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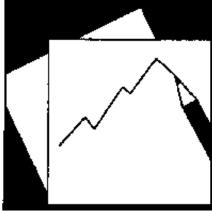

IMF Working Paper

Oil Revenue Assignments: Country Experiences and Issues

Ehtisham Ahmad and Eric Mottu

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IMF Working Paper

Fiscal Affairs Department

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Prepared by Ehtisham Ahmad and Eric Mottu[1]

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Abstract

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Based on country experiences, the paper assesses policy options to assign oil revenues to subnational governments (SNGs). The literature recommends that oil revenues be centralized. Given political economy considerations, this paper suggests that a possible alternative is to assign stable oil-tax bases to oil-producing SNGs, supplementing these with predictable transfers from the center. Although commonly used, oil revenue-sharing arrangements are the least preferable solution, as they complicate macroeconomic management and do not provide stable financing. Revenue sharing also does not diffuse separatist tendencies, since oil-producing SNGs would still be better off by keeping their oil revenues in full.

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I. Introduction

The assignment of oil revenues in multilevel countries raises a number of issues, including the right of subnational regions to raise revenues on natural resources, the ability of subnational jurisdictions vis-à-vis the central government to stabilize revenues in response to oil price uncertainty and volatility, interjurisdictional equity and redistribution, as well as environmental concerns. There is also an overriding emotive or political economy consideration associated with the assignment of natural resource revenues—particularly with those from oil—reflected in demands for a direct share of the oil revenues from the regions where the oil fields are located. Factors in determining appropriate revenue assignments would also include stabilization, efficiency, and redistributive considerations traditionally addressed in the literature.

The paper describes arrangements to assign oil revenue to different levels of administration in a range of countries—ranging from large federations to relatively small unitary states. Based on country studies, the paper presents a simple typology of existing arrangements, including full centralization, full decentralization, and various revenue-sharing schemes including the definition of various overlapping revenue bases.

While the paper considers a large number of oil-producing countries, the following countries are examined in more detail: Canada, Colombia, Indonesia, Mexico, Nigeria, Russia, the United Arab Emirates, the United States, and República Bolivariana de Venezuela (hereinafter referred to as Venezuela)—representing differing constitutional and political arrangements touched on above.

Arguments for centralization of oil revenues are based on a number of considerations. A central government can better absorb the uncertainty and volatility of oil prices because it usually has a broader tax base, less correlated with oil prices, than subnational jurisdictions. And if subnational governments do have other assigned taxes, oil-rich regions may have less incentive to use such bases if they are also assigned oil revenues—this can lead to internal beggar-thy-neighbor outcomes within federations and a misallocation of factors of production. Moreover, a central government can contribute to horizontal equity by redistributing oil revenue between resource-rich and resource-poor regions. As a depletable resource, oil cannot be considered as a buoyant long-term source of revenue for subnational governments.[2]

The main arguments for assigning oil revenues to subnational jurisdictions are mainly political and turn on either constitutional stipulations that delineate the regional or local ownership of the natural resources or the right to levy taxes on certain bases or sources of income. Another common arrangement—to share revenues—is often the result of attempts

[2] See Boadway and Shah (1994); Brosio (2000); McLure (1983), (1998), (2000), and (2001); Mieszkowski (1983); Norregaard (1997); and Ter-Minassian (1997a).

by central governments to appease separatist tendencies in natural resource-producing regions. We examine the merits and problems associated with such arguments in the context of possible arrangements for different types of countries.

The case of the small unitary state may appear trivial, as the oil revenues are necessarily centralized in these countries. However, a number of considerations are important, and the preconditions for effective stabilization in such countries indicate the necessary conditions in larger unitary states or federations for decentralization of oil revenues to subnational jurisdictions.

The paper assesses the advantages and drawbacks of the various types of arrangements, including their ability to contribute to macroeconomic stabilization and fiscal discipline. It concludes that centralization of oil revenues would be a desirable arrangement, along with the assignment of other tax bases to subnational governments and a transfer system to address distributional or equalization concerns. An alternative solution is to assign more stable oil-tax bases, such as production excises, to oil-producing subnational governments and to design the transfer system accordingly to guarantee a minimum level of resources for all subnational governments to finance a stable level of public services. The least preferred solution is oil-revenue sharing. By taking away large amounts of revenue from the central government, it precludes and complicates macroeconomic management. By fully transmitting the volatility of oil revenue to subnational governments, it does not provide stable financing of local public services, and it usually does not manage to diffuse separatist tendencies, since oil-producing regions can still do better by keeping 100 percent of their oil revenues.

The next section provides general background figures on oil revenue and its volatility in oil-producing countries. Section III presents the experiences and issues in assigning oil revenue in unitary countries—both small and large. Section IV turns to the experiences in federations. The last section concludes with some policy options.

II. Experiences of Oil-Revenue Assignments

Data on oil revenue disaggregated by level of government are scarce. For both sets of unitary and federal countries, Table 1 presents the oil revenue collections as well as total revenues over the period 1997–2000. A major feature that is apparent is that **oil revenues are more volatile than total revenues**—in all major countries and groupings of countries (small and large, predominantly oil producing and so on). Volatility, defined as the standard deviation relative to the mean, of oil revenues was roughly similar for unitary and federal countries. However, within each group there were considerable differences across countries, and for instance for unitary states oil revenue volatility was higher for countries such as Iran, Indonesia, and Colombia than for Saudi Arabia or Kuwait—reflecting a lower ability to use quantity adjustments to compensate for price variations. A similar pattern was apparent for federal states, with Nigeria, the United States, and Venezuela being subject to greater oil-revenue volatility than Mexico, Russia, or the United Arab Emirates.

