignidad*, moving its financing source to the hydrocarbons tax, reducing the eligible age to 60, and increasing the amount of the pension to Bs2400 for those without any pension whilst maintaining the amount of Bs 1,800 for those with some kind of contributory pension. Pensions were also now paid monthly, giving the elderly a more regular and secure income source from which to support their livelihoods and continue contributing to the family economy.

Challenges remain, however, including how to deal with revenue volatility. The *Renta Dignidad*'s funding base relies heavily on the current high international oil and gas prices. In the case of a huge, sudden drop of prices, the central government may have to intervene to provide the missing funds in the most difficult circumstances.

There are also problems concerning the effective payment of these transfers. Many elderly still lack identity papers or have incorrect papers, and are not registered in the database to receive this benefit. Furthermore, the military are currently the delivery mechanism to rural areas, something that in the long term should be replaced with better banking infrastructure and new technologies to ensure easy access to poor rural older people.

Italy

Italy is a modest producer of hydrocarbons. However, the incidence of nationally produced oil and gas on domestic consumption is not negligible: about 6 percent for oil and 10 percent for gas. A royalty is levied at a rate of 10 percent on oil and gas produced. Italian oil and gas producing Regions and Municipalities are assigned with a share of the rent collected by the public sector. More precisely, seven tenths of the royalty on oil and the entirety of the royalty on gas are allocated to regional and local governments.

According to decision of 2009, the remaining three tenths of the royalties levied on shore are channeled to a fund (Fuel Price Reduction Fund), managed by the central government, whose proceeds are used to fund transfers to car drivers in all the producing regions.²⁵ More specifically, every possessor of a driving license, who is a resident of a region where its share of the royalties amounts to more than 30 Euros per capita, will receive an electronic card expendable at the gas stations. If the per capita entitlement is less than 30 Euros, the corresponding sum will be channeled directly to the regional budget.

The allocation started in 2011 with reference to royalties earned in 2010. Only one region – Basilicata – did reach the prescribed threshold of 30 Euros per capita. In order to benefit from this transfer, one needed to be a resident of the Region Basilicata, possess a valid driving license, and apply.²⁶ The number of applicants is estimated to have been around 270'000 with 91 percent applications considered as possessing the requisites.

The scheme could be criticized for its lack of equity, because it limits the range of beneficiaries to drivers only and to its conditionality. In the Italian context, however, given the widespread ownership of vehicles there seems to be an almost perfect overlap between adult population and holders of a driving license.

Because of its small size (relative to the per capita income of the region), the transfer is not likely to create problems in terms of absorptive capacity and volatility. On the other hand, also because of its small size, the transfer has a limited effect on poverty and on the accountability for public services: individuals being only able to make a very partial substitution of publicly provided services with private services (Brosio and Vannini, 2011).

²⁵ The royalty has been increased from 7 to 10 percent in 2009 by Law N.99 of July 23.

²⁶ The allocation for 2012 has increased to 140 euros. However, its disbursement has been stopped following a ruling of administrative court of Lazio according to which the demand coming from other two Regions claiming their right to a share of the royalties paid to the Basilicata region has an acceptable legal ground.

Iran

Also Iran appears to be in the process of adopting a policy of cash transfers to individuals. In January 2010, Iran's Parliament adopted a law to phase out price subsidies and replace them with universal cash transfers to the population, phased in over five years (Tabatabai, 2010). At this stage, it is not clear, however, whether the total amount of the new transfers will be linked to oil revenue or to the volume of past subsidies (Dominique G., R. Zytek and M. Farzin, 2011).

CONCLUSIONS

We have analyzed in this paper the problems connected with the assignment of NRR to levels of government and to individuals. In addition to the analysis of the allocation, i.e. the spending of NRR, we have devoted a considerable attention to the fiscal instruments for extracting the rent. This is frequently the locus for huge mismanagement and fraud.

There is a rationale to fully compensate the (subnational government of the) producing areas for the negative environmental, social and economic impact of production activities. In fact, sharing NRR with subnational governments of the producing areas is the prevailing practice worldwide. However, this impact has to be accurately measured to determine the compensatory allocation.

Assignment to all – including the non-producing – subnational governments may create problems in view of the volatility of revenue and the low absorption capacity of small government units. In fact, it is less frequently found worldwide, although it is increasingly used (particularly in Latin America) as an instrument to correct inequalities deriving from allocation of NRR to the producing areas and defuse conflicts. The problems related to the sharing with all governments can be attenuated with the use of proper instruments.

The obfuscation that very frequently permeates the centralized process of extracting NRR originates a number of problems, starting with corruption, and continuing with misspending and conflict. In this regard, the allocation of NRR to all subnational levels and individuals increases the number stakeholders and gives them incentives to exert control. This is a relevant argument against full centralization of NRR assignment, particularly in countries with a weak capacity of public scrutiny of government activities.

Allocation of NRR to individuals with direct transfers is not, necessarily, a full alternative, but rather a complement to the intergovernmental allocation. This option, which is increasingly suggested for Africa, in view of the prevailing poor governance of NRR, could increase the welfare of citizens by increasing their scrutiny of NRR use by government. The reduction of misspending that scrutiny implies could maintain the existing level of public goods provision even in presence of transfers, hence providing a substantial gain.

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