International Experience with Benefit-Sharing Instruments for Extractive Resources

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Introduction

This study reviews international experience with managing resource revenues in both developed and developing countries. The intent is to assess the scope for using benefit-sharing instruments to spread the benefits of mineral extraction across the economy and catalyze broader-based growth. Of particular interest are policy mechanisms that could be implemented in poor regions with untapped mineral resources, so as to generate more inclusive development.

The global experience with benefit sharing varies widely, as do the degrees of success in converting resource wealth into permanent wealth. This study draws on both the best practices and the problematic ones to illustrate the options, tradeoffs, and challenges. The study begins with a review of the literature on resource revenue management, including recent guidelines for transparency. Then we present case studies from developed countries: Alaska and the Permanent Fund, Alberta and the Heritage Fund, Norway and the Petroleum Fund, and Australia and the Aboriginals Benefit Reserve, as well as special liability funds in the United States. Subsequently, we review diverse strategies in developing countries, including Botswana, Chad, and Papua New Guinea, as well as some schemes in Central and South America. We ask how, how much, and for whom the policy mechanisms are employed and the revenues obtained and allocated. We then summarize the options for collecting and distributing revenues, drawing lessons from the case studies. In the conclusion, we consider options for managing resource revenues in developing countries.

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Recent Studies of Resource Revenue Management

A growing body of literature and case studies addresses the management of government revenues from resource extraction. Hannesson (2001) focuses on the question of making resource wealth permanent, arguing that the best strategy is to invest resource revenues in the highest-returning assets, such as international equities or, in developing countries, education and infrastructure.[1] Davis et al. (2001) look at the role—and abuse—of savings and stabilization funds in managing nonrenewable resource wealth. Other case studies have primarily been concerned with macroeconomic policy responses to avoid the "resource curse" of a booming mineral sector that squeezes out other sectors, induces profligate and volatile public spending and borrowing, and stifles long-run growth.[2] However, with the emphasis on exchange rate management and macrolevel fiscal policy, little attention is paid in these studies to the microlevel questions of how the benefits are allocated among stakeholders.[3]

Lessons from the Resource Curse Literature

Managing resource wealth in developing countries requires not only good governance, in the sense of transparent management and absence of corruption, but also good policy, such that resource exploitation benefits the economy and society as a whole. Since Sachs and Warner (1995) identified an empirical relationship between resource abundance and lagging economic growth, explaining the resource curse has been a major concern in the development literature. A common theme in the early literature is that resource sectors have weak linkages with the rest of the economy because imported inputs and capital-intensive production generate little employment; therefore, the real impact on the overall economy depends on how the wealth is used. More recently, attention has turned to the role of institutions.

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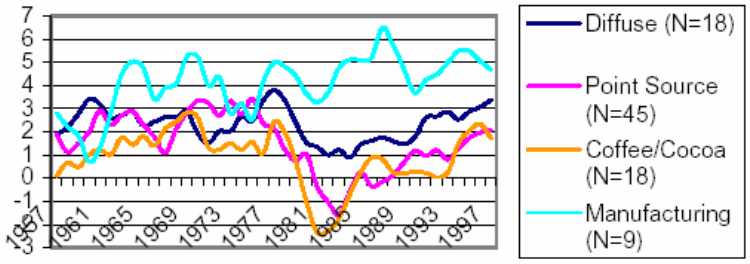
[1] His study compares the experiences of Alaska, Alberta, and Norway (also covered in this study), as well as Nauru, a small phosphate-rich island nation in the South Pacific.

[2] Examples of these studies include Cuddington (1988), Mansoorian (1991), Katz et al. (2004) for sub-Saharan Africa, Everhart and Duval-Hernandez (2001) for Latin America, and Sarraf and Jiwanji (2001) for Bostwana.

[3] ESMAP (2002) aspires to this kind of comparison for Latin America but falls short of providing relevant details and thorough analysis.

The following figure, from Isham et al. (forthcoming) reveals how economies dependent on exports of certain natural resources—namely "point-source" nonrenewable resources and coffee or cocoa plantations—have experienced lower growth rates, particularly relative to manufacturing-based economies.

Figure 1. Growth Rates and Export Structure
Smoothed Median Growth Rates for 90 Developing Economies, 1957–1997



Source: Isham et al. (forthcoming).

In a thorough summary of this literature up to the time, Sarraf and Jiwanji (2001) note several potential explanations of the resource curse. First, absorbing revenues from the resource boom into the economy through government spending attracts labor and capital to nontraded goods sectors. Second, the increase in foreign exchange, not properly sterilized, causes the real exchange rate to appreciate, further deteriorating the competitiveness of manufacturing and other tradable sectors. A deterioration in the manufacturing sector may then also lead to less investment in education and labor productivity. Unsustainable protectionist policies are another frequent byproduct. This collection of problems, known as Dutch Disease, is less relevant for resources that are exploited at the subnational level; nonetheless, the issues of regional economic capacity remain real.

A third problem is that primary goods have volatile prices and production volumes, leading to widely fluctuating exports and government revenues. Boom times can mask fiscal irresponsibility, allowing market discipline to relax. Boom-based borrowing to expand public infrastructure can lead to unsustainable expenditures and burdensome debt after the boom. Furthermore, once government expenditures are expanded, they may be difficult to contract.

Other reasons involve political economy and governance. Pressure to spread revenues around other industries can lead to unproductive investment booms, squandering of money on protecting failing industries, or overheating of the economy if its capacity to absorb the influx is limited. Finally, Sarraf and Jiwanji note that since resource wealth tends to be concentrated in the hands of a few companies and the public sector, rent-seeking behavior is often a problem.

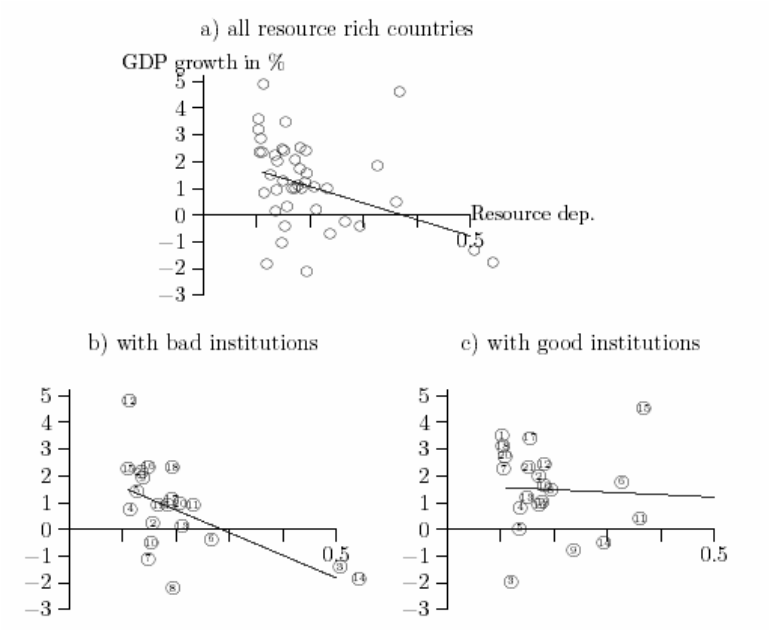
Since 2000, the resource curse literature has focused much more on those latter issues. Rodrik et al. (2002) also assert the "primacy of institutions" in explaining the large divergence in development experience. Public institutions are responsible for investing in infrastructure, regulating markets and their externalities, providing rule of law, managing conflict, stabilizing the macroeconomy, and providing social insurance. Without good institutions, not only is development impeded, but also exploiting natural resources can harm the environment and provide little in the way of public benefits. Acemoglu et al. (2004) reinforce this notion by documenting theoretical and empirical evidence for the primacy of institutions in economic growth. They also argue that growth-friendly institutions are more likely to emerge in part when relatively few rents are available to be captured by power-holders.

Mehlum et al. (forthcoming) reveal that the divergence in growth outcomes among resource-abundant countries can be explained by the quality of their institutions. In the following figure from their paper, they show the original relationship between growth and resource dependence, as found by Sachs and Warner (1995), and then they decompose this relationship for countries with good and bad institutions.

Worse, some recent theory evidence suggests that resource exploitation can have a deleterious effect on institutional quality. Lane and Tornell (1999) theorize that resource abundance increases the incentive to engage in nonproductive rent-seeking activities. Leite and Weidmann (1999) find a link between natural resource abundance and increased corruption. Collier and Hoeffler (2004) find a strong and nonlinear impact of natural resources on the risk of armed conflict. Isham et al. (forthcoming) also survey studies in political science on the influence of "point-source" resources—those that generate concentrated resource rents, like most nonrenewable resources and plantation farming—on political institutions. The most compelling arguments involve the "rentier effects" of revenues derived from concentrated

sources that can be easily controlled.[4] With resource revenues, society has less need for taxes and thereby less incentive to develop mechanisms of responsiveness and accountability between government and civil society. Furthermore, windfall revenues mean the government can afford to mollify dissent, either by favors or by force.

Figure 2. Resource Dependence and Growth



Source: Mehlum et al. (forthcoming).

Isham et al. (forthcoming) find econometric evidence not only for the positive influence of institutional quality on growth, but also for the negative influence of export concentration in point-source resources on institutions. Sala-i-Martin and Subramanian (2003), using similar methods, also find that their index of institutional quality is negatively associated with nonrenewable resources, and once this is accounted for, they cannot find a direct impact of

[4] Other theories include "entrenched inequality" and "delayed modernization." The inequality that results from plantation production or concentrated resource wealth creates a social structure that is not conducive to a strong civil society. The concentrated power structures associated with resource wealth can also be resistant to modernization in other sectors, which shifts political and class power.

resources on growth. Thus, the mechanism for resources' deleterious effect on growth and development seems to be their corrosive impact on institutional quality.

On the other hand, Boschini et al. (2004) note that some institutional differences precede resource discoveries. They find a low correlation between natural resources and institutional quality. However, like Mehlum et al. (forthcoming), they find a strong impact of their interaction on growth. In other words, resources are a blessing if the institutions are good and a curse if they are not.

In view of the many pitfalls they identified, Sarraf and Jiwanji (2001) draw out certain principles for revenue management from the literature:

- Pursue high rates of return from resource assets. Toward that end, invest in human capital and critical public infrastructure, do not invest beyond the absorbtive capacity of the economy, and do not protect unsustainable businesses.
- Diversify the economy.
- Accumulate surpluses, avoid large-scale debt, and control exchange-rate appreciation (when applicable).
- Create a stabilization fund to cope with commodity-price volatility.
- Promote transparency and good fiscal practices.

These recommendations are echoed in the 2003 World Development Report, which adds two caveats:

- Ensure some distribution of wealth to affected communities.
- Avoid corruption and prevent misuse of funds.

Implementing those recommendations in the presence of weak institutions may be difficult, however. Davis et al. (2001) note that governments with poor self-control can easily raid stabilization or savings funds or render them ineffectual by borrowing against them. Boschini et al. (2004) emphasize the need for countries with point-source resources to strengthen their institutions. Sala-i-Martin and Subramanian (2003) worry that resource rents will only weaken governance, so much so that they argue for keeping the rents out of government hands entirely. Harford and Klein (2005) summarize some of the additional

recommendations of this literature on institutions and the resource curse, which can be applied to donor aid as well:

- If the problem is that revenues expand budgets and discourage the development of accountable institutions, direct revenues away from government and toward beneficiaries, service providers, and even the private sector.
- If the problem is that rents fuel patronage and corruption, impose greater controls on the allocation of the revenues to eliminate discretion.

We will see examples of all of these tactics in our case studies, in developed as well as developing countries.

The Role of Transparency

Another area of study attempts to address some specific institutional issues directly. Efforts to improve fiscal transparency in developing countries have recently been extended to the management of resource revenues. Two sets of guidelines have emerged: The IMF *Guide on Resource Revenue Transparency* assesses how fiscal policy can be structured to enhance transparency, and the Extractive Industries Transparency Initiative promotes specific reporting requirements. We review these guidelines for "good practices" in the Appendix.

The main recommendations are for standardization of contracts and reporting, as well as central budgeting, to improve transparency and accountability. Of course, although transparency is an important means for improving fiscal governance, it is not an end in itself. Several legitimate policy measures, by adding complexity, can pose challenges for developing streamlined processes for transparency. For example, certain earmarked payments can be justified on economic efficiency grounds as user fees. Payments for subsequent environmental reclamation and remediation fall into this category. These fees can help internalize the full environmental costs of resource extraction.

In other cases, as discussed in the literature on institutions, the central government may not be consistently able to use resource revenues wisely over time or collect and share them effectively with appropriate stakeholders. In the absence of government capacity in the targeted regions, companies in those regions may be better able to address local needs by engaging in their own public service activities, in support of corporate outreach and public relations. In the

absence of good governance and transparency in the central budget process, earmarking can improve long-term management by removing some discretion of current office holders. Thus, transparency is only one tool among many that are needed to improve resource and revenue governance, particularly where institutions are weak.

This study surveys the broad range of international practices and policies for managing resource assets, aside from transparency. For details of legal implementation and transparency requirements, the specific recommendations of these previous studies can still be endorsed. But the focus here will be on identifying general policy options that are likely to be applicable and realistic for developing countries and their subnational jurisdictions, since the domain over mineral extraction does not always lie in the hands of a central government.

Experience in Developed Countries

In surveying the experience in developed countries, we first compare the use of oil and mineral revenues in the state of Alaska in the United States, the province of Alberta, Canada, and the country of Norway. A common characteristic of these regions is that they are sparsely populated and their economies are highly dependent on the natural resource sectors and thereby subject to greater volatility than more diversified regions. All three regions also have high-quality institutions. Each government primarily uses resource revenues to support public expenditures and has established a trust fund to save and share the benefits from its nonrenewable resources: the Alaska Permanent Fund, the Alberta Heritage Fund, and the Norwegian Petroleum Fund.