Table 1. Oil Revenue Volatility in Selected Countries, 1997–2000

	Oil Revenue (In percent of GDP) 1/	Volatility (In percent) 2/	Total Revenue and Grants (In percent of GDP) 1/	Volatility (In percent) 2/	Oil Revenue (In percent of total revenue) 1/	Coverage
Unitary countries 3/	16.6	27.6	32.8	12.6	48.2	
Azerbaijan	5.7	29.1	19.6	5.1	28.6	General government
Algeria	21.4	25.9	32.7	13.3	64.4	Central government
Bahrain	13.0	26.3	24.6	15.1	51.9	Oil and gas
Colombia	2.6	38.3	27.7	2.8	9.4	Nonfinancial public sector
Ecuador	7.4	32.1	25.1	15.9	31.3	Nonfinancial public sector
Indonesia	5.6	32.7	17.5	11.5	31.1	Oil and gas. General government. 4/
Iran	13.3	42.0	25.5	18.2	49.8	Oil and gas. Central government. 5/
Kuwait	38.6	19.2	60.7	13.3	63.0	Oil and gas. 6/
Libya	23.0	8.0	39.0	14.7	59.9	Consolidated government
Norway	8.9	30.8	52.3	4.0	16.9	General government
Oman	30.2	15.6	39.5	6.9	76.0	
Qatar	16.7	27.4	28.6	19.9	57.3	4/
Saudi Arabia	24.6	27.4	33.6	15.5	72.0	Central government
Yemen	21.6	31.9	33.1	20.4	63.8	Central government
Federal countries 3/	12.7	28.2	29.0	9.9	44.7	
Canada	7/	25.9	46.2	0.5	…	General government. 4/
Mexico	5.3	17.7	21.5	4.4	24.7	Public sector. Excludes excises on gasoline
Nigeria	23.8	39.3	31.8	28.6	72.4	General government
Russia	3.8	26.4	13.1	14.2	28.8	Oil and gas. Federal government
United Arab Emirates	18.2	22.4	34.6	6.3	52.0	General government
United States	8/	31.1	29.9	1.6	…	General government. 9/
Venezuela	12.2	34.6	25.9	13.8	45.7	Public sector (excl. nonrecurrent operations)

Sources: IMF Country Reports; and staff estimates.

1/ Average during 1997–2000.

2/ Defined as the standard deviation in percent of the mean over the period 1997-2000.

3/ Unweighted average.

4/ Fiscal year starting on April 1.

5/ Fiscal year starting on March 20.

6/ Fiscal year ending on June 30.

7/ Resource revenue in the provinces of Alberta and Saskatchewan.

8/ Oil revenue in the state of Alaska.

9/ Fiscal year ending on September 30.

The data also confirm that the **volatility of total revenues is greater the higher the share of oil revenues in total revenues**. This is seen clearly from Figure 1, based on the data from Table 1. This has implications for states that lack non-oil revenue bases, as well as subnational governments that come to rely extensively on oil revenue shares or assignments.

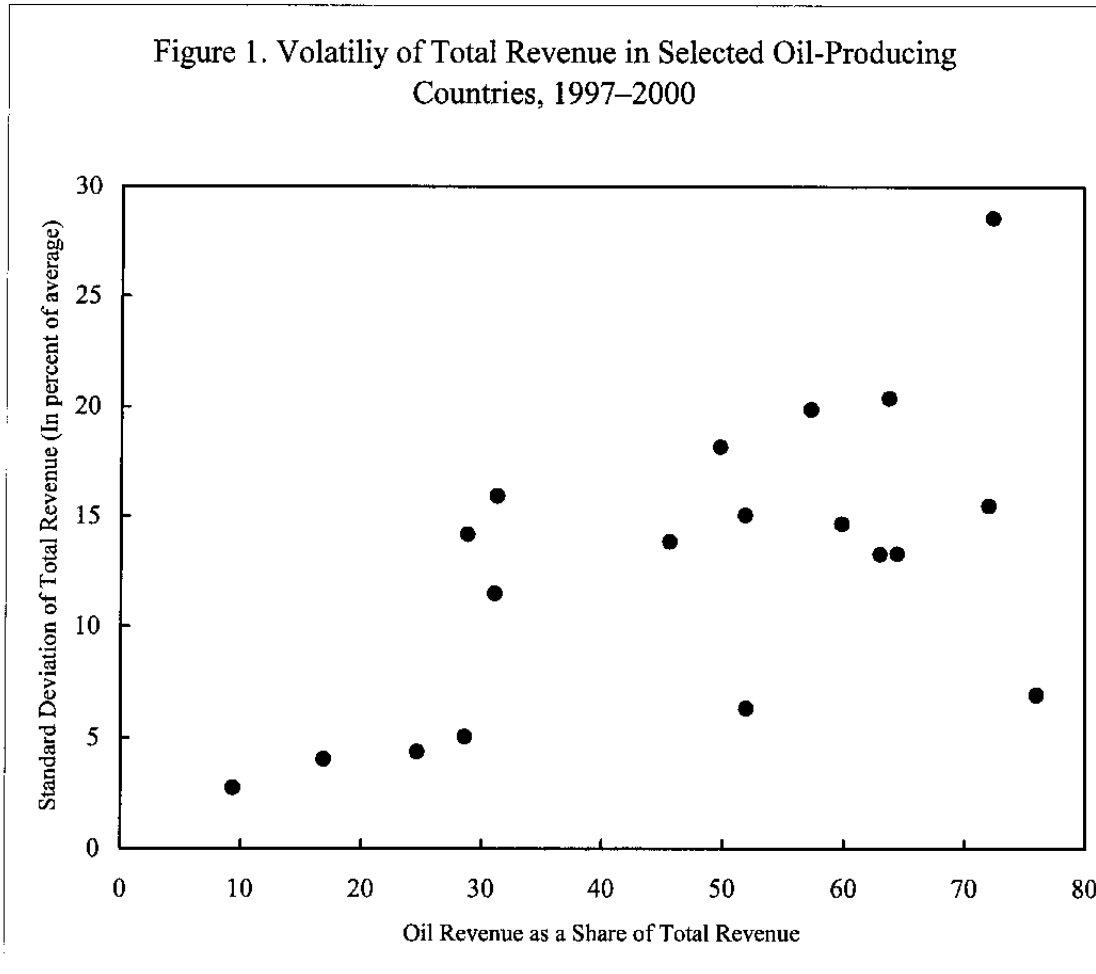

Figure 1. Volatiliy of Total Revenue in Selected Oil-Producing Countries, 1997–2000

Specific arrangements to assign oil revenues in unitary and federal countries can be broadly classified into four categories: full decentralization, full centralization, assignment of overlapping/shared tax bases, and revenue sharing (see Table 2).[3]

[3] Boxes 1 and 2 present the general principles of tax assignment and revenue-sharing arrangements.

Table 2. Classification of Oil-Revenue Assignments in Unitary and Federal Countries

	Full Decentralization	**Full Centralization**	**Shared Revenue Bases**	**Revenue Sharing**
Unitary Countries		Algeria Azerbaijan Bahrain Indonesia (until 2000) Iran Iraq Kuwait Libya Norway Oman Qatar Saudi Arabia United Kingdom Yemen		Colombia (D) Ecuador (C) Indonesia (since 2001) (C) Kazakhstan
Federal countries	United Arab Emirates 1/		Canada United States	Mexico (C) Nigeria (D) Russia (D) Venezuela (D)

1/ Upward revenue-sharing arrangement.
C: Rather centralizing arrangement.
D: Rather decentralizing arrangement.

Most **small unitary countries** centralize oil revenues, often because local governments in these countries do not have important expenditure responsibilities, or have other revenue sources. The challenge for these countries is to develop non-oil revenue bases and to deal with the stabilization and saving of volatile oil revenue at the national level.

Box 1. Subnational Taxation and Revenue Assignment

Arrangements assigning revenue-raising responsibilities to central and subnational governments (SNGs) should seek to promote economic efficiency, distributional equity, macroeconomic stability, and accountability.

First, arrangements should induce the least possible *economic inefficiencies* or *distortions* in the location of economic activities and individuals by limiting wide differences in the tax burden across jurisdictions, and by limiting excessive tax competition. To limit tax-induced movements of businesses, SNGs should be assigned a more *immobile* tax base.

Second, arrangements should favor distributional *equity* by providing all SNGs with a fair share of the national tax base, and by promoting positive incentives with respect to local economic development. Equalization grants may have to correct for an uneven distribution of the tax base or to support jurisdictions facing particularly high costs; but there are limits to the degree of equalization achievable. Thus, the ideal subnational tax base is one that is relatively *evenly distributed* across jurisdictions.

Third, arrangements should provide the central government with *stabilization* instruments, and conversely, shelter the budgets of SNGs from cyclical fluctuations. Thus, subnational taxes should be relatively *insensitive* to movements in GDP and national income. The table below summarizes these criteria.

Criteria for Assigning Revenue-Raising Responsibilities

	Central Tax	Subnational Tax
Mobility of tax base	Mobile	Immobile
Distribution of tax base	Uneven	Even across SNGs
Sensitivity to GDP	High	Low

In addition to these criteria, revenue-raising responsibilities should be closely associated with expenditure responsibilities. This links the benefits of public expenditure to their price, namely the taxes levied to finance them. Such a link promotes *fiscal responsibility* and *accountability* of subnational policymakers to their electorate. Instead of relying on transfers from the central government, SNGs have to adjust the marginal tax rates when they decide to increase expenditure.

According to these criteria, it is generally accepted that corporate income taxes, VAT, taxes on natural resources, and taxes on international trade should be assigned to the central government. Personal income taxes appear more suitable for—at least partial—assignment to the subnational level, since the mobility of individuals and households tends to be less than that of businesses. However, to minimize distortions and tax-induced movements of labor and capital, it is preferable that the definition of the subnational tax base be homogeneous throughout the country and that rate differentials among SNGs be kept relatively small. Single-stage sales and excise taxes can be assigned to SNGs, provided that the rates do not differ excessively among regions. Property taxes, business license taxes, and user fees for local services are also good potential subnational taxes, since their base is relatively immobile.

Box 2. Tax Assignment and Revenue-Sharing Arrangements

Tax bases can be assigned either exclusively to one level of government (separation of tax bases) or shared between several levels (overlapping tax bases). In the latter case, the same tax base, for example personal income would be used by both central and subnational governments (SNGs) as the base of their own taxation, which may have different tax rates and schedules.

Once a tax has been assigned to one level or another, there remains the possibility to share the tax receipts among levels of government (*revenue sharing*). This requires a definition of the share of receipts to be allocated to SNGs, and the appropriate formula for distributing this share among the different SNGs. Typically, the formula can be based either on the revenue that has been collected in each jurisdiction (derivation principle), or on other criteria such as population, expenditure needs (needs assessment), and tax capacity (resource base).

In addition to tax or revenue-sharing arrangements, *grants* from the central government to SNGs are often an important component of intergovernmental financial transfers. Grants can be unconditional transfers usable for general purposes, or can be conditioned by the grantor to specific uses, for example to finance specific programs or projects. The table below summarizes the various possible arrangements for assigning revenue to SNGs, which result in decreasing degrees of fiscal autonomy (see Norregaard, 1997).

Revenue Assignments and Fiscal Autonomy of Subnational Governments

Own taxes	Base and rate under local control.
Overlapping tax bases	Nationwide tax base, but total rates (national and subnational governments) under SNG control.
Nontax revenues	Fees and charges under SNG control, but sometimes with specific provisions set by the central government.
Revenue-sharing	Nationwide tax base and rates. A fixed proportion is allocated to SNGs, according to the derivation principle or some needs or resource base formula.
General purpose grants (block grants)	Are determined by the central government, but SNGs are free to determine how the grant should be spent. The amount received may have an equalization component.
Specific or conditional grants	The central government specifies the expenditure program for which the funds should be spent.

Large unitary states (such as Colombia and Indonesia) tend to be pressed into revenue-sharing arrangements with subnational governments, but these lead to many difficulties, not least in terms of macroeconomic management. Moreover, oil-producing regions are generally unsatisfied with the arrangement, leading to potential political instability.

The same issues arise in **federal countries**, in particular in Nigeria. While expenditure responsibilities of subnational governments remain relatively stable over time, oil revenue transferred through revenue-sharing arrangements is highly volatile, leading to major fiscal management problems that these governments cannot address for lack of alternative revenue bases.