In both North American cases, the government owns most of the resource rights and uses the revenues for general funding. Following the high oil prices of the early 1970s and the OPEC crisis, both established trust funds in 1976 to use current windfalls to prepare for future downturns. Similarly, in Norway the Crown owns the resource rights; major production began later and the trust fund was established in the 1990s, as the value of Norway's oil and gas assets became apparent. Although all three funds were established with similar goals, they evolved quite differently in terms of management, structure, governance, and objectives.[5]

Managing mineral revenues in Australia has a somewhat different history because mining was conducted on traditional Aboriginal lands. With the codified return of land rights to the Aboriginals came rights to enjoy the benefits of mineral extraction and the creation of the Aboriginals Benefits Reserve. This fund serves as a clearinghouse for payments to stakeholders, rather than a savings fund.

[5] For a comparison of the Alaska and Alberta cases, see Warrack and Keddie (2002).

Another class of funds seen in developed countries is liability funds, which are savings mechanisms with an insurance component. These funds are targeted toward remedies for those who are adversely affected by the physical presence of the resource exploitation activities.

Alaska and the Permanent Fund

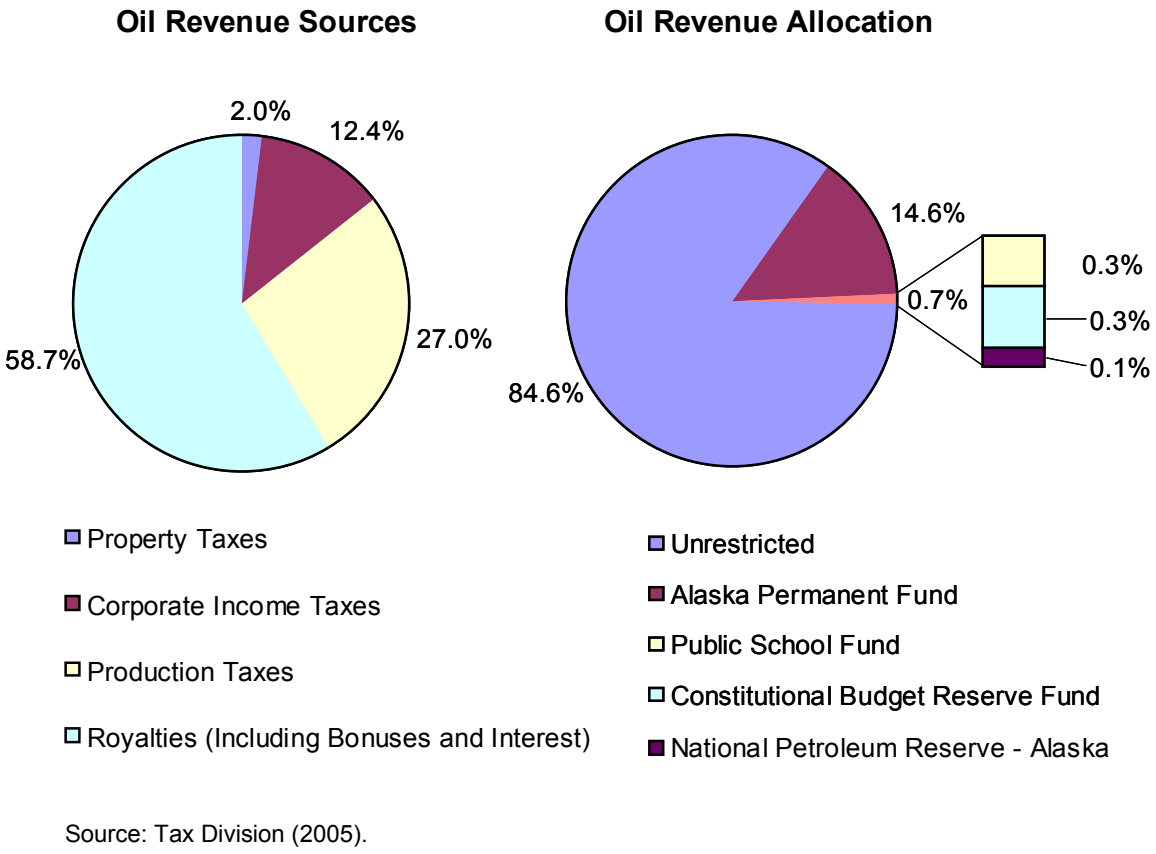
On the northern slope of Alaska lies Prudhoe Bay, North America's largest oil field. In the late 1960s, as Prudhoe Bay was developing into a major oil field with long-term exploitation possibilities—and a steady stream of oil and gas royalties for the Alaska government—the idea for the Alaska Permanent Fund (APF) took hold. Supporters argued for the APF on two main grounds:

- First, the fund could create an investment base from which future income could be generated, ensuring a revenue stream for the state once oil revenues diminished.
- Second, the fund could take a significant portion of the revenues out of the hands of the legislature, curtailing opportunities for excessive spending.

Since the constitution of Alaska had prohibited automatic earmarking of state funds, an amendment was required to establish the APF. The implementing ballot passed almost two-to-one in a referendum in 1976.

Still, only about 15 percent of overall Alaskan oil revenues is diverted to the APF. The bulk of oil and mineral revenues is used to fund the state government: 75 percent of royalties and 100 percent of oil-related tax revenues accrue to the state budget as undedicated funds. The Public School Fund receives 0.5 percent of royalty revenues as a dedicated source of funding. It is also significant to note that the resource revenues not dedicated to the APF were used to create government agencies with clear mandates for economic development and diversification. Thus, Alaska uses the APF strictly for savings and income, while some current revenues are used for economic development goals.

Figure 3. Distribution of Oil Revenues and Allocations in Alaska, FY 2004



Source: Tax Division (2005).

Fund Income and Management

The APF comprises two parts: principal, and earnings reserve. The principal is the main body or the "dedicated" part of the fund. Once allocated to the principal, monies cannot be removed except by voter approval in a statewide plebiscite. The earnings reserve is an accumulation of net income that has not been allocated to the principal or appropriated by the legislature. Essentially, it represents retained earnings dividends. Decisions about the use of the earnings reserve are made annually by the state legislature and the governor.

The principal has three sources of income: 1) dedicated oil revenues; 2) legislative appropriation; and 3) income transferred from the earnings reserve for inflation proofing. Under the terms of the state constitution, 25 percent of all mineral royalties, lease rental income, and related bonuses is automatically deposited in the APF. The legislature may also choose to transfer additional undedicated oil revenues into the APF. To provide inflation proofing, each

year an amount equal to the percentage change in the U.S. consumer price index multiplied by the year-end principal balance is transferred into the principal. If any income remains, it is left in the earnings reserve as undistributed income, which can be appropriated by the legislature or used in the event of a shortfall in income to pay dividends and inflation proofing.

Since 1980, the assets of the APF have been invested and managed by the Alaska Permanent Fund Corporation (APFC), a state-owned company.[6] APFC is overseen by a board of six trustees, appointed by the governor. Alaska law provides that the board consist of four public members who serve staggered four-year terms, as well as the commissioner of Revenue and one additional cabinet member. The board reviews and approves the asset allocation, which targets a 5 percent real (above inflation) rate of return at slightly below-average risk, using a statutory list of approved investments and the "prudent expert rule," which charges fiduciaries to seek reasonable income, preserve capital, and avoid speculative investments. Currently, the asset allocation is 55 percent stocks, 32 percent bonds, 10 percent real estate, 2 percent private equity, and 1 percent absolute return.

APFC does not manage expenditures from the fund. The dividend program is administered by the Department of Revenue's Permanent Fund Dividend Division.

Beneficiaries

Alaska residents benefit directly from the fund, since the primary use of the income is to pay dividends to every citizen in the state. Total dividends equal half of the fund's average net income for the previous five years; that amount is then divided among all Alaska residents.[7] The dividend in 2004 was $920.[8] As a share of total oil revenues, however, less than one-eighth is dedicated toward benefit sharing in the stricter sense.

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[6] The official website for APFC is http://www.apfc.org/.

[7] Technically, the calculation is as follows: 1) Add the fund's net income for the past five years; 2) multiply that number by 21 percent; and 3) divide the result in half.

[8] http://www.apfc.org/alaska/dividendprgrm.cfm.

Since much of the APF is dedicated to citizen dividends, government revenues remain subject to oil price volatility and production variability. The Constitutional Budget Reserve Fund is intended to provide some insulation from price shocks, but its contributions are small. Hence, the stabilizing effect of the APF is weak for the provision of public goods, but the averaging provisions for the dividends can help smooth incomes of citizens somewhat.

Within the Alaska Permanent Fund also resides the Amerada Hess Account, which arose from a legal settlement with oil companies for lost royalties due to undervaluing of oil and gas production. In November 2005, Governor Murkowski proposed using the earnings from this account to fund a new "community dividend program," with the beneficiaries being local governments. The proposal would distribute the earnings to boroughs on a per capita basis, which could use the funds for basic responsibilities such as public safety, road maintenance, fuel, and education.

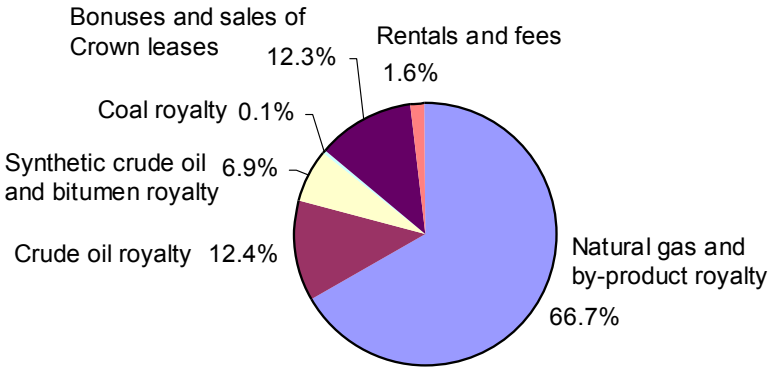
Until the late 1990s, the remaining oil and mineral revenues, the fund's earnings, and fuel taxes have been sufficient to pay for government services such that no income or sales tax was needed. At that point, expanding expenditures and declining revenues began generating significant budget deficits. Still, voters overwhelmingly rejected a proposal to use Alaska Permanent Fund earnings to balance the state budget in 1999.

Alberta and the Heritage Fund

In Alberta, Canada, nearly 80 percent of oil and gas production occurs on land owned by the provincial government—"Crown land"— as does all of commercial forestry (Warrack and Keddie 2002). As the owner of the resource, the provincial government collects revenues in the form of royalties and stumpage fees. Alberta, like Alaska, uses the majority of these revenues to fund enhanced public goods and services while maintaining low taxes for residents.

In Alberta, nonrenewable resource rents are primarily captured through royalties, which account for 86 percent of nonrenewable resource revenues, net of some tax credits. Lease sales and bonuses are 12 percent of revenues, with the remaining 2 percent from rentals and fees.

Figure 3. Sources of Nonrenewable Resource Revenues in Alberta, 2004–2005



Source: Province of Alberta Budget (2005).

These revenues flow to the provincial budget. The parliament then decides how to allocate money among projects and funds.

The province has several trust funds, the flagship of which is the Alberta Heritage Savings Trust Fund (Heritage Fund). This investment fund also provides income to the General Revenue Fund of the province, to which earnings are transferred. Investment income is used for Albertans' priorities, including capital projects, health care, education, roads, and tax reductions.

In addition to the Heritage Fund, the province has several educational funds: an advanced education endowment, a scholarship fund, and a science and engineering research fund. A capital account is a fund for capital spending over three years. Finally, a "sustainability fund" was created to insulate core programs from resource revenue volatility. It represents a funding layer between resource revenues and the Heritage Fund and other uses. All resource revenue over $3.5 billion goes into the fund, and once the fund exceeds $2.5 billion, excess money can be transferred into the capital account of the Heritage Fund, be put toward debt repayment, or remain in the fund. Withdrawals from the sustainability fund are permitted when resource revenues drops below $3.5 billion. Other justifications for withdrawals include situations when resource revenues are high but other revenues are low, if natural disasters require emergency funding, and when natural gas rebates come into effect.

Investment Strategy

Established in 1976, the Heritage Fund's enabling legislation set three objectives: "to save for the future, to strengthen or diversify the economy, and to improve the quality of life of Albertans." [9] An interesting feature of the fund is that it attempts to achieve these goals not only through the earnings of the fund but also through its asset investment strategies.

The Heritage Fund has five divisions charged with making different kinds of investments:

- The goals of the Alberta Investment Division are to strengthen and diversify Alberta's economy. Investments made by this division were expected to make a reasonable return, but not necessarily market returns. The largest component of the Heritage Fund until 1997, it primarily invested in or made loans to provincial government corporations. As such, the returns have been generally low.
- The Canada Investments Division lent funds to other provincial government entities from 1977 to 1982. The interest rates were offered at preferential terms; still, even low-risk rates were high during this time of high inflation.
- The mission of the Capital Projects Division is to provide long-term social or economic benefits to Albertans, rather than financial returns. Typical investments are physical or social infrastructure projects, particularly medical research facilities.
- The Commercial Investment Division was added in 1980 to invest in Canadian stocks and money market securities. Although this portion of the fund is expected to yield a commercial return on its investments, it represented only a small portion of the fund until 1997, when the Heritage Fund was restructured to focus on optimizing returns.
- The Energy Investment Division was also established in 1980, with the mission of investing to help develop Canada's energy sector. However, this division is inconsequential compared with the others.

When it was established, the Heritage Fund received funds from two sources. First, a special contribution of $1.5 billion of cash and other financial assets was transferred from Alberta's General Revenue Fund to the Heritage Fund. Second, a share of the resource revenues

[9] Official documentation for the fund is available at http://www.finance.gov.ab.ca/business/ahstf/.

received by the government of Alberta accrued to the Heritage Fund. From 1976 to 1983, 30 percent of nonrenewable resource revenues was diverted to the fund; from 1984 to 1987, this share was lowered to 15 percent as oil and gas prices began to decline. Fund yields were reinvested until 1982. Since 1987, all resource revenues and yields have been allocated to the Alberta budgets.