Two federal countries (Canada and the United States) assign oil tax bases to subnational governments (overlapping with the federal government) instead of sharing oil revenue collected centrally. This tax assignment creates more accountability for the governments concerned. The revenue disparities with respect to non-oil-producing regions can be addressed through the national equalization system (Canada). Only one country, the United Arab Emirates, fully decentralizes oil revenue and has an upward revenue-sharing arrangement.

These arrangements are discussed in more detail in the following sections.

III. Unitary States

Most small unitary states reflect a **full centralization model,** where all oil revenues accrue to the central government. Proceeds of taxes on the extraction and production of oil are included in general revenue of the central government. Such countries include those in the GCC region: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and Yemen (the case of the United Arab Emirates is somewhat different and is examined with the federal countries).[4] Most other large unitary oil-producing countries also follow this model (Algeria, Azerbaijan, Indonesia (until 2000), the Islamic Republic of Iran, Iraq, Libya, Norway, and the United Kingdom).

The **advantages** of full centralization of oil revenues are that (i) the central government fully absorbs oil-revenue fluctuations, which most are able to do because of more diverse tax bases uncorrelated with oil; (ii) inter-regional disparities can potentially be reduced if the central government is assigned oil revenues, as the latter may be in a better position to establish horizontal equalization mechanisms; and (iii) there may be less scope for a competitive race

[4] The United Arab Emirates has a unique system of decentralization whereby part of the oil revenues collected by individual emirates is shared "upward" with the central government.

to the bottom[5] for other subnational taxes than if oil revenues were assigned to regions or localities.[6]

A. Issues in Small Unitary States

A number of policy responses to oil-price volatility in small oil-producing states are noteworthy. First, most oil-producing states recognize the need to develop a ***significant non-oil revenue base*** to minimize the variance in total revenues. Such a base is needed to compensate also for a reduction in customs tariffs that have occurred during the past decade, either due to regional initiatives, or the impending membership of the WTO of some of the oil-producing states. Countries such as Azerbaijan have made significant progress in the establishment of a VAT.

Second, some countries have attempted to address the issue of oil-price volatility, by the ***establishment of a stabilization fund***, with a view to smoothing revenues, hence expenditures, over time.[7] Examples include Azerbaijan, Norway, and Kuwait (the Reserve Fund). One of the main difficulties with such an arrangement is the possibility of establishing a parallel budget mechanism, often with less oversight that the regular budget. This difficulty is particularly pronounced at the subnational level especially in developing countries. Norway's responses to the potential difficulty are noteworthy: all resources coming into the oil fund are reported to parliament—which must also authorize any transfers from the fund to the budget. All spending is done from the regular budget.

Third, the finite duration of oil extraction is sometimes addressed by setting up ***a savings fund,*** with a share of annual oil revenue being saved for future generations.[8] An example is the Kuwaiti Reserve Fund for Future Generations (RFFG)—spending from which is expressly curtailed—however, the government was permitted to borrow from the RFFG on account of the reconstruction of the country following the end of the Iraqi occupation. Neither a stabilization fund or a savings fund necessarily stabilizes public finances or effectively raises public savings—these depend on the overall stance of fiscal policy. The potential difficulties noted above may far outright potential benefits and the introduction of such a fund should be very carefully assessed at the outset.

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[5] See Breton, 2002.

[6] Mieszkowski and Toder (1983) find that efficiency losses due to the migration of capital and labor to energy-producing states in the United States (which benefit from oil revenues) may range from 2 percent to 9 percent of the revenue raised.

[7] For a full discussion of the advantages and problems associated with oil stabilization funds see Davis, Ossowski, Daniel, and Barnett (2001).

[8] This is also the case in Alaska.

B. Trends in Larger Unitary States

At a time when small nation states are seeking to offset the problems caused by the variance in oil revenues, there has been considerable pressure in the larger unitary states (and federations) to enter into **revenue-sharing arrangements** or **assign oil-revenue bases** to producing regions or localities.

In addition to the problems also faced by the small oil-producing regions, the sharing or assignment of oil revenues to the producing regions or localities also faces the difficulties that: (i) it is difficult to determine the relevant jurisdiction that should receive the "largesse," especially if the relevant unit for revenue sharing is the district or county—typically an oil well in one district may draw on reserves technically under several district jurisdictions; (ii) assigning such revenues to producing districts or regions may exacerbate horizontal inequalities across districts or regions; (iii) as stated above, it may lead to distortions in economic development by allowing non-oil taxation to be lowered "in a race to the bottom" in oil-producing districts; and (iv) it makes the stabilization function of the central government more difficult to achieve.

Fiscal discipline may be difficult to enforce if subnational governments receive large amounts of fluctuating oil revenues. In developing countries, governments may not be able to resist the temptation to spend the "oil windfall" during periods of high prices—given the relatively low-income levels and the substantial developmental needs. Moreover, the transparency in expenditure management needed to ensure an effective stabilization fund would be difficult to establish at the central level and more so at the subnational level, where the expenditure management procedures and reporting practices are likely to be rudimentary.

If regional governments provide significant amounts of services and infrastructure for the exploitation of the natural resources, some charges may be considered a compensation for the associated costs, justifying that some share of the revenues (e.g., a proportion of royalties) could be returned to the regional governments under the benefit-tax linkage principle. There could also be production excises or severance taxes. These alternatives to the sharing of oil revenues may also be less volatile than oil revenues per se, and thus more appropriate as revenue sources for subnational governments.

While oil production is not a good subnational revenue source, political economy realities might dictate that some form of regional taxation on natural resources is inevitable if there is distrust that the center will provide sufficient untied grants for regional expenditures. There are also a number of economic arguments (based on the benefit principle and externalities) that may justify the levy of taxation on such resources. In addition, since oil and gas are subject to income taxation, piggybacking arrangement with this and other sources may be considered (this might be quite attractive and might not exacerbate regional inequalities if applied across all income sources). There may thus be ***a number of taxes or charges on oil and gas that could accrue to regional governments.***

Three case studies are illustrative of some of the difficulties alluded to above—including Indonesia, Colombia and Nigeria (discussed later in Section IV on federations).