The Heritage Fund is managed by the provincial government through the Alberta Treasury. The provincial parliament oversees the fund, with a standing committee that reviews its management. Some have argued that it has suffered from the lack of arms-length oversight and from a politicized review process (Hannesson 2001).

Beneficiaries

Both oil revenues in general and the Heritage Fund in particular are used to benefit current and future residents of Alberta, via provincial government programs. As a savings mechanism, the Heritage Fund diverts some benefits to future residents, who will be able to enjoy more public goods and transfers at lower tax rates. Oil revenues overall have afforded Alberta residents larger public expenditures and lower taxes than other provinces in Canada, as they have in Alaska. In a recent development, because of high resource prices and budget surpluses, Alberta is offering a direct "resource rebate" (also being called a "prosperity dividend") of $400 per resident for 2005. Like the Alaska Permanent Fund dividend, the tax-time rebate is a cash transfer; however, it is made at the discretion of the provincial government on an annual basis. Alberta also offers a natural gas rebate, which is triggered when prices exceed $5.50/GJ.[10]

An important point to note in contrast with Alaska has to do with institutional discretion. Whereas Alaska changed its constitution to mandate earmarking to the APF, Alberta allocations occur at the discretion of the provincial parliament. Once funds are allocated to a

[10] Details available at http://www.energy.gov.ab.ca/2853.asp (accessed November 11, 2005).

trust and a particular division, they may more difficult to divert. However, since transfers can be made from the Heritage Fund earnings to the general budget, there seems to be a fair amount of fungibility in the Alberta scheme.

To involve stakeholders in the process, the provincial government has conducted repeated surveys to gauge the preferences of Albertans for using the Heritage Fund. Savings were a priority early on, and the Heritage Fund earned strong returns lending money to other provinces with low credit ratings. At the time, market interest rates were high, and these loan rates were preferential, but because of their lengthy terms, the loans have proved profitable in the long run. In the 1980s, priorities turned more toward spending on capital projects. Since the late 1990s, saving for the future has again taken precedence—at least for the funds already in the Heritage Fund; no particular share of resource revenues is earmarked.

The Heritage Fund has likely had positive and negative effects in terms of oil revenue management for Albertans. In addition to lower taxes than other Canadians, residents have enjoyed generally lower utility prices. They have also benefited from jobs that were created by Heritage Fund support of otherwise uneconomic projects. On the other hand, returns have been lower than they could have been because of underpricing of Crown corporations' outputs (such as telephone services), natural gas price subsidization, funding of uneconomic projects, and lending at below-market interest rates. Thus, future residents will benefit less than if the funds had been invested in assets and infrastructure with higher returns.

Norway and the Petroleum Fund

The Norwegian experience is often held up as a "best practice" in resource revenue management (IMF 2005). It is a good example of well-governed, transparent central budgeting and saving for future needs with a high-yielding investment strategy.

Oil was discovered on the North Sea Continental Shelf in the late 1960s, and large-scale production began in the midst of the first oil crisis in the 1970s. The infusion of oil revenues has helped fund the expansion of the welfare state in Norway, both directly and indirectly. Directly, the revenues have sustained strong growth in public sector employment and social security, and indirectly, they have helped avoid public debt accumulation and the attendant large

interest payment obligations that burden most other nations belonging to the Organisation for Economic Co-operation and Development (van den Noord 2000).

Despite this revenue growth, other taxes remain high in Norway, in contrast to Alaska and Alberta, which offer residents relatively low tax rates. The idea is that making dramatic adjustments to the national tax system in response to the oil and gas boom would require equally dramatic adjustments at its end, leaving the economy even more sensitive to the cycles of the resource sector. Instead, to ensure a sustainable expansion, surpluses are being invested in other assets.

Managing Oil Revenues

The Norwegian parliament, the Storting, founded the Petroleum Fund in 1990 and made the first transfer (of NOK 2 billion) in 1995. Oil revenues are accumulated through a system of royalties, taxes, and state-owned production, and they flow into the central government budget, managed by the Ministry of Finance. All fiscal decisions are made through the central budgeting process, and any budget surplus flows to the fund. The goal of the Petroleum Fund is to provide a reserve for continued expenditures over the long term, since the North Sea shelf is expected to reach depletion within the next decade or so. As a reserve for future general government budgets, the use of the funds is not specified by earmarking toward any particular programs.

Annual contributions to the Petroleum Fund are much larger than fund contributions in other countries. The central government essentially transfers all of the revenues from petroleum activities to the fund, after covering the nonoil budget deficit, which remains relatively modest. In all, over the 2004–2006 budgets, 28 percent of annual resource revenue was consumed; if one also includes reinvested earnings, 76 percent of the revenue generated from petroleum activities was saved in the fund.

Table 1. Fiscal Budgeting with Petroleum Revenues in Norway, 2004–2006

	2004	2005	2006
1. The fiscal budget	(billion NOK)		
Total revenues	746.4	863.1	920.5
Revenues from petroleum activities	222.1	306.7	348.4
Revenues excluding petroleum activities	524.3	556.3	572.1
Total expenditures	622.2	649.7	669.4
Expenditures on petroleum activities	18.7	23.7	20.4
Expenditures excluding petroleum activities	603.6	626	649
Surplus before transfers to the Petroleum Fund	124.2	213.4	251.1
– Revenues from petroleum activities	203.4	283	328
= Nonoil budget surplus	–79.2	–69.6	–77
+ Transfers from the Petroleum Fund	80.7	69.6	77
= Fiscal budget surplus	1.5	0	0
2. Government Petroleum Fund			
Revenues from petroleum activities	203.4	283	328
– Transfers to the fiscal budget	80.7	69.6	77
+ Dividends on the Petroleum Fund	33.3	42.1	54
= Surplus in the Petroleum Fund	155.9	255.5	305.1

Source: Norwegian Ministry of Finance.

The responsibility for managing the Petroleum Fund, which technically lies with the Ministry of Finance, has been delegated to Norges Bank, at least for everyday matters. The ministry has issued guidelines for the investment of the fund's capital. As a small, open economy, Norway has chosen to invest fund assets exclusively in foreign bonds and equity. This strategy reflects the main goals of income generation and risk diversification. Recently, guidelines for ethical investing have also been developed. Reporting is transparent and publicly available, and oversight is strong.

Capturing Oil Rents

A good deal of attention has also been paid to the methods by which Norway captures rents from its resources. The revenues from petroleum activities are derived from a combination of taxes and license fees for drilling, royalties, and the State Direct Financial Interest (SDFI).[11]

The production royalty for oil is normally taken out in oil. Sale of this oil is handled by Statoil, which makes monthly payments to the Norwegian Petroleum Directorate. The SDFI is an arrangement in which the state owns interests in certain oil and gas fields, pipelines and onshore facilities. These shares are decided on a field-by-field basis as part of the negotiation for awarding production licenses. As an equity partner, the state is responsible for paying its share of investments and costs as well as receiving its share of the income. Until the SDFI was established in 1985, Statoil was responsible for ownership holdings in production licenses. In 1985, Statoil's participation was split into one direct financial share for the state (SDFI) and one for Statoil. In 2001, Statoil was privatized, and the administration of the SDFI portfolio was transferred to the state-created trust company, Petoro.

The tax regime for activities on the continental shelf includes a special corporate income surtax of 50 percent on profits derived from oil production, minus a special allowance called "uplift." Companies also pay a royalty of 8 to 16 percent of gross sales on oil from fields cleared for development before 1986 and an acreage charge (levied as a lump sum per square kilometer licensed). By accruing on all production licenses after the expiry of an initial period, the area fee is intended to encourage return of acreage that companies do not wish to exploit. Since 1991, a tax has also been levied on carbon dioxide emissions.

Through these taxes, operating surpluses from the state-owned company Statoil and its own production facilities on the continental shelf (SDFI), the government is estimated to extract

[11] Details of the tax system are described in English at http://www.npd.no/English/Emner/Ressursforvaltning/Promotering/whynorway_tax_system.htm (accessed August 31, 2005) and in plain English in Larstad and Dretvik (2005, Chapter 7).

around 80 percent of the natural resource rent (van den Noord 2000). According to this OECD study, the effective tax burden on the continental shelf is not out of line with that observed in other gas and oil production areas in the world that apply similar tax systems.

On the other hand, other provisions maintain incentives to invest in less profitable fields: the special depreciation allowances (16 2 /3 percent per year), the "uplift" (an extra deduction that tops up the annual depreciation allowance by 5 percent of the investment for a period of six years), and the deductibility of interest payments against the standard corporate and the surtax. There is some debate, however, over the extent to which these investment incentives reduce the share of the resource rents extracted by the government.

Beneficiaries

The beneficiaries of Norway's resource revenue management are Norwegian society as a whole, through a sustainable expansion of government budgets. In recent years, petroleum-related revenues have covered one-quarter of the budget, allowing current residents to benefit from greater public services relative to their tax burden. Good management of these public investments has also helped foster strong economic growth. The Petroleum Fund is structured to benefit future citizens; three-quarters of current revenues is saved and invested for high yields, all to provide for continued government revenues after resource rents diminish. None of the funds are earmarked for particular projects or benefit sharing.

The Norwegian case is a good example of how strong, well-governed institutions can manage natural resource assets for the greater good, without need for specific earmarking schemes. As such, though, the lessons may be more limited for countries lacking in governance.

Australia and the Aboriginals Benefit Reserve

Australia has a particular experience, since mineral extraction involves concerns over Aboriginal land rights. To focus on questions of sharing with local communities, we will restrict our review of resource revenue policies in Australia to those concerning Aboriginal lands.

In 1976, the Commonwealth Parliament enacted the Land Rights Act, granting land in the Northern Territory to its traditional Aboriginal owners. It also provides Aboriginal people

with effective control over activities on the land granted, establishing land councils to administer the act in each of four regions.

Part IV of the act establishes processes for the granting of exploration and mining rights on land granted under the Land Rights Act. Most notably, the act gives traditional Aboriginal owners the right to veto exploration (and consequently mining activities) on Aboriginal land, with the exception of national interest. In other words, mining companies must follow a multilayered process of approval: not only must they conform to requirements of the Department of Mines and negotiate contracts with the identified traditional landowners, but their application to conduct exploration and mining activities must also be approved by the local land council.

The Land Rights Act also establishes a financial regime whereby the land councils, Aboriginal people affected by mining, and the broader Aboriginal population in the territory receive a share of the mining royalties earned from activity on Aboriginal land.

The statute established the Aboriginals Benefit Reserve (ABR) to receive and disburse mining royalties for activities on Aboriginal lands. Contributions are received in the form of "mining royalty equivalents" (MREs), roughly equal to the sum of the royalties paid to the Commonwealth and territory governments by mining companies for their activity on Aboriginal land. The value of MREs changes from year to year as commodity prices vary and is outside the control of the ABR. This, in turn, directly affects the funds available for disbursement from year to year. Some income is also derived from earnings when surplus funds are invested. However, the main purpose of the ABR is to be a clearinghouse for payments to Aboriginal stakeholders, not a savings fund.

Questions about management of the ABR and whether the Land Rights Act struck an appropriate balance between the interests of Aboriginal land owners and efficient processes to allow exploration and mining spurred policy reviews in the late 1990s. In 1997, the minister for Aboriginal and Torres Strait Islander Affairs appointed John Reeves QC to conduct a review of the Land Rights Act, which was presented to the Australian Parliament in 1998 as the Reeves Report. The recommendations in that report were evaluated and rebutted in a subsequent

committee report (House of Representatives Standing Committee on Aboriginal and Torres Strait Islander Affairs 1999), which serves as background for this section.

Revenue Management and Distribution

As of 1999, the ABR was being administered by a section of the Northern Territory State Office of the Aboriginal and Torres Strait Islander Commission in Darwin, known as the ABR Secretariat. The ABR has three main categories of distribution for the MREs:

- *Land council administration costs:* 40 percent is paid to the land councils to cover their administrative costs. The minister determines what proportion of this amount is to be distributed to each land council.
- *Affected areas money:* 30 percent is forwarded to land councils for them to distribute to Aboriginal organizations in areas affected by mining operations. These payments are tied to the amount of mining royalties received from the areas concerned.
- *Grants program, residual costs:* The remaining 30 percent goes toward a grants program for the benefit of Aboriginal people living in the Northern Territory; the administrative costs of the ABR; and the administrative costs of the land councils when the minister agrees that is needed.

An advisory committee to the ABR gives the minister its recommendations for awarding grants under the grants program. The advisory committee consists of 15 members, with a chair appointed by the minister and the remaining 14 members elected from the membership of the land councils.

According to the ABR's financial management strategy, approved by the minister, the grants program has an annual cap of $5 million. This cap has allowed the residual to accumulate in a reserve, serving as a buffer against any sudden downturn in revenue.

This management structure has not been met with universal approval, however. The Reeves Report recommended creation of a Northern Territory Aboriginal council to administer the ABR; the land councils proposed that they manage the ABR and the funds be placed under direct Aboriginal control. Parliament responded with a weaker proposal to expand the role of the ABR advisory committee but retain management by the Aboriginal and Torres Strait Islander Commission rather than incur the costs of establishing a new administrative body.

The management strategy has also met with criticism. The Reeves Report proposed that the ABR pursue an investment strategy to become self-sufficient in income from a particular mining resource by the time that resource is estimated to be expended. Others in the Aboriginal community preferred not to forgo the benefits until the future.

Reform of the 40-30-30 percent rule has also been under consideration. One idea is that allocating a greater share to the areas affected would encourage them to be more open to mining on their land. Another idea was to remove the automatic earmarking of MREs to the land councils, instead requiring them to submit official budget justifications, like other government agencies. Questions of accountability versus sovereignty have loomed large over many of these deliberations.

Beneficiaries

The structure of the ABR provides land councils with a guaranteed, independent source of income. These funds are intended to help finance Aboriginal peoples' capacity for self-governance. However, the annual distributions can be highly variable because of the year-to-year fluctuations in the value of MREs.

The distribution of monies for affected areas has, for the most part, contributed to infrastructure and other development projects in the communities. However, it has also suffered from very weak accountability. In a few areas, payments to individuals, unjustified by specific disbursement goals, have generated tensions.

In addition to the ABR, private royalty payments and gate money are also negotiated in commercial arrangements with mining companies. These arrangements benefit the local royalty associations or private landowners and fall outside the public consideration of benefit allocation.

Overall, this case presents an interesting example of attempts to balance traditional local property rights with questions of governance. Although local Aboriginals are deemed to own the resource, the state manages the distribution, at least to a certain degree. Assuming the administering body has better institutional capacity than the recipients, this arrangement can

help improve accountability and facilitate resource utilization. However, if the objectives of the administrators do not align with those of local communities, conflicting interests are likely to overshadow governance issues.

Liability Funds in the United States

Another kind of fund, distinct from compensation and savings funds, is the liability fund. These funds collect excise taxes in a kind of insurance scheme to cover the environmental or worker health liabilities associated with extraction activities. To the extent these later costs may not be fully borne by the entities conducting current extraction, liability taxes can improve the efficiency of resource extraction and production by helping to internalize the full costs of those activities.

In certain instances, it may be difficult to make the polluter pay directly, necessitating these indirect schemes. For example, although strict environmental regulations may be in place requiring cleanup after mining activities, private mining companies might go bankrupt and not be in business to conduct the remediation. Alternatively, it may be difficult to ascertain which company is responsible for a particular harm.

There are several examples of liability funds in the United States alone:

- The Abandoned Mine Reclamation Fund, which dates from 1978, is intended to ensure that mine operations pay to remedy the problems that stem from mine closure, such as mine subsidence, acid drainage, erosion, and despoliation of scenery. It funds the reclamation of mines for which liable firms cannot be found. The fees are 35 cents per ton on surface coal, 15 cents per ton on coal mined underground, and 10 cents per ton of lignite (EIA 1999).[12]
- The Black Lung Disability Fund, established in 1977, compensates miners for disabilities due to long-term inhalation of coal dust. It applies to miners who stopped working in mines before 1970 or for whom no mine operation could be assigned liability.

[12] http://www.eia.doe.gov/oiaf/servicerpt/subsidy/excise.html.

- Federal petroleum trust funds target past and potential environmental damages and safety problems arising from the storage and transport of petroleum and other hydrocarbons. Funding is derived from per unit taxes and user fees on the related products or activities. They include the Leaking Underground Storage Tank Trust Fund, which finances remediation of sites where the responsible party cannot be found or cannot pay; the Oil Spill Liability Trust Fund, which finances the oil pollution prevention and cleanup efforts of various federal agencies[13]; and the Pipeline Safety Fund.

In addition to funds for unclaimed liabilities, in many instances producers are required to put up bonds that are forfeited in the event they shirk their cleanup responsibilities.

These policies represent good examples of tactics for preparing for the environmental consequences of extraction, while ensuring that the polluter pays. The incentives are not perfect, since the fees do not apply directly to actual pollution or risky behavior, but they are reflected as an appropriate cost of business in extraction. The funds also offer models for providing benefits for people adversely affected by mining activities.

[13] The Oil Spill Liability Trust Fund excise tax expired after December 31, 1994.

Experience in Developing Countries

In this section, we review the experience of a few developing countries in managing their resource revenues and development goals. Because of poverty and weaker institutional capacity, they face greater challenges in collecting, managing, and distributing resource revenues. Consequently, their strategies involve some different policies and instruments than those in developed countries.

Botswana

The case of Botswana is held out as an example of "best practice" in a developing country context (Leith et al. 1999; Sarraf and Jiwanji 2001). In essence, these studies find that Bostwana was able to avoid the resource curse by pursuing prudent fiscal policies.

Since the late 1960s, the diamond industry has dominated the mining sector, though copper and nickel represent important products as well. Over the past two decades, minerals have represented one-third to one-half of gross domestic product (GDP), 40 to 60 percent of government revenues, and more than three-quarters of export earnings. Price volatility in the diamond market, particularly in the 1980s, has led to large swings in these shares as well. Despite its dominant role in the economy, this industry has employed a relatively small share of the formal labor force (4 percent in 1989), as is typical in capital-intensive mining.[14] Botswana's diamonds are of the primary (kimberlitic) type, which require costly mining technology, as opposed to secondary (alluvial) diamonds, the type in the Democratic Republic of Congo and Sierra Leone, which require little capital to extract.[15]

[14] Sarraf and Jiwanji (2001).

[15] Boschini et al. (2004)

National Development Plan

The primary mechanism of Botswana's revenue management is not an explicit savings fund or allocation scheme, but rather a solid approach to budgeting: the National Development Plan (NDP). The rationale behind instituting this planning process was to stabilize government spending growth so that it would not add to volatility in the economy, and to prioritize spending. In part, the process was carried over from donor requirements in earlier years, when most of the budget was financed by donor agencies. The need for multiyear planning was further underscored by a period of sharply depressed diamond prices in the early 1980s.

The multiyear planning process of the NDP is conducted in consultation with all ministers and senior officials, and the plan is ultimately adopted by the parliament. The planning documents articulate the major policy issues facing the government and linked with the proposed capital and ongoing expenditures over the projected horizon of five or six years. The Ministry of Finance and Development Planning forecasts feasible expenditure paths and considers explicitly the sustainability of recurring expenditures. The consultative process then sets the spending priorities. After the budget is adopted, expanding spending is difficult. Supplementary expenditures must be formally approved.

Monetary policy is conducted in a joint evaluation process between the central bank and the finance ministry. The central bank manages the foreign exchange reserves and, in partnership with the World Bank in the late 1980s, developed an investment strategy. The bank engaged commercial fund managers, with performance benchmarks, and as expertise was built up within the central back, it began to manage more of the reserves internally.

The planning process serves not only to impose fiscal discipline but also to enunciate clear policy goals. The four main objectives are 1) rapid economic growth; 2) social justice; 3) economic independence; and 4) sustained development. In pursuing these goals, the government followed four main fiscal and monetary strategies:

- accumulate international reserves and earmark budget surpluses for stability spending in leaner years;
- manage foreign exchange reserves, liquidity in the economy, and the exchange rate to avoid real appreciation;

- expand essential public services and infrastructure, including electricity, water, roads, government buildings, police, courts, broad-based primary health care, and especially education; and
- provide credit to state-owned enterprises, which in turn made commercial loans.

On the whole, the strategies have proved effective. The infrastructure and human capital investments have been a necessary catalyst for private investment. Government spending has grown steadily, and cutbacks were avoided during the diamond price crash. On the margins, however, some have expressed concern about overinvestment in public infrastructure, charging that misallocation of capital to projects with relatively low returns has lowered overall productivity (Lange and Wright 2004).

State-owned enterprises have played both positive and negative roles in economic development. The establishment of public utilities brought essential services that were fundamental to progress. Many of the infrastructure investments were made with World Bank loans early on, which ensured that the public utilities' pricing regimes covered costs and did not entrench costly subsidies. However, utilities management has not always been sound.

Other state-owned enterprises, particularly the financial institutions, engaged in excess and uneconomic lending. On the one hand, the willingness of state-owned institutions to invest less conservatively and for longer terms than commercial banks provided the private sector with greater access to credit, particularly for risky ventures. This strategy may have helped manufacturing keep a steady share of 5 percent of GDP.[16] On the other hand, the state institutions were also less prepared to respond to payment arrears and loan defaults. In some cases, like that of the national development bank, the government had to intervene and restructure the failing financial institution. Although corruption has been identified as a significant problem only in the housing corporation, many state-owned enterprises became less effective over time as they became more beholden to their own constituencies (Leith et al. 1999).

[16] Acemoglu et al. (2001).

Capturing Rents

To generate government income from mining operations, Botswana has kept its royalty rate at an intentionally modest level, so as not to discourage production, and mandates that it receive (free of charge) equity shares in the mining operation. This enables the government to reap significant profits without relying on an income tax system. Rents are further enhanced by exercising market power in conjunction with the Central Selling Organization for diamonds. In addition, the accumulated foreign exchange reserves generate significant investment income.

Botswana has also incorporated environmental protection into its mining policy. As part of the concession agreements, mining companies were made responsible for implementing specified protective measures.

Beneficiaries

Mining revenues in Botswana have been leveraged for broad-based growth through expanded government services. Consequently, benefits have not been earmarked to specific recipients, but rather accrue to citizens more generally, as determined by the central budgeting process.

Good public institutions have been critical to Botswana's success. The question, then, is how Botswana was able to adopt and foster good practices—and maintain them—despite the temptation of large resource rents. Acemoglu et al. (2001) argue that the source of Botswana's success is its "institutions of private property." These kinds of institutions protect investors' rights, provide political stability, and maintain a participatory political system that constrains the political elites. The authors conjecture that the evolution of these institutions is due to several factors. First, Botswana's precolonial tribal institutions were relatively inclusive, encouraging broad-based participation. Second, colonialism in Botswana was light, as the British viewed the territory as having more strategic and geographic value than extractive value. Third, following independence, the political elite had economic interests in maintaining and strengthening institutions of private property. Investments were made in promoting cattle ranching, the traditional rural activities and main source of income for tribal leaders. Fourth, the value of the diamond rents did not become apparent until after the postindependence

institutions were established. With sufficient political security, embedded constraints, and broadly distributed rents, no group dared jeopardize the status quo by grabbing rents. Finally, the individual postindependence leaders are also credited with taking consistent decisions on the side of maintaining broad-based political coalitions and a merit-based bureaucracy.

One could also speculate that Botswana was endowed with a type of resource that was conducive to this system. The fact that Botswana's diamonds are kimberlitic, and therefore quite costly to extract, enabled it (and de Beers) to keep tight oversight of extraction and revenues, prevent entry, and gain monopoly rents. Meanwhile, in Sierra Leone, Angola, and the Democratic Republic of Congo, easily accessed alluvial diamonds contributed to civil conflict. This story runs somewhat counter to the hypothesis that point-source resources are more deleterious for institutions, but it does underscore the importance of the interaction between resource rents and institutional quality for growth.

Botswana's unique history thus limits the application of its experience to other situations. It is not clear how a country on a different historical path can implement such preconditions for good institutions on its own, especially after resource asset values are discovered. Furthermore, another state without the benefit of good institutions would be ill advised to follow Botswana's style of central budgeting of all resource revenues. Botswana thus illustrates the potential of best practices, but not necessarily the reality of appropriate practices for all situations.

Chad

Recent, evolving experience in Chad offers an example, in contrast to Botswana, of an attempt to impose external controls and institutions for managing resource rents to compensate for inadequate general government institutions. Chad ranks as one of the poorest and least developed countries in the world. The Chad-Cameroon Pipeline project thus offered promise for funding critical efforts to reduce poverty. The World Bank Group partially financed the project and, in collaboration with the Chad government, structured unprecedented safeguards. The resulting Petroleum Revenue Management Program (PRMP) was designed to ensure that Chad's oil revenues would be effectively managed and directed toward poverty alleviation and

development. In the first year the pipeline was online, oil revenues represented 40 percent of government revenues, a share that is expected to grow considerably.

The goal, from the World Bank Group's perspective, is to bring $40 million annually in petroleum-based financing for education, health, infrastructure, rural development, water resources, and the environment. Since the project is still new, with only two years of revenues thus far, there has been little chance yet to evaluate its performance. However, the structure of the PRMP, in its policy and management strategies, reflects some of the more recent thought on how to design a program for managing and distributing resource revenues in a developing country.

Revenue Policy

Petroleum-related revenues include royalties on the sale of oil and dividends from the government's equity investment in the project, and income taxes on the pipeline and oilfield activities. After financing costs for the related development loans, the funds are channeled through off-shore accounts, which are audited.

The PRMP provides for oversight of the collection and use of oil revenues. By law, the government must allocate the oil revenues according to specific shares.

Overall, income taxes are expected to represent about 15 percent of revenues, although income taxes on the oilfield operations do not begin accruing until around the seventh year of production, depending in part on oil prices. Income tax revenues are allocated to the central government to support increased development expenditures generally.

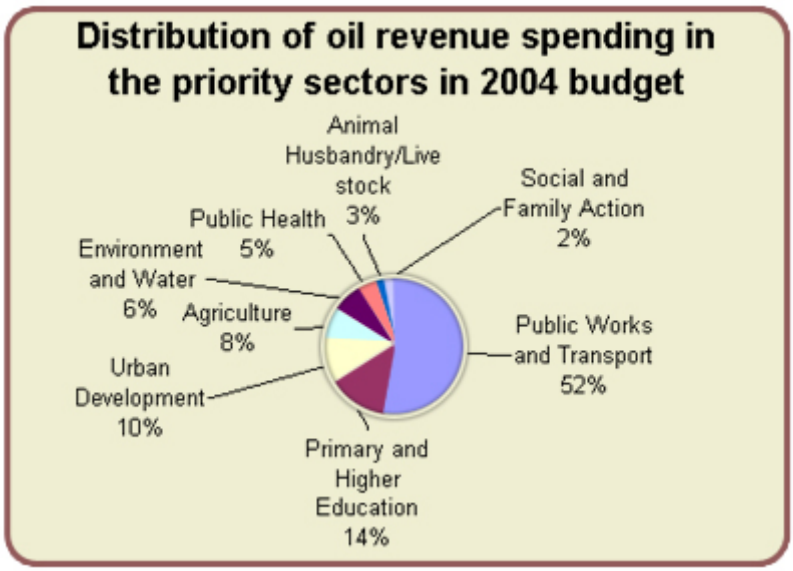
Royalties and dividends are allocated between two types of accounts. The Future Generations Fund receives 10 percent of the revenues to invest for the future. Special Petroleum Revenue Accounts, which are Treasury accounts held in one or two private commercial banks in Chad, receive the other 90 percent for poverty alleviation. Of this amount,

- 80 percent goes to priority sectors—incremental projects targeting poverty reduction and development, including health, education, rural development, infrastructure, and environmental projects;

- 5 percent is allocated to community-driven projects in the oil-producing region; and
- 15 percent is directed to the general budget for the first five years for pressing operational needs, after which it is intended to contribute to the priority sectors.