Indonesia

Until 2000, all oil (and gas) revenue accrued to the central government and was not subject to any revenue-sharing arrangement with provincial and district-level governments.
Between 1997 and 2000 oil and gas revenues represented 33 percent of total revenue of the central government (5.6 percent of GDP).

The laws on decentralization, which came into effect in 2001, transferred expenditure responsibilities such as education, health, and local infrastructure to provinces and districts. They also instituted revenue-sharing arrangements for onshore oil and gas revenue, whereby 15 percent of oil revenue and 30 percent of gas revenue were to be transferred to the originating provinces, districts, and adjacent districts, starting in 2001.[9] However, unlike in Canada and the United States, where the provinces own the natural resources and have the right to tax earning from these resources, in Indonesia these resources are owned by the unitary state.

Given the political economy considerations in Indonesia, it was inevitable that recognition of the demands of residents for a share in the resource rents be accommodated in some fashion. However, the sharing of oil revenues with producing regions within the country may not in itself satisfy the aspirations of regional separatists—since by definition they would do better if they keep all the oil revenues.[10] Thus, for the center and the producing regions it may be difficult to establish the politically acceptable level of resource sharing, particularly of oil and gas revenues, and there is plenty of scope for building up further resentments. National unity would thus have to rest on other factors, such as the services that the center could provide with greater efficiency, defense, and national identity.

Moreover, the sharing of oil and gas revenue is likely to further increase regional disparities in revenue capacities, as the sources of oil and gas revenue are concentrated in a small number of provinces and districts. It is estimated that districts in five provinces would likely receive over four-fifths of the total local share, while those in the remaining 25 provinces would receive zero or near zero oil and gas-revenue shares. Thus, there remains a need for

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[9] In addition, at least 25 percent of central government revenue (net of revenue sharing) is to be transferred to all lower level governments through a general transfer mechanism, and additional grants may be distributed for specific purposes (IMF, 2002).

[10] The equilibrium may be less than 100 percent, however, because of the costs associated with secession. See Ahmad and Singh (forthcoming) for a discussion. In Indonesia in 2001 Aceh Province accepted the offer of an asymmetric deal based on retention of 55 percent of oil revenue and 40 percent of gas revenue.

"equalization transfers" for non-oil/gas-producing provinces or districts.[11] Finally, revenue from oil and gas production is highly volatile, and does not provide a stable source of financing.[12]

In sum, there are considerable risks in sharing oil and gas revenues in Indonesia. This could widen regional disparities; prove difficult to administer, particularly at district level, as volatile oil prices lead to a divergence between budgets and realized revenues; complicate the functioning of a grants system; add to "unsatisfied aspirations;" and significantly increase the central government deficit.

Colombia

Colombia is a unitary republic, but with significant subnational governments. Considerable expenditure responsibilities, as well as some revenue, were devolved to districts and municipalities by the 1991 constitution—the provinces perform deconcentrated functions on behalf of the center (as in Indonesia). As a result, municipalities have taken over several important functions and their expenditures represent over one-third of total non-financial public sector (NFPS) expenditure (35 percent on average during the period 1997–2000). The municipalities are mainly responsible for health and education expenditures,[13] as well as for local capital expenditure.

The constitution specifies compulsory intergovernmental transfers to subnational governments, and these are to reach 46.5 percent of the central government's current revenues by 2002. This imposes a considerable constraint on the central government's overall fiscal effort. Since subnational governments have not fully used their powers to collect own taxes, a large share of their revenue (close to one-half) comes from the central government or public enterprises, making them dependant on the intergovernmental transfers. A constitutional amendment was approved in 2001 reducing central government transfers to lower levels of government.

In this context, oil revenue represents a non-negligible share of total revenue of the NFPS, on average 8 percent during the period 1997–2000 (about 2.6 percent of GDP).[14] This revenue is

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[11] Ahmad and Mansoor (2002).

[12]For example, as of mid-December 1998, the price of benchmark Minas crude oil stood at about US$10 per barrel, compared with an assumed price of US$13 for the purposes of the central budget, causing monthly average revenue to fall to US$600 million in the third quarter of 1998, compared with US$1,000 million per month in the fourth quarter of 1997. The rupiah's strengthening to about Rp 7,500 to the dollar from the Rp 10,600 assumed in the central budget compounded the fall in revenues. The revenues from oil rose dramatically during the rebound of oil prices in 1999/early 2000. The seesaw continued during 2001/02.

[13] There have been difficulties in the assumption of teachers' salaries by the municipalities, thus the education function has only been partially decentralized.

[14] This share increased from 5½ percent in 1997 to about 14 percent in 2000.

shared between the various levels of government and public enterprises. Oil revenue comprises the operating surplus of the public oil company (Ecopetrol) and direct transfers from Ecopetrol to an oil savings and stabilization fund (FAEP).[15] Part of the operating surplus is transferred to the central government, another part as royalties for subnational governments, mostly in producing regions, harbors, or regions crossed by pipelines. Resources from the FAEP fund are shared between all subnational governments and Ecopetrol, according to a formula established in the law (the formula takes into account population and tax revenue performance). In sum, a large share of oil revenue accrues to subnational governments, either through direct transfers to the FAEP fund or through royalty payments.

The law on the oil revenue-sharing system was established to prevent political considerations influencing the use of the revenue. However, these oil revenues shares (together with guaranteed transfers) have had a deleterious effect on macroeconomic stability by inducing some territorial governments to contract debt beyond their repayment capacity. Several subnational governments have been brought to the brink of bankruptcy, and in 2000, seven provinces and two municipalities had to restructure their debt. Moreover, the sharing of oil-related royalties favors relatively small and rich oil-producing subnational governments (Ahmad and Baer, 1997)—exacerbating regional disparities.