Provisions were also made for sterilizing revenues in excess of what the macroeconomy can absorb.

Figure 4. Priority Spending in Chad



Source: World Bank Group (2005).

Several noteworthy tactics are evident in these allocations. First and foremost, development priorities dominate, reflecting the dire poverty in Chad. An important question is whether Chad can effectively absorb and put to productive use such a large share of the oil revenues. Second, the share to government is significant but limited, seemingly in an attempt to balance general government needs with governance challenges. Third, only a small share is dedicated to communities affected by the petroleum activities because the resource is considered primarily a national asset rather than local property.[17] Finally, a relatively small proportion is dedicated toward saving for the future. This limited role for savings reflects not

[17] This contrasts with the experience of Papua New Guinea, discussed next.

only the expected lifespan of the project (28 years) but also a need for development now—and, implicitly, a confidence in the program's ability to deliver it now. This strategy has risks, not only in terms of ensuring future revenues and development—which may take longer than the project lifespan, if other countries' experiences are telling—but also because the ability to smooth revenue volatility is limited.

The Collège

The PRMP has an independent governing body in the Collège de Contrôle et de Surveillance des Revenues Pétrolières (Committee of Control and Oversight of Petroleum Revenues), whose mission is to monitor and oversee spending and ensure transparency. The Collège is composed of nine members:

- four civil society representatives from different aspects of civil society—local NGOs, unions, human rights and women's groups, and religious groups;
- two members of the parliament;
- the head of the central bank;
- the director of the Treasury; and
- a member of the Supreme Court.

The committee is supported by administrative staff and four technical staff specializing in accounting, economics, budgetary procedures, and public procurement.

The Collège is charged with three main tasks. First, it must see that Chad receives the obligated oil revenues. Revenues are deposited in an offshore escrow account that committee members can log onto and monitor through Citibank online; they verify that deposits correspond with the declared production and the terms of the sales contract.

Second, it must ensure that the government allocates the oil revenues according to law.

Third, the Collège approves the allocations to the priority sectors, reviewing each project and the overall government budget for the oil revenues. It works with the ministries, which submit proposals for priority projects, a process that is still being refined, and verifies that projects are satisfactorily executed.

Finally, during the transition, the Collège is itself monitored by the World Bank Group and the U.S. Treasury. Additional technical support and government capacity building are being provided by international donor agencies. A concern is finding a secure funding source for Collège operations so that it can remain independent.

Project-Affected Areas

Special attention was given to the concerns of local populations in the Doba producing region. A visible if largely symbolic 5 percent of the revenues was earmarked to help residents increase local capacity, enhance regional economic development, and encourage local participation in the development process.

In addition to necessary improvements like roads, producers were also financing such community-based efforts as outreach health activities and the drilling of water wells for use by local communities.

Finally, donors and NGOs are supporting activities to mitigate the demographic impacts of production. Strategies include an information campaign to limit the amount of inflow of migrants to the region and upgrading essential infrastructure and services at the greatest pressure points before the migration flow gathers momentum.

Papua New Guinea

Papua New Guinea has been struggling to turn resource wealth into development, but success has been elusive (Mathrani 2003). Copper mining began in the 1960s, and major deposits of copper, gold, and nickel were discovered in the subsequent decades. Mining represents nearly 20 percent of GDP but directly employs only 3 percent of all formal sector employees, although seven times that many are estimated to engage in small-scale, informal mining activities. The petroleum sector accounted for about 2 percent of employment and 12

percent of GDP in 2001, but production has been on the decline. At that time, it alone was supplying about 17 percent of government revenues.[18]

Despite decades of substantial contributions to the economy and government budgets, the resource revenues have made little difference in the lives of most Papua New Guineans, 80 percent of whom live in rural areas and engage primarily in subsistence agriculture. The revenues have mostly funded current consumption and nonproductive sectors, particularly the multiple layers of federal, provincial, and local government. Infrastructure investments have not been very successful, monies have been squandered by weak institutions, and other invested revenues have been targeted to domestic enterprises yielding low returns. Consequently, the resource wealth has yet to be converted to development or other assets with permanent earnings potential.

Still, Papua New Guinea offers important lessons and interesting ideas in benefit sharing. Extractive resource exploitation brought Western companies and production techniques into previously isolated rural areas. Not only did this introduction create culture clashes, but with 99 percent of the land area under customary (collective) tenure, the question of landownership rights—and thereby mineral access—arose. Through this convergence of cultural and land-use conflicts, and with strained government capacity to manage the revenues for development, a diverse set of strategies has emerged for sharing the benefits. In particular, we see more emphasis on local stakeholders.

This section reviews the mechanisms for managing and sharing resource benefits in Papua New Guinea. The mining sector has generally posed greater challenges than the petroleum sector, since mining activities span a larger footprint, with larger community and environmental impacts, and since oil and gas developments are more recent. Thus, in addition to a broad policy overview, we highlight the experience of one of the major mines, Ok Tedi, in illustrating strategies for benefit sharing.

[18] Mathrani (2003) provides much of the background for this section.

Mineral Resource Stabilization Fund

Like many countries, Papua New Guinea set up a stabilization fund in the mid-1970s to prevent unstable mineral revenues from generating large annual swings in public expenditures. However, the government was able to bypass these constraints by passing legal amendments to permit large drawdowns from the fund and by borrowing against the fund's reserves. Thus, the Mineral Resource Stabilization Fund neither curtailed excessive public spending nor smoothed government revenues over business cycles.

Fund returns were also quite low, since fund assets were invested locally rather than abroad. This lack of diversification meant an even larger lost opportunity to earn relatively high interest rates on dollar deposits in the 1990s, which would have been further enhanced by the depreciation of the Kina.

By 1999, public short-term debt had reached K2.5 billion, or about 25 percent of GDP. Given its lack of performance, the Mineral Resource Stabilization Fund was then closed out and used to retire about a quarter of the country's high-cost domestic debt.

Development Forums and Benefit Sharing

In the 1970s and 1980s, the main question for benefit sharing was how much should the central government share with the provinces, with the provinces lobbying intensely for higher royalties and greater participation in the negotiation of projects. Landowners—as those directly affected by the project became known, in spite of little private land tenure in Papua New Guinea—did not enter the equation until later, when conflicts became more vocal and even violent, prompting the closure of the Bougainville mine.

Ambiguity in the nation's constitution as to whether the state is the legal owner of resources, as well as the weakness of the government's reach into the hinterland, has afforded landowners effective veto power over mining projects and an expectation of compensation. These rights, tacitly in practice, were formalized in the development forum process that emerged in the late 1980s, and they were later codified in the 1995 Organic Law on decentralization, which provides that developers shall pay "landowners benefits in respect of

natural resources obtained." Although the form of compensation to landowners is not specified, it has often taken the form of services rather than direct payments.

Both the central and the provincial governments, as well as local landowners and extractive resource companies, participate in the development forums. They serve two main purposes: 1) to let project developers inform stakeholders of the nature, scope, and impact of the project; and 2) to allow stakeholders to agree on the sharing of the benefits. Memoranda of agreement among the parties spell out commitments by the two governments to provide infrastructure and services to the landowners, as well as the respective shares in project equity and royalty payments. In return, the landowners promise not to disrupt the project. Finally, all parties agree to an ongoing consultation process throughout the life of the project. The agreements thus provide a transparent, formal record of commitments of all parties that can later be independently verified for compliance.

The development forums have been successful in facilitating resource exploitation. They have also facilitated a shift in benefit shares: Mathrani (2003) noted a decided trend toward landowners and away from the government as new projects proceeded. However, this trend does not necessarily imply improvements in local well-being.

One reason is that royalty payments and dividends on equity are generally disbursed in cash to local landowners, and this money tends to be spent rather than saved or invested. Indeed, many of the basic concepts of banking, interest, and investment are foreign to the average recipients. These cash handouts can also lead recipients to rely less on their own productive activities.

Furthermore, the payments to local landowners are often concentrated in the hands of a few powerful clans and their leaders, not necessarily those most affected by the extraction activities. Under the 1998 Oil and Gas Act, the Ministry of Energy conducts a preproject investigation of local landownership. Incorporated landowner groups are created to select the community leaders who will interact with the government and project developers. The basis for entitlement is usually clan-based landownership, as opposed to project-affected persons. The incorporated landowner groups also manage the disbursement of cash, often with poor

oversight; clan leaders can abuse their power and appropriate more for themselves. These problems seem endemic in petroleum activities, but mining projects take a slightly different approach. The Department of Mining, after preparing a land investigation report, uses agents appointed under the Lands Act rather than incorporated landowner groups. Distribution of cash benefits is made in public, with clan representatives present, and the payments are published, preventing personal appropriation by representatives of the beneficiaries. Although mines are larger than wells, mining tenements tend to be smaller than petroleum license areas, meaning that local landowners are more closely mapped to project-affected persons for mining activities than for oil and gas, where some beneficiaries may be quite remote from the drilling activities.

Another potentially adverse impact of greater local landowner benefit shares is that the government becomes less inclined to devote limited resources to economic development in the mining or petroleum areas.[19] Whether this is truly adverse, of course, depends on the effectiveness of the government's spending relative to that of the community's. Still, as a result of this ratcheting, project developers come under increasing pressure from local communities to make up for the shortcomings of the government in the provision of infrastructure and services. These kinds of activities are epitomized by the example of Ok Tedi, the largest mining operation in Papua New Guinea.

Ok Tedi Trusts

Ok Tedi Mining Ltd. has established several trusts to administer funds and compensation payments to affected communities. The principle of compensation was integral from the start, with the conceptual framework laid out in the Mining (Ok Tedi Agreement) Act of 1976. Today, there are six landowner compensation and benefit schemes and eight trusts.

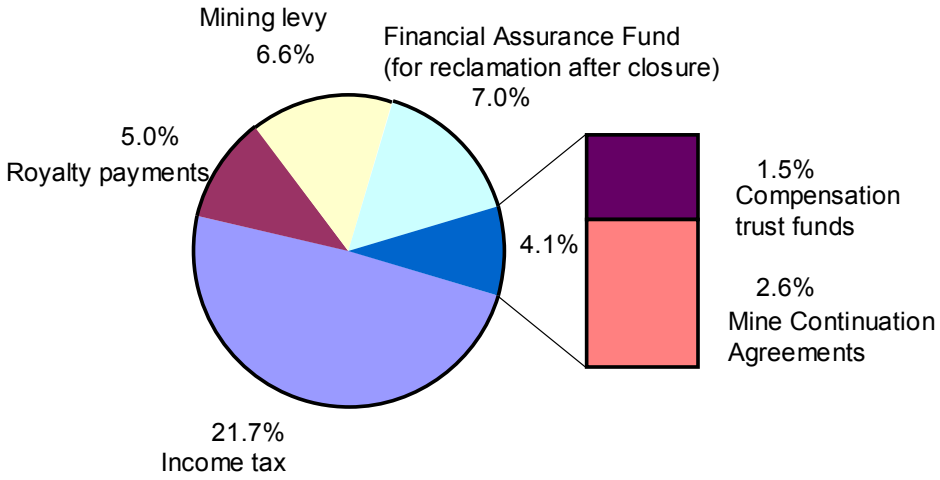
[19] Since 2002, to recoup funds, the government has reduced the infrastructure tax credit scheme by more than half and cut back on the flow of special support grants to mining provinces by 75 percent.

Two of these are discretionary funds established by Ok Tedi; the others are legally binding agreements related to land lease compensation arrangements or legal settlements.[20]

According to its own figures, the mine has provided benefits to the local area in the form of goods and services, infrastructure, wages, training, and cash compensation and royalties totaling more than K700 million since 1982. Initially, the company had a division of external community relations to manage community benefits. Recently, these functions (and many of the personnel) were transferred to the Ok Tedi Development Foundation, established in 2001 by the Ministry of Mining to manage the resource rents from the previous 10 years of the mine.[21]

The following figure indicates the distribution and levels of compensation paid by Ok Tedi in 2003–2004, expressed as a share of net revenues before tax and fund payments. Altogether, the contributions amount to 44.5 percent of pretax cash flow.

Figure 5. Ok Tedi Tax Payments and Contributions as a Share of Pretax Cash Flow



[20] The source for much of this subsection is the Ok Tedi Development Foundation itself, http://www.oktedi.com/odf/development/index.php (accessed September 21, 2005). An independent evaluation of these private sector activities has not been found. Of additional concern is that even though the mining company website is up to date, the Ok Tedi Development Foundation site remains incomplete, dated from 2001.

[21] According to its website, the foundation was "to begin operating by mid-2003" http://www.oktedi.com/odf/overview.php (accessed September 21, 2005). No further update was given.

Community Trusts from Mine Continuation Agreements

The community mine continuation agreements were signed with the affected communities in six regions.[22] The agreements include integrated benefits packages, which provide a mix of benefits for each community to address its needs arising from mining impacts and to use for sustainable development purposes.

The funds are held in individual community development trusts.[23] Each trust is managed by the Ok Tedi Development Foundation and a board of trustees appointed by each community. In one area—the mine lease area—a village planning committee decides which projects to fund.

Fly River Development Trust

Ok Tedi set up the Fly River Development Trust in 1990 to provide funding for community and economic development to 107 villages along 1,000 kilometers of the Ok Tedi and Fly rivers. These villages were outside the mining area and excluded from the royalty and lease payments established under Ok Tedi's early agreements with the national government. Now these villages receive a range of compensation payments, in addition to Fly River Development Trust projects.

The stated objectives of this trust are twofold. The first goal is to improve public services by developing village infrastructure facilities and amenities, with particular emphasis on meeting social, education, health, and recreation needs. The second is to spur economic development by helping to foster village-based, self-sustaining commercial activities.

[22] Mine Lease Area, Highway, North Ok Tedi, Lower Ok Tedi, Middle Fly, and South Fly. South Fly was divided into four subregions: Suki Fly Gogo, North Bank, South Bank, and Kiwai and Wabada Islands.

[23] The trusts are the Nupmo Development Foundation, Tutuwe Development Foundation, Wai-Tri Development Trust, Middle Fly River Development Foundation, Suki Fly Gogo Development Foundation, Dudi Development Trust, Manawete Development Foundation, and Kiwaba Development Trust.

Roughly 80 percent of the trust funding has been spent on village infrastructure projects, including water tanks, solar lighting, and community halls. The projects are identified in consultation with village leaders.

The other 20 percent has been targeted to agribusiness programs, including a joint venture rubber-processing factory for North Fly Rubber Ltd., as well as the construction of a new processing facility for the Obo Fishing Company Ltd.

Cumulative funding over the life of the mine is expected to reach K80 million.

Alice River Trust

The Alice River Trust arose in 1997 out of a settlement in a legal dispute between Ok Tedi and villagers in the Lower Ok Tedi over environmental impacts of the mine. The trust was established to administer funds flowing from the new agreement, with the goal of improving living conditions, housing, education, and other community facilities and activities.

The Lower Ok Tedi Agreement stipulates that payments from Ok Tedi be made and held in three funds, administered by the Alice River Trust:

- Development Fund, which is geared toward promoting participation in commercial ventures as well as toward education, housing, youth, women, and general community improvement programs;
- Future Generations Fund, an investment fund that saves money or puts it into secure investments until mine closure, at which point it will be added to the Development Fund; and
- Non-Renewable Resources Fund, another investment fund, which receives money on behalf of the landowners of the "lease for mining purposes area" (the dredge storage area) under the lease compensation agreements.

Some examples of projects completed under the Alice River Trust Development Fund include portable sawmills, rubber farming, poultry projects, new housing projects, roads, aid posts, housing for schoolteachers, owner-driver taxis, trucks, and clearing and backfilling land for new housing projects. Projects implemented in 2004 under this trust include village housing schemes, sports equipment, uniforms, outboard motors and dinghies, school fees, business

projects, sewing machines, and secondhand clothing. According to the Ok Tedi 2004 annual report, Alice River Trust also has an education assistance fund to help students with school fees.

Papua New Guinea Sustainable Development Program Company

As indicated by the preceding example, environmental problems have clouded mining activities, from waste discharges of large mines to mercury exposure by artisanal miners. In part, the Sustainable Development Program Company also grew out of the environmental problems. The Ok Tedi mining project was plagued with such widespread environmental impacts that BHP Billiton, the largest investor, decided to close it in 2002, viewing it as too great a liability. However, the Papua New Guinea government hesitated to shut down the mine quickly, fearing the social and financial losses. Consequently, BHP Billiton divested, and its 52 percent interest was transferred to an independent trust, the Sustainable Development Program Company. The intent is to use the dividends from the continued operation of the mine to foster other sustainable economic activities until the mine closes in 2010.

The Sustainable Development Program Company is based in Singapore and is independent of both the mining operations and the Papua New Guinea government. It has seven independent directors, one based in Singapore, and operates through an executive officer, program manager, and advisory council. Its clearly defined operating rules include criteria for selecting programs and projects, for consultation, and for public reporting.

The stated purpose of the company is "to fund short- and long-term sustainable development projects in Papua New Guinea, enabling a direct return of the funds to the people of the nation and the Western Province."[24]

BHP Billiton's exit agreement with the government stipulated the funding allocations for the program. After administrative costs and taxes, dividends are distributed as follows:

[24] http://www.oktedi.com/sustainable/sustainableDevelopmentProgramCompany.php (accessed September 22, 2005).

- Two-thirds is devoted to a long-term fund to provide ongoing financial resources after the mine closure.
- The remaining one-third of the dividend goes to the Sustainable Development Program Company to be spent on current sustainable development projects. Of this amount, one-third is earmarked for the Western Province and two-thirds for elsewhere in Papua New Guinea.

As dividends, these funds continue only until mine closure, after which the long-term fund is available. While waiting for the program to get up and running with fundable projects, the dividends slated for current projects have been invested in short-term, low-risk investments.

The Sustainable Development Program Company's directors determine the project funding distributions. At this point, projects identified for possible support include rehabilitation of the Highlands Highway, and development of sustainable rubber, oil palm, cocoa, and other agricultural industries in the Western Province and several other provinces. Also under consideration are ecoforestry and ecotourism projects and the generation of power from domestic gas, geothermal, and hydro resources to support economic production and social services. Other projects have been identified in the areas of education, health, and capacity building at the local level.[25]

The Sustainable Development Program Company is also expected to provide a funding source for the Ok Tedi Development Foundation. Overall, the various trusts for the Ok Tedi Mine areas reflect some common strategies, at least for the past decade of mine operations. First, they all emphasize sustainable development projects, rather than cash disbursements like the standard landowner compensation agreements. Second, some share of the mining payments must be saved for the future. Since cash payments—and contributions to government coffers—will end when the mine closes, these trusts seem to be the only significant savings mechanisms for development projects post-2010.

[25] http://hsecreport.bhpbilliton.com/2003/caseStudies/cs_community26.html (accessed September 22, 2005).

Central and South America

Latin American countries have had their share of governance issues when it comes to extractive resources, particularly oil and gas. Several (including Bolivia) have suffered from Dutch Disease, and ownership of resource production assets has been a source of social unrest (Venezuela, Bolivia).[26]

In managing their oil and mineral revenues, Latin American countries have pursued strategies that differ from those of the other case studies. In particular, earmarking of revenues to specific budget items is more prevalent in Central and South American countries, in part because the governments are more decentralized. As an example, we will discuss the Colombian experience. Although we shall not delve into other country experiences, we shall draw out some of the shared experiences and highlight some of the more interesting uses of resource revenue funds.[27]

Most countries receive the bulk of their resource revenues from royalties and participation. Large shares of the revenues tend to be reallocated to state and local governments, disproportionately where production occurs, as revealed in Table 2. Many countries use oil and mineral revenues to help fund their university systems. In some cases, expenditures for social support and development projects, particularly in affected regions, are earmarked from central or regional revenues. In Colombia, as of 2001, a share of the royalties of the producing departments and municipalities is designated to projects that benefit indigenous communities, when their lands are involved in production.

[26] Tinker-Salas (2005).

[27] Some sources for this section are ESMAP (2002), ESMAP (2005), and Energy Information Agency country reports.

Table 2. Distribution of Oil Rents in Latin American Countries, FY 2000

	Bolivia	*Colombia*	*Ecuador*	*Peru*
Central government	55.4%	29.9%	95.3%	49.1%
Local government	25.3%	43.7%	2.7%	42.5%
Managing entity	0.6%	0.0%	0.0%	4.7%
Investment or stabilization fund	0.0%	24.8%	2.0%	0.0%
Pension fund	17.9%	0.0%	0.0%	0.0%
Universities	0.3%	0.0%	0.0%	3.0%
Social support	0.0%	1.4%	0.0%	0.0%
Other	0.5%	0.2%	0.0%	0.7%
Of local government distributions, share to producing areas	88.0%	89.9%	——	91.7%

Source: ESMAP (2002).

Several kinds of trust funds are also observed:

- Oil stabilization funds for smoothing spending are present in Ecuador and Venezuela.
- Ecuador has a regional development fund, which targets revenues toward a particular region— in this case, the Amazon. A payment schedule is determined by law, on a per barrel basis, based on national production volumes.
- Colombia has an investment fund (the National Fund of Royalties), in which a certain percentage of royalties is directed toward a fund devoted to development projects.
- Bolivia allocates certain revenues generated by the capitalization of the state-owned petroleum corporation (YPFB) into a pension fund for supporting the national pension system.

As we observe in this table, the Colombian experience stands out for several reasons. First, the share of oil rents accruing to the central government is the lowest among the countries studied, and the local government share is the highest. Second, Colombia also diverts a large share of the rents to a trust fund and to social support systems. For these reasons, we explore this example in greater detail.

Colombia

Colombia began a concerted effort to decentralize government in 1986, with legislation transferring powers and finances for basic public services to the departments and municipalities. The Political Constitution of 1991 not only reinforced this devolution but also laid down much of the current framework for managing nonrenewable resource exploitation.

Legal Framework for Revenue Management

Article 360 provides for royalties as an "economic compensation" for extraction of natural resources. This law outlined a royalties regime for minerals, as well as oil, replacing the traditional regime of specific taxes. It specifies rates for different kinds of minerals, ranging from 3 to 12 percent.[28]

The law similarly specifies the allocation of the revenues. It also affords the departments and municipalities rights to certain shares in the royalties from activities in their jurisdictions, including both production and transportation. Article 361 provides for the establishment of a national fund for distributing unallocated royalty revenues to other jurisdictions, and in 1994, the Royalties Law No. 141 created the National Royalties Fund. Law 756 of 2002 provides that 47.5 percent of the royalties is transferred to the producing departments, 12.5 percent to producing municipalities, 8 percent to ports, and the remaining 32 percent is allocated to the National Royalties Fund (ESMAP 2005).

Though management is decentralized, the use of these revenues is, to a certain extent, prescribed by law. Monitoring, however, is generally thought to be poor. The legal framework stipulates that local and regional governments apply the money from royalty revenues to investment programs and ongoing government activities according to their development priorities. Subnational government recipients are required to invest 90 percent of the funds in

[28] For example, rates are 10 percent on coal (5 percent on less than 3 metric tons per year), 8 percent on nickel, 6 percent on alluvial gold, 5 percent on copper, iron ore and platinum, 4 percent on lode gold and silver, and 1.5 percent on emeralds (Doan 1999).

municipal development projects, as listed in the mandatory development plans. Special priority is to be given to environmental sanitation projects and the construction and expansion of basic public services like health, education, electricity, drinking water, and sewers. Of the remaining funds, 5 percent is dedicated to the technical supervision of the projects, and the other 5 percent is intended for operational expenses. National agencies may receive up to 50 percent of this latter amount to pay for their costs of collecting and distributing royalties and compensations, provided that these resources do not come from hydrocarbon projects. In addition to the local development priorities, some earmarking to indigenous peoples is mandated. For example, when resource exploitation occurs within 5 km of an indigenous settlement, the law dedicates 5 percent of the department's allocated royalties and 20 percent of the municipality's toward investment projects in that settlement.

The National Royalties Fund faces its own mandates for distributing the funds, the intention being to fund development projects, environmental protection, and mining promotion. Power and gas projects receive 15 percent. Another 15.5 percent funds specific local investment projects, for which local governors and mayors apply to the Ministry of Mines and Energy; the National Planning Department determines their priority.[29] The Regional Corporation of Rio Grande de la Magdalena receives 10 percent of National Royalties Fund revenues. Finally, the National Royalties Fund retains 1 percent to cover operational expenses.

With the remaining 58.5 percent, the National Royalties Fund has its own resources for projects, of which the shares are also determined by law. Mining promotion receives 15 percent, and environment preservation gets 30 percent, of which at least 20 percent must be directed toward environmental sanitation in indigenous community areas. The other 54 percent is dedicated to funding priority regional investment projects from the territorial agencies' development plans. By law, the National Royalties Committee must consider the following criteria for allocating these funds: regional balance (based on the national index for "unfulfilled

[29] Arbelaez (2004) and ESMAP (2005) provided much of the detail on the royalties regime.

needs"); "harmonic" national development; environmental, social, and economic impacts; effects on the territorial agency of resource exploitation; funding of regional development plans; and population density. The distribution of centrally collected royalties is thus intended to follow national social justice priorities, with a particular emphasis on basic public infrastructure like electrification and roads.

Given the multiple layers of earmarking, as depicted in the table, the departments and municipalities receive the vast majority of royalty revenues. They also receive, by law, shares of income tax, value-added tax, and all other taxes. However, the central government retains some of these revenues, and it profits from direct production through state-owned oil and mining companies (ECOPETROL and Minerales de Colombia), as well as joint ventures with foreign producers. In recent years, the central government has responded to fiscal crises by retaining more revenues. Hence, the distribution of all rents from extraction activities is not as heavily weighted toward subnational entities as the distribution of royalties.

In addition to the revenue management framework, Colombia has a regulatory framework for the environmental and social aspects of resource extraction. Environmental licenses are required for exploration and exploitation. Environmental impact studies and documents of environmental evaluation and management are used for both environmental and social supervision, although the authorities suffer from weak capacity for monitoring and control. Zoning restrictions, territorial plans, and rehabilitation requirements may also apply. In addition to environmental regulations are requirements to give priority to local sources of personnel and supplies. Formal agreements between companies and local governments are also common, such as for the construction of infrastructure in lieu of some initial tax payments. There is no national regulation of corporate contributions toward development projects, which are seen as voluntary, though companies may deem them necessary to build local goodwill.

Table 3. Distribution of Royalty Revenues in Colombia

	Share of royalties		*Of which*		*Of which*
Departments	47.5%	Technical Intervention	5%		
		Operating expenses	5%		
		Investment in priority development projects	90%	Sanitation, health, and basic services for nonproducing areas	45%
				Additional earmark until minimum coverage achieved	15%
				Other development plan projects	40%
Municipalities	12.5%	Technical Intervention	5%		
		Operating expenses	5%		
		Investment in priority development projects	90%	Sanitation, health, and basic services	75%
				Other development plan projects	25%
Ports	8%				
National Royalties Fund	32%	Energy and gas	15%		
		Specific projects	15.5%	Sanitation, health, and basic services	60%
				Other development plan projects	40%
		Operating expenses	1%		
		CORMAGDALENA	10%		
		Own resources	58.5%	Mining promotion	15%
				Priority regional investment projects	54%
				Environmental sanitation	30%
Adjacent indigenous communities	5%	of department revenues			
	20%	of municipal revenues			
	20%	of National Royalties Fund environmental sanitation spending			

Revenue Management in Practice and Company Involvement

In practice, the success of decentralized management has been mixed. A grave challenge for revenue and resource management in Colombia is corruption, not to mention political violence (ESMAP 2005). Although local royalty revenues can be substantial, many community needs go unmet, with royalties sapped by debt servicing and mismanagement. Community participation in the local government decisionmaking process seems limited. In some instances, communities have actually requested that the mining company intervene in the management of royalties.[30] Without significant benefits, the damages of mining—water pollution, dislocation of people, income inequality, pressure on municipal services—can exacerbate an already precarious social situation.