IV. Federations

Most federal countries use some form of revenue sharing—or assignment of tax bases. In the revenue-sharing model, oil revenues are collected by the central government (or by a subnational government in the case of the United Arab Emirates) and redistributed to all or some levels of government according to a specific rule or formula. The alternative assigns specific tax bases to different levels of government—some of these might be overlapping bases.

A. Revenue-Sharing Arrangements

There are numerous types of revenue-sharing arrangements for oil. Some apply the same rule or formula to share oil revenues as used for other fiscal transfers, while others have a different rule. Some arrangements favor the derivation principle, whereby each subnational government's share is related to the oil revenue originating in its territory. Others follow other criteria such as population, needs, or tax capacity (this makes the resulting revenue share very much like a transfer).[16] Some revenue-sharing arrangements provide relatively large amounts of revenue to subnational jurisdictions (these are rather *decentralizing*

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[15] The fund's objectives are to save part of oil revenues and to stabilize oil revenue fluctuations.

[16] See Ahmad and Craig (1997).

arrangements), others provide small amounts (rather *centralizing* arrangements) (see Table 2). The first category would include Colombia, Nigeria, Russia, and Venezuela. The second category would include Ecuador, Indonesia, and Mexico.

The main advantage of revenue sharing is that it is a convenient form of transferring fiscal resources to subnational governments, especially if oil is a major source of revenue. While administrative considerations often militate for centralization of tax assignments, including oil revenues, revenue sharing provides a way to redistribute funds to subnational governments. The sharing formula may also be tailored to address various concerns regarding equalization or compensating for special regional needs.

Revenue sharing, however, has major drawbacks with regards to macroeconomic management and overall fiscal discipline (Ter-Minassian, 1997b). In addition, revenue-sharing arrangements tend to be politically controversial and unstable.

The alternative to revenue-sharing would be to assign specific revenue bases, some of these (such as production excises) to the subnational level. Specific excises linked to oil production—instead of prices—may be relatively stable, as well as positively correlated with environmental damages. The United States and Canada represent examples of this variant.

Mexico (limited revenue sharing)

Oil revenue in Mexico represents a significant share of revenue for the public sector, close to one-third during 1997–2000. Over this period, revenues from oil extraction rights, oil excess return levies, and the net income of the state-owned oil company amounted to about 5.3 percent of GDP.

Although most of the oil revenue accrues to the central government, a small part is shared with the subnational governments according to a formula-based system established by the law on fiscal coordination.[17] Specifically, lower level governments receive (i) 20 percent of so-called ordinary oil extraction rights; and (ii) 3.17 percent of the additional oil extraction rights. The former share is incorporated into a general fund, which is distributed to the states based on a fixed formula taking into their characteristics.[18] The latter share is earmarked for municipalities that are located in oil-producing regions or where oil is shipped abroad, to

[17] Subnational governments have considerable expenditure responsibilities, mostly the provision of education (elementary and middle schools), public health care and social services, basic social infrastructure, security, and utilities. Most of their revenues are in the form of conditional transfers and revenue sharing arrangements with the central government, totaling about 7 percent of GDP.

[18] In addition, states receive a 20 percent share of the excise tax on gasoline and of the overall VAT revenue. They must redistribute at least 20 percent of their shares to municipalities. Central government transfers are based on revenue estimates included in the annual budget, but are automatically adjusted each month to reflect actual revenues.

compensate for environmental damage caused by the extraction and sale of oil (Amieva-Huerta, 1997).

Revenue sharing from oil has not been a source of political contention in the recent past, mainly because the resources are channeled through a general pool of shared resources and distributed according to a transparent formula. Except for a small part transferred to municipalities involved in oil production and export, there is no direct link between oil-producing subnational governments and oil revenues in the general revenue-sharing arrangement. Moreover, because oil revenue represents a small part of the revenue of the subnational jurisdictions, the oil revenue-sharing has not been a source of fiscal instability.

Nigeria (extensive revenue sharing)

Oil is the main source of revenue in Nigeria, amounting to 82 percent of the total revenue of the general government, or 40 percent of GDP, in 2000.[19] After so-called first charges[20] are withheld, oil revenue is shared between the federal government and the state and local governments according to an arrangement whereby the remainder (over 75 percent of gross oil revenue) is divided between the central government and subnational governments. More specifically, the 1999 constitution assigns the control and collection of oil revenue to the federal government, but attributes at least 13 percent of the net oil revenue to the oil-producing states. In addition, about half of the net proceeds (after deduction of first charges) are redistributed to state and local governments according to a formula decided by parliament every five years. Excess proceeds over the budgeted revenue are also redistributed in the same way, after assigning 13 percent to oil-producing states.

The formula is clearly defined and based on an oil price assumption used in the budget documents. If the effective price exceeds the budgeted price, the excess proceeds are to be distributed. Excess process need not be spent; they could be saved for spending in the following years. If prices are lower than envisaged, the actual amount is distributed.

States and local governments are highly dependent on revenue-sharing arrangements with the federal government.[21] In 1999, 75 percent of state revenue came from redistributed revenue from the federal government, including their share of the VAT (85 percent of total proceeds),

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[19] Oil revenues consist of (i) crude export earnings of the NNPC; (ii) profit taxes and royalties of oil-producing companies (usually joint-venture companies with a government majority ownership); and (iii) domestic crude sales and upstream gas sales.

[20] First charges comprise mainly the government share of the production cost of oil ("cash calls") and priority projects of the national oil company, the external debt service, and the 13 percent allocated to oil-producing states.

[21] State and local governments are responsible for providing education, health, public works, and local utilities and infrastructure. However, there is little information on subnational government's budgets, much less on the precise level and composition of their expenditure. In general, it is assumed that subnational expenditure is equal to their revenues, but some subnational governments have accumulated considerable debt vis-à-vis banks.

and 94 percent for local government revenue. Most of this revenue was oil related. Federation revenue released to subnational governments rose from 7.4 percent of GDP in 1999 to about 15.3 percent of GDP in 2001.