In response, many companies engage in their own community development projects, either through internal management or a foundation. Cerro Matoso S.A., for example, targeted capacity building at the local government level, initiating a strategic planning process involving the communities for improving the local development plans. In other cases, companies target areas not prioritized by local governments.

Overall, some studies have shown extractive industries to have a positive impact on economic and social indicators in Colombia.[31] However, they also have found detrimental impacts of mining on specific agents, and several studies note the hindrance created by corruption.

[30] IDRC (2003) gives the examples of the Cerro Matoso project and Carbones del Caribe.

[31] ESMAP (2005) cites Fedesarrollo (2001) as an example.

Summary and Lessons

International experience reveals a broad range of options for both collecting and distributing resource revenues. Although in practice, shares of certain revenue sources may be linked to particular allocations, there is no necessary correspondence between certain combinations—say, royalties and savings funds. The main exception for linking a benefit to a particular resource revenue source (as opposed to fund earnings) would be as part of implementing a user fee. Policymakers might also prefer to link an annual benefit to a less volatile tax base. However, when the benefits are derived from a trust fund, the volatility of the contributions matters less. Another constraining factor may occur when resource exploitation licensing and revenues are managed by a subnational agent, since that jurisdiction may be limited by law or tradition in terms of the taxes it can levy. We abstract from most of these issues and review the options here in turn.

Sources of Public Revenues from Extractive Resources

Several options are available to capture the rents from resource extraction. They differ in their distribution of risks and rewards, as well as in their incentives for efficient investment and extraction. For a primer on mineral taxation, see also Baunsgaard (2001), who compares tax and nontax instruments. We discuss the main options and tradeoffs in the context of the international experiences surveyed.

State-Owned Production and Equity Participation

In most developed countries, while the state (country, state, or province) may own the land, it seldom manages the extraction. Rather, it licenses private companies with particular expertise to develop the resource. In well-functioning market economies, government management of production activities is deemed less efficient than relying on the private sector.

Production sharing is more common. The state, as owner of the resource, engages a company to develop the resource in return for a share of production. In this manner, the company bears the exploration and development costs and the risks, though some incentives may be offered to offset them. Typically, the state oil company enters into a long-term,

production-sharing contract with a foreign investor. The state-run company may sell the oil (or resource) on its own, or allow the foreign company to market it. Provisions for shares can be straightforward or more complicated; for example, in Norway, the production share depends in part on the value of the commodity.

Joint ventures, with state equity participation, are another option for developing the resource in partnership with the private sector. However, they may entail some state financing and risk bearing. Even when equity is transferred gratis to the state, without initial investment obligations, certain financial risks may remain in the form of "cash call" obligations for contributing to ongoing development costs.

Another risk of state-owned production is that the government is then required to monitor itself for environmental compliance. This situation can create conflicts of interest, as seen in the Ok Tedi mining case in Papua New Guinea. The ministry of mining is likely to be much more powerful relative to the environmental ministry when the former controls not only mining practices but also the revenues from those activities. With the other options for rent capture, the revenues tend to fall into the hands of the central budgeting authority—or local governments or stakeholders. Although the government still has a financial stake in the extraction project, the specific ministries charged with resource and environmental management do not.

License Fees and Auctions

The government may charge a fee for awarding the contract to explore and/or develop the resource. This fee may be set in advance, by negotiation, or by auctioning the rights to access the resource. License fees 1) transfer rents up front; and 2) ensure that the project risks are borne by the resource extraction company, but these features can be altered in the contract.

A competitive auction generally ensures that the maximum rents are transferred to the government. The United States (Gulf of Mexico), Canada, and Australia auction off production licenses. Bids are made taking into account the range of uncertainties facing the project, such as costs and capacity of the resource pool and future oil prices. In the case of many developing

countries, however, political and other economic risks are also factored in, lowering the expected value of (and bid for) the license.

Large, one-time transfers to the government involve their own risks, in that they may be prone to political machinations and squandering unless governance is excellent and stable. Contracts, however, can be structured such that payments are made over time, and they can also be made conditional on certain events, so as to manage risks.

Tax and Royalty Options

Royalties and Severance Taxes

All of the countries surveyed collect a large share of their resource rents by taking a portion of the value of ongoing extraction. Royalties can take many forms, including revenue taxes (ad valorem taxes), per unit production taxes, profit taxes (value of production net of cost), and export taxes (less common in developed countries). These different tax bases carry different types of risks, depending on their relationship to prices, output, costs, and exchange rates, all of which subject revenues to variability. The tax bases also entail different collection and auditing costs; for example, calculating net production value requires collection of cost data, as well as the production levels and sales prices required for gross production value.

Royalties and similar taxes raise marginal extraction costs and change utilization incentives, reducing extraction rates early on (tilting the path) and changing the cutoff point, which can imply that some of the resource that may otherwise be economically recoverable goes undeveloped. They also diminish the licensee's willingness to pay for the contract, and thereby the government's ability to extract the maximum expected rent up front. If set too high or structured poorly, they can impede investment or provide inadequate incentives for cost management. However, unlike license fees, taxes can offer an ongoing revenue source that adjusts automatically to events in resource markets and local supply.

Special capital depreciation or investment allowances for the extractive sector can help maintain private investment incentives while the government continues to tax a large portion of the rent. Of course, these provisions decrease the tax revenues that would otherwise be

received, and assessing their overall impact on government revenues can be difficult (van den Noord 2000).

Income and Profits Taxes

Resource extraction activities are almost always subject to the standard corporate income tax, and they often are assessed a surtax on their income or profits. This practice, as conducted in Norway, has the benefit of piggybacking on the existing tax regime, avoiding the complexity of calculating an additional tax base. However, special provisions also often apply, undoing some of this simplification.

One type involves special deductions for investment or exploration. These incentives are designed to avoid discouraging new developments while maintaining a high rate of rent capture.

Another type involves "ring fencing." This tactic is required when income taxes are levied on a project basis rather than on a company as a whole. Ring fencing delineates the scope of the project's tax base (such as a license area), ensuring that revenues from those activities are not offset by deductions from the startup costs of exploring and developing new projects elsewhere in the country.

Finally, the income surtax may be made progressive, designed to capture more rents should the project turn out to be highly profitable. The tax rate schedule can be indexed to producer prices, volume, or other variables associated with higher profitability.

Resource Rent Tax

A resource rent tax attempts to capture rents above an expected rate of return. The tax is applied when the calculated payback factor exceeds one, or when cumulative cash flow (which may incorporate a certain real rate of return) turns positive.

This type of tax is not common, since it backloads government revenues. It is also more difficult to administer and ensure compliance.

Liability and Environmental Taxes

Liability fund fees and taxes reflecting environmental damages are designed primarily to cope with external costs of resource extraction, not to raise revenue. They can promote more efficient extraction when the taxes are closely linked to the marginal damages from resource recovery activities.

Uses of Public Revenues

In the use of public revenues, decisions involve two important dimensions. One is the allocation of the revenues among priorities; the other is the allocation of the revenues over time. In many cases, another choice is made in terms of allocating revenues across jurisdictions.

Although much attention is devoted to funds, the use of oil revenues should be approached holistically, since funds are only part of the equation. Governments can earmark their budgets or create trust funds to the same effect. Funds can function as clearinghouses for current payments; as short-run stabilization mechanisms, in which the principal is allowed to be drawn down; or as long-run savings mechanisms, in which only earnings are spent. We thus prefer to differentiate options for spending and earmarking revenues from options for saving and investing revenues, noting that actual policies can represent different combinations along those dimensions.

Allocation Options

Finance Current Government Expenditures

All countries surveyed use resource revenues in part to finance current government expenditures. This use primarily benefits current residents, who receive more public services at lower tax costs. If expenditures are used to invest in infrastructure, education, and services contributing to development, they can also benefit future generations. However, the ineffective inflating of public expenditures benefits few.

Three important issues need to be addressed to make effective use of these public expenditures, and they are of particular relevance to developing countries:

- First, the government must have the capacity to make good use of the revenue inflows. In some cases, this question may be related to which level of government is best suited to deliver services. Channeling resources to the institutions with the greatest capacity may run into obstacles, however, based on resource ownership law, traditions, or politics. In some cases, no level of government may be very capable. Transparency and civic oversight are crucial to effective utilization.
- Second, the volatility of the resource revenues can threaten the stability of government budgets if spending is not smoothed over time by some mechanism, like a stabilization fund. Good institutions are also required to manage a stabilization fund properly, as the effects can easily be undone by borrowing against those assets.
- Third, when resource revenues are large relative to the economy, the macroeconomic consequences of fiscal policy must be taken into account. This lesson is particularly evident in the Dutch Disease literature. Although exchange rate impacts are not of concern for a state- or province-managed resource sector, the absorptive capacity of the regional economy still is.

Botswana and Norway present some of the best examples of this tactic. Oil revenues are managed through a solid central budgeting process that identifies national priorities and takes a multiyear planning perspective. Revenues that will not be used most effectively today are saved for future use.

Finance Special Priorities

With well-functioning governments, earmarking revenues to specific policy priorities is an inefficient mechanism, as it deprives the government of the flexibility to respond to changing demands. Notably, Norway has resisted dedicating any of its revenues to specific government programs.

However, in an imperfect world with less faith in the government's willingness and ability to respond to priorities, earmarking can help ensure funding for priority needs and limit government discretion to spend indiscriminately. Earmarking to programs close to the hearts of major stakeholders can win acceptance for a project that might otherwise seem a nuisance.

For example, many U.S. states (Montana and Alaska are examples) earmark severance tax revenues to specific popular funding needs, like education. Bolivia dedicated part of its resource revenues toward funding its pension scheme. Other Latin American countries use oil

revenues to fund their university systems. Many others, including Alberta and Chad, earmark significant shares of the revenues to regional economic development, as well as other funds, discussed subsequently.

Finance Economic Development and Diversification

The most common earmarking scheme dedicates revenues to regional development. Alaska does this by funding related agencies with the oil revenues not diverted to the Permanent Fund. Alberta channels funds to regional development through the Alberta Investment Division. Ecuador and Colombia have regional development funds. Chad has mandated its largest spending share for development priorities. Many of the individual extraction projects in Papua New Guinea have related community development funds, set up by either the government or the mining companies, with royalties and dividends dedicated to development projects.

Targeting investments to local industries can boost the regional economy and help it become less reliant on exhaustible resources. However, this strategy has its own risks. Investments in local economic ventures generally reap lower returns than investments in a diverse portfolio, from the perspective of converting resource assets into permanent wealth. Particularly, without local capacity to absorb the investments productively and without capable, politically independent oversight of project selection, one risks squandering the proceeds on uneconomic commercial ventures. For funds or revenue shares that are large relative to the domestic economy, additional concerns arise about overheating the economy with too much local investment.

Many earmarked development funds target public projects rather than private enterprise. These projects can include the full range of government products and services, from infrastructure investment and education to health care and even research. These kinds of investments are often of high priority in developing countries and communities, like Papua New Guinea or Chad, but they are also observed operating outside the general government budget in developed countries, as in the Alberta Capital Projects division.

But does earmarking revenue shares toward development improve the allocation relative to the general budgeting process? Even with a mandate, the funds are not always additional, since the availability of a development fund reduces pressure on the government to use other parts of the budget for development projects. These kinds of funds are more likely to be additional when they are targeted at the regional or local level—places where the national government is less likely to devote as much attention. Still, the more funds are devoted to specific areas, the less is available to promote development in other regions that lack extractive resources.

Give Cash Dividends or Compensation to Stakeholders

In some cases, resource benefits are distributed directly to defined stakeholders. In the case of Alaska, earnings from the Permanent Fund are returned as citizen dividends, paid in lump sum on a per capita basis. This method offers a broad-based, progressive income transfer mechanism, since each citizen gets the same amount, unlike the result of a broad-based tax cut.

In other cases, payments are targeted to affected parties. In Australia, extraction on Aboriginal lands generates payments to Aboriginal councils, via the Benefits Reserve. In Papua New Guinea, designated landowners often receive compensation as part of agreements for the development of resource fields. Having a fair and clearly defined process for determining land ownership or affected party status is essential, since it confers substantial benefits. In Papua New Guinea, project development has invariably led to land disputes. Although extraction companies may be most concerned with winning the acceptance of powerful stakeholders, others may also be concerned with equity. In this case, other constraints on the distribution among affected people, as well as transparency and accountability, may be desired, but they can also clash with traditional notions of local or tribal sovereignty.

Cash transfers ensure direct benefits for citizens and limit the government's ability to divert funds to undesired ends. Sala-i-Martin and Subramanian (2003) argue strongly for distributing all of Nigeria's oil and gas revenue to adult citizens on a per capita basis. The goal of this recommendation is to eliminate the corrupting influence that resource wealth exerts on

Nigerian institutions. By forcing the government to raise revenue through normal means of taxation, the institutions will be made more accountable to the citizenry.

Arguably, cash transfers can make immediate improvements in current recipients' lives. In Alaska, Permanent Fund dividends have ranged from about 5 to 10 percent of median family income for a family of four over the past 10 years.[32] In Nigeria, with current and projected production levels, each household would receive a transfer amounting to 43 percent of per capita purchasing power parity (PPP) GDP—and nearly double that with the full exploitation of natural gas—which is well above the poverty line (Sala-i-Martin and Subramanian 2003).

However, there are also cautionary tales of distributing cash benefits. In developing countries, banking and investment opportunities for individuals, particularly in hinterlands, are limited. As a consequence, transfers are much more likely to be spent than saved or invested, making them even less likely to spur additional economic development. The additional income may also substitute for labor supply. These results are especially problematic when compensation is tied to the life of the mine or well; afterward, income drops off without other productive assets available to pick up the slack. This prospect is a concern for Papua New Guinea, where some recipients have reduced their productive activities.[33] Hannesson (2001) notes that the decline of phosphate mining on the island nation of Nauru has posed serious problems for its inhabitants, who had become dependent on the royalty transfers and had largely abandoned traditional agricultural and other production in favor of imports.

Although distributing revenues in cash can limit the government's ability to squander funds, by the same token, it also limits the government's ability to direct the funds toward desired ends. Even weak public institutions require some funding. Forcing them to raise funds through taxes may improve public accountability, but tax policies entail their own costs of

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[32] Alaska Permanent Fund Corporation (http://www.apfc.org/alaska/dividendprgrm.cfm) and U.S. Census (http://www.census.gov/hhes/www/income/statemedfaminc.html).

[33] It was also a serious problem with the decline of phosphate mining in Nauru (Hannesson 2001).

administration, enforcement, evasion, distortions to incentives for work and investment, and questions of progressivity. These problems are also quite substantial for developing countries, and it is not clear that the marginal costs of institutional erosion always exceed the marginal costs of raising public funds.

Savings Options

Trust funds present an opportunity to save resource wealth for future uses. Most oil-rich governments in developed countries have established some sort of trust fund, although they differ substantially in their purported goals. In particular, the distribution of annual earnings from these funds seems to pose important tradeoffs.

Create a Stabilization Fund

Stabilization funds for government expenditures offer some stability to government budgets, as compared with using direct oil revenues. Trust fund income is subject to market fluctuations, but investment portfolios can be structured according to risk preferences, and in general the stock market is less cyclical than oil revenues and often countercyclical to them. Alberta uses this approach in part, as does Norway, in a sense, which covers its nonoil budget deficits with fund earnings. The Alaska Permanent Fund does not contribute to stabilization.

Many developing countries have also employed stabilization funds, with mixed success. Botswana is a good example of a country that exercises fiscal restraint, conducts multiyear budgeting, and uses the stabilization fund to cope with sudden drops in diamond prices. Many other countries, however, have thwarted the purpose of the stabilization fund by borrowing against it to expand spending in boom times, leading to debt and difficulties during busts. Papua New Guinea, for example, ultimately dismantled its stabilization fund to pay down the debt it had accumulated.

Create a Savings Fund

Savings funds are trust funds that use resource revenues to accumulate wealth and generate a permanent source of income. That income may then be used for any of the allocation options indicated above.

An important question for savings funds regards the investment strategies. Norway, for example, invests in foreign securities to help diversify the government revenue portfolio away from the domestic economy. This strategy is arguably the best for generating the highest investment returns, and thereby the highest income for future use.

Other savings funds attempt to pursue allocation goals simultaneously. For example, the Alberta fund is committed to local investments with the fund principal (as opposed to using just the earnings). Often these goals run counter to earning the highest investment return.

A similar tradeoff is posed with respect to current earnings. Reinvesting earnings provides additional savings for future governments to use, after the oil or resource boom ends. Distributing them annually can achieve allocation goals but tends to add to current coffers that are already full with resource revenues that were not diverted to the fund.

Another governance issue is whether a ministry-run fund should pursue controlling stakes in publicly traded companies. This control can generate conflicts of interests, when the government is both regulator and owner.

True savings funds—that is, savings beyond stabilization and expenditure smoothing—seem to be less of a focus in developing countries. In Papua New Guinea, the Alice River Trust incorporates a future generations fund, which cannot be tapped until after the mine closes. Chad also has a future generations fund. Still, those funds receive only a small share of revenues, the bulk of which is devoted to current development.

In many cases, the best investment return for the public's assets would be achieved by investing in infrastructure, human capital, and the necessary foundations for economic growth, as has been the strategy of Botswana. However, other countries have largely squandered decades of resource revenues with little development to show for it—arguably a very poor return on the investments. Where governance is weak, even when development needs are high, resource rents may well be better saved in trust until they can be put to constructive use. At the extreme, when safeguards fail to prevent wasteful spending of resource rents, the ultimate savings mechanism would be to leave the resource asset in the ground.

Comparison across Countries

The countries surveyed take quite different approaches with respect to the tradeoffs in utilizing current nonrenewable resource revenues, as shown in the following table.[34] Botswana, whose resource revenues equal nearly half of its budget, the highest share among the countries, also uses the largest percentage for current expenditures—essentially 100 percent in the two recent fiscal years. By contrast, Norway, which has the second-largest ratio of resource revenues to budget, uses the least for current expenditures, saving the lion's share for future governments. In common, both countries have confidence in the quality of the central budgeting process; neither earmarks funds specifically, although they devote them implicitly to public goods, services, and economic development. The main difference is that Norway is a developed country, with solid revenues from traditional taxes, that needs fiscal stability more than rapid growth at this point in its history. Botswana, on the other hand, has a limited ability to raise revenues from other tax sources and has greater immediate needs for development, although it has engaged in fiscal smoothing during past boom-and-bust cycles.

Chad uses even less of its revenues for current government spending than Norway, but primarily because most of the remainder is earmarked specifically for development projects and local communities; only 10 percent is saved for the future. Like Botswana, Chad is in immediate need of economic development, but unlike Botswana, it has a central budgeting process that is not trusted to prioritize properly. Alaska also exhibits a certain distrust of the state government's wisdom in utilizing resource revenues, resulting in the earmarking of a seventh of the revenues to a trust fund for citizen dividends. Still, Alaska is second only to Botswana in using the largest share of resource revenues for current government expenditures. Alberta lies somewhere in between, saving 40 percent of its nonrenewable resource revenues for future uses. Alberta also has several trust funds for which the earnings are earmarked, although it has not been automatically adding to them in recent years.

[34] Australia and Papua New Guinea are excluded, since many of the revenues in the specific cases surveyed bypass the government.

Table 4. Relative Size and Distribution of Nonrenewable Resource Revenues

	Alaska *FY 2004–06*	*Alberta* *FY 2004–06*	*Norway* *FY 2004–06*	*Botswana* *FY 2004–05*	*Chad* *FY 2004*
Nonrenewable resource revenues as share of government budget	38.5%	31.0%	43.4%	46.6%	40.0%
Share of nonrenewable resource revenues devoted to …					
Current government expenditures	84.6%	60.0%	27.9%	100.0%	13.5%
Future government expenditures, stabilization	0.3%	40.0%	72.1%	0.0%	10.0%
Citizen payments	14.6%	0.0%	0.0%	0.0%	0.0%
Local community earmarks	0.0%	0.0%	0.0%	0.0%	4.5%
Other trust funds, earmarks	0.4%	0.0%	0.0%	0.0%	72.0%

Mandating Private Provision of Public Goods

A final policy option avoids government collection and distribution of revenues altogether by requiring the private sector to provide public benefits as a condition of licensing and operation. In remote areas, the resource extraction company is the visible presence, and contributions to the community in some form are necessary to promote civil relations with local stakeholders. In some cases, companies may be more logistically capable of providing services to local citizens than weak governing institutions.

Nevertheless, companies are ultimately in the business of extracting resources, not providing public goods. In Papua New Guinea, the Ok Tedi mining company decided to spin off its community affairs branch into a separate development foundation to manage the local projects it was funding. Also, mandating public goods provision, just like a tax, imposes costs on the resource extraction project, meaning that less rent can be captured through other means, such as tax revenues or compensation agreements. Furthermore, since the companies can deduct these activities as business expenses, they tend to directly lower profits and thus income taxes and dividends.

Conclusions and Recommendations

In this section, we draw general conclusions from the international experience in resource revenue management, and we highlight some recommendations for managing the rents from resource extraction in developing countries. Perhaps the most important point in designing a resource revenue policy is that it must correspond to the governing institutions' ability to implement it.

Best Practices

Norway and Botswana provide the models for best practices, according to the mainstream literature:

- designing central budgets with long-term planning and without explicit earmarking;
- using expenditures to invest in public infrastructure, health, and education, as foundations for economic growth;
- saving revenues to smooth public expenditures and investing them in a diverse portfolio with foreign assets;
- avoiding excess expenditures beyond the government's or economy's current ability to absorb them productively;
- incorporating mechanisms for transparency and accountability; and
- designing resource tax and participation regimes that allow the government to capture a large share of the rents without discouraging investment.

However, one must proceed with caution in applying these guidelines to other circumstances. Some of these recommendations rely on three critical characteristics of the central government: 1) having clear title and authority to engage in resource development; 2) being strong and effective in providing public goods and services; and 3) being able to regulate and enforce environmental compliance, without conflicts of interest. When these conditions are not met, second-best practices may be more suitable.

Second-Best Practices

Drawn from the array of international experience, certain lessons emerge to suggest guidelines for tailoring resource revenue management policies to the circumstances. The beneficiaries, the appropriate managers of the programs, the benefits to be allocated, and the source of revenue all depend on the specific situation.

Defining Beneficiaries

Assess land tenure conventions. Since different countries and cultures have different legal systems and traditions, a necessary precursor to resource development is establishing which parties—public and private—have rights to the resource.

First, which level(s) of government has the right to authorize, regulate, and tax extraction activities? In some cases it may be the national government (as in Norway, Chad, and Botswana); in others it is primarily the state or province (as in Alberta and Alaska) or even local jurisdictions. In the case of overlapping authorities, as in Australia, Latin America, and Papua New Guinea, these issues must be resolved and coordinated. The answer to this question can constrain the choice of which institution should manage the revenues, and the involvement of multiple jurisdictions may constrain options for allocations.

Second, which private stakeholders have a right to negotiate or have an expectation of compensation? The answer to this question can also influence the options for allocating the benefits, compared with a centralized system, since a certain share must be reserved for these groups. The experiences of Australia and Papua New Guinea reveal the importance of respecting land-use traditions. As also seen in these countries, the provision of clear land rights can serve as a benefit allocation mechanism itself, albeit with the tradeoff that the government surrenders some authority to monitor and influence the use of those benefits.

Consult with local stakeholders. Serious conflicts can arise when local stakeholders—whether or not they have legal tenure over the land—are adversely affected by a resource development project. A clear process should be in place for informing them, incorporating their input into decisions about resource exploitation, and offering or negotiating some form of compensating benefits. The development forums of Papua New Guinea are one example.

Choosing the Managers

Assess institutional capacity. Since the success of resource wealth management depends on good governance, a critical question is, which institution is best able to provide services? In some cases the central government may have the most capacity; in others, the local governments are closer to the people and better able to serve their needs. Ideally, the answer to this question would also align with the answer to the question of authority. If not, or if the best is still inadequate, policymakers should explore options for improving capacity or otherwise shifting management authority and revenue allocations to better-suited institutions. Some options include quasi- or extra-governmental management, such as establishing independent trusts to oversee the distribution of revenues. Properly designed, trust fund managers may be less susceptible to rent seeking or political caprice and more faithful to development objectives. However, while trusts can be set up to control the purse strings, government institutions are still necessary to implement many projects funded with resource revenues.

A last resort may be to rely on the extractive resource companies themselves to provide services. But even if community outreach is in their interest and they are capable of meeting people's needs, social services are still not their core business. Furthermore, their interests are best aligned with programs to appease the communities closest to the activities. Private provision is thus less suitable for programs that engage in broad regional development. As seen in Papua New Guinea, companies are beginning to spin off their outreach activities to foundations and independent organizations.

Formalize management structures and priorities. A potential benefit of earmarking revenues to a trust fund is that explicit allocation mechanisms and oversight structures can be designed, independent of existing governing institutions. However, as Botswana shows, a process for identifying priorities and planning expenditures can also be implemented within a governing institution. The point is that a formal structure with a clear mandate should be put into place to prioritize and plan spending, be it through a trust fund board or government institution—or both. The better these processes, the fewer inflexibility mechanisms (earmarking) will be needed.

*Ensure transparency***.** Any program managing resource revenues benefits from greater transparency. Regular reporting of all operations, both public and private, and independent auditing are recommended.

Defining the Benefits

Offer benefits in a productive form. To benefit society in a developing country, revenues are best allocated toward providing critical public infrastructure and services: transportation, water, health, education, etc. The particular needs of an area should be assessed through a well-structured process, as previously noted. Cash transfers are likely to be spent on nonproductive consumption; although they may alleviate current poverty if distributed broadly, they do not generally contribute to development. Thus, private cash distributions should be resisted, even though that may be difficult when negotiating compensation for landowners. Harder questions arise when public expenditures are not likely to be very productive, either. In this case, investing in governance capacity and saving the resource wealth until it can be put to better use—either through a future generations fund or even by leaving it in the ground—may be the best course.

Consider the scope of the revenue stream. The larger the revenues from the extraction activities are relative to the economy, the more important it is to follow proper macroeconomic policies as well as microlevel allocation issues. The extraction horizon is equally important. If revenues are expected to flow consistently over a very long horizon, it may be less necessary to save for the future, other than for stabilization and sterilization. However, if revenues from the sector are likely to boom and taper off within a shorter horizon—in particular, before broader economic development is achieved—it is important to save more substantial amounts to ensure future financing for continued public expenditures.

Spend within one's means. Although development needs may be urgent, the capacity of the regional economy and the government to absorb new revenues and put them to effective use may be limited. Capacity limitations should be honored and excess spending avoided—particularly that financed by credit. Mandatory savings funds can help enforce this rule, but government restraint is still required; as seen in Papua New Guinea and Latin America, such funds do not provide net savings if the government borrows against them.

Generating Revenue

Capture rent without discouraging investment or creating conflicts of interest. The choice of rent