The two key challenges posed by the Nigerian model of fiscal federalism are the conflicting claims over oil resources and the lack of fiscal discipline of subnational governments (IMF, 2001). As sharing arrangements for oil revenue combine the derivation and the distribution principles, they remain highly contentious. Given large disparities in natural resource endowments, oil is concentrated in only a few of the 36 states, which have onshore or offshore oil production. Several oil-producing states call for a total regional control over oil revenues. Other oil states claim that the 13 percent share accruing to oil-producing states should also be applied to oil revenue from offshore production (which represents about 40 percent of oil revenue). Clearly, the sharing agreement has led to severe political problems with the oil-producing states demanding an increasing share of oil revenues, and non-oil producers demanding greater redistribution of oil resources.

There is no legal mechanism to impose fiscal discipline on the lower tiers of government. The high oil prices in 2000–2001 have led to a large increase in the distribution of financial resources to subnational governments, particularly to oil-producing states, without the corresponding assignment of new expenditure responsibilities. As these transfers were immediately spent, the rapid increase in aggregate demand contributed to a rise in inflation and a sharp depreciation of the currency in the parallel market.

The revenue-sharing arrangement leaves virtually no room for maneuver on the fiscal side. It places the burden of macroeconomic adjustment on the federal government with control over less than half of the federation revenue.

Ideally, financial resources to state and local governments should be insulated from oil price fluctuations, and commensurate with the tasks that they are assigned to perform and their capacity to effectively spend such resources. This would imply a shift from a transfer system, which relies on the sharing of volatile natural resource revenues, to one that provides for stable financing of the provision of at least a minimum set of essential subnational public services.

Russia

Oil and gas revenues are considerable in Russia. At the federal level, oil revenues might make up to about 25 percent of total revenue, and 45–50 percent including gas revenues. This includes oil and gas-related revenue from profit taxes, VAT, excises, export duties, and resource mineral taxes. Most taxes are collected by the federal government and shared, to a certain extent, with subnational governments according to either negotiated or fixed rates systems.[22] However, natural resources taxes are mainly collected by subnational governments

[22] For the specific revenue-sharing arrangements, see Martinez-Vazquez and Boex, 2001.

and are important sources of own revenue in the oil-producing regions. These taxes include petroleum production royalties, charges for use of mineral deposits, and exploration fees.

Because natural resources, including oil, are highly concentrated in a few regions, the decentralization of taxes on these resources create large disparities in the revenue between resource-rich regions and others. In 1997, the five richest regions, accounting for only 5½ percent of the population, collected 53 percent of all subnational government revenues from taxes, fees, and charges on natural resources (Martinez-Vazquez and Boex, 2001).

There have been strong pressures for local control over natural resources. Resource-rich regions with high per capita revenues have demonstrated a strong desire for greater autonomy, and particularly for control over revenue from their own resources. While economic arguments would favor centralizing oil rents to minimize the large horizontal fiscal disparities, this may be resisted by producing regions (McLure, 1994a and 1994b). As in other oil-producing countries (e.g., Nigeria), revenue sharing may not be a fully satisfactory solution, as it would not protect regions from price fluctuations, and they would always do better by keeping a larger share. An alternative may be to assign part of the revenue base (e.g., production excises) and implement an appropriate and reliable fiscal transfer system.

Venezuela

Oil revenue accounts for a large share of central government revenue in Venezuela, on average 47 percent of total revenue during the period 1997–2000 (about 9 percent of GDP). Oil revenues include royalties, income taxes, and dividends, which all accrue to the central government.

Subnational governments play a relatively important fiscal role in Venezuela, with expenditure representing about one-third of central government expenditure. Most of subnational governments' revenues come from revenue-sharing arrangements and transfers, making them dependant on the central government. It is estimated that about half of subnational government revenues are oil-related. In addition to receiving 20–25 percent of total central government revenues through various schemes (including 15–20 percent of VAT revenues), subnational governments are entitled to 20–30 percent of oil royalties.

Revenue-sharing arrangements are a continuous source of political and fiscal contention. The central government believes that resources assigned to subnational governments are excessive, and that there is little control over the ways these funds are spent. State and local governments, on the other hand, would like to see their share of revenue increased. The issue of sharing of oil revenue is to be discussed once again in the context of the draft law on public finance of state and local governments.

United Arab Emirates

The United Arab Emirates is a federation formed in 1971 and comprises of seven emirates.[23] Each emirate retains a considerable degree of economic and political autonomy, and has full ownership and control over its oil resources. Oil and gas revenue accounted for about half of total revenue of the consolidated government on average during 1997–2000 (18 percent of GDP).

Oil and gas revenue accrue to emirate governments through royalties, company profit transfers, and income tax receipts. For the largest emirate, Abu Dhabi, 58 percent of revenue came from crude oil royalties and taxes on average between 1997–2000 (about 15 percent of GDP).

The federal government is mostly financed by an upward revenue-sharing arrangement, whereby the oil-producing emirates—mostly Abu Dhabi and, to a lesser extent, Dubai and Sharjah—make cash or in-kind contributions. These contributions and services provided, which represent 60 percent to 106 percent of Abu Dhabi's oil revenue, account for about two-thirds of federal government revenue. As cash contributions are negotiated each year between the federal government and each emirate, there is considerable smoothing between high- and low-price years, providing the federal government with a relatively stable source of revenue despite price fluctuations.

B. Overlapping Revenue Bases: North America

Assigning specific tax bases—possibly with some overlapping between levels of government—represents an attractive alternative to revenue sharing. Canada and the United States are examples of this model, although Canada is close to full decentralization.

United States

The United States assigns resource revenue bases to the states, which are sovereign under the constitution and own the resources (except on federally owned land), but with a sharing of the income tax base—following from its specific political and historical setting (McLure, 1994b). Alaska—where oil revenue represents about four-fifth of own revenue—presents an interesting example of the methods used.

On oil, the state of Alaska levies a property tax (at 20 mills or two percent on appraised value), a severance tax ranging from 12¼ percent to 15 percent on oil, subject to a minimum tax per barrel, royalties, a production tax surcharge for hazardous spill, and a corporate income tax. The corporate income tax is based on corporation worldwide net income apportioned to Alaska under a three factor formula involving (i) the percentage of corporate

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[23] The seven emirates are Abu Dhabi, Ajman, Dubai, Fujairah, Ras Al-Khaimah, Sharjah, and Umm Al-Qaiwan.

sales and tariffs from Alaskan operations; (ii) the percentage of production from Alaska; and (iii) the percentage of property represented by Alaska holdings—at a maximum marginal rate of 9.4 percent. All state taxes and royalties are deductible for federal income tax purposes.

The main advantage of this type of system is that the subnational government is fully accountable for the fiscal policy choices related to oil revenues and their possible uses for spending or savings. Alaska has created a fund to save part of the oil revenue for future generations[24] (as has the province of Alberta in Canada).

Canada

In Canada, taxes on natural resources, mostly oil, are also assigned to the provinces, and Canadian provinces levy a range of taxes (including minimum taxes) and royalties on natural resources.[25] However, oil revenues are strongly concentrated in a few provinces, mainly Alberta where these revenues account for about one-quarter of revenue, and Saskatchewan where they represent about one-tenth (Krelove, Stotsky, and Vehorn, 1997). On aggregate, however, oil revenues account for only 3½ percent of the total revenue of subnational governments. While decentralization of oil revenue contributes to the disparities in fiscal capacity among provinces, the federal equalization system takes these into consideration by not providing any equalizing grants to the relatively rich provinces, including oil-producing Alberta.

However, decentralization and the imposition of oil and gas royalties have led to a heavy taxation of these industries (possibly deterring investment) relative to other industries. In addition, the oil-producing provinces have reduced sales and income taxes relative to other non-oil-producing provinces. Canadian scholars would prefer to reallocate natural resource taxes from provinces to the center, but recognize that this is unlikely to happen given the political constraints and the constitutional rights of the provinces.[26]

Canada and the United States have found means to compensate for the drawbacks of assigning oil revenues to subnational governments. First, oil-producing states in these two countries have created oil funds that in effect contribute to shielding their budgets from fluctuations in oil revenue and prevent excessive public spending. Second, the federal

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[24] The Alaska Permanent Fund was created in 1976 to save part of the large oil revenue derived from the exploitation of the state's oil resources. The fund receives about one-fifth of oil revenue, as well as other discretionary state transfers. It saves part of its revenues and distributes the other part to its residents in the form of an annual dividend. At end-2001, the fund totaled close to US$25 billion in net assets (about 95 percent of state GDP), see Alaska Permanent Fund Corporation (2001).

[25] For a discussion of the role of natural resource rents on the design of the transfer system in Canada, see Boadway and Hobson (1993).

[26] See Ip and Mintz (1992).

equalization system in Canada compensates for the large revenue generated by oil-producing provinces by excluding these provinces from the equalization framework. Third, the piggy-backing arrangements for personal and corporate income taxes, whereby provinces can set their own tax rates on the federal tax base, contribute to mitigating the volatility of oil revenue by providing a somewhat more stable revenue source.

V. Policy Options

Based on the country experiences, this section assesses the various policy options to assign oil revenue to the different levels of government, given the objective of financing a stable level of public services provided by subnational governments.

In an unconstrained world, it would be best to fully centralize oil revenue. This should be accompanied by (1) appropriate revenue assignments that give the subnational administrations control over some major tax rates at the margin (needed for accountability); and (2) well designed transfers with appropriate transparency and based on equalization principles—these sources of finance providing for a stable level of public services to be provided by the subnational governments and the financing, if necessary, of large infrastructure projects. This would address the issues of oil revenue volatility and uncertainty, disparities in oil revenue among subnational governments, and fiscal discipline and accountability.

However, given the political realities in most countries, some degree of subnational control over natural resource bases or revenues is likely to be needed—this could take the form of **revenue-sharing or assignment of revenue bases**.

Because revenue-sharing arrangements take away large amounts of revenue from the central government, they complicate macroeconomic management. Decentralizing a large revenue source—such as oil taxation—reduces the capacity of the central government to run counter-cyclical fiscal policies, or implement effective fiscal adjustment. The central government may be left with little revenue to exert a significant macroeconomic impact, and subnational governments may not be willing to follow a determined policy, especially in the case of fiscal adjustment.[27] Further, by fully transmitting the volatility of oil revenue to subnational governments, revenue sharing does not provide stable financing of local public services. Finally, revenue sharing may not always diffuse separatist tendencies, as it may be difficult to agree on the proportion of revenues to be shared—the oil-producing subnational government can always do better by keeping 100 percent.

[27] Although not related to oil revenue, in Argentina there were several "pacts" between the federal government and the provinces during the 1990s, aiming at sharing the burden of fiscal adjustment. However, these arrangements proved difficult to set up (not all provinces participated) and to enforce (mechanisms to that effect were weak). See Schwartz and Liuksila (1997), and Jimenez and Devoto (forthcoming).

For these reasons, **sharing tax bases, with stable elements assigned to subnational governments** (such as specific production excises), may be preferable than revenue sharing. It may also be more desirable, for example, on environmental grounds, since revenue would be correlated with environmental damage. These revenue assignments encourage stronger accountability for the subnational governments concerned, which can determine oil tax rates and the use of oil revenue, and can potentially provide adequate financing. They would need, however, to be assessed against expenditure assignments, and transfer systems designed accordingly. Moreover, subnational governments remain exposed to oil-price volatility, and the oil revenue base may be at times insufficient.

Hence, several conditions need to be met to assign oil revenues to subnational governments:

- Oil should not be assigned solely to subnational governments, that is, there is some degree of overlapping in the oil tax base;
- The amounts of revenue involved should be kept relatively small, if possible;
- If the assignment leads to large or fluctuating revenues, appropriate safeguards and transparency would be needed (such as in Alaska). This is not likely to be possible at the subnational level in most developing countries;
- Subnational government should be assigned other sources of stable revenues, e.g., production excises and piggy-backed income taxes supplemented by stable transfers from the center.

If these conditions are met, assigning oil tax bases to subnational governments may provide—for the reasons discussed above—an attractive alternative to oil revenue-sharing.

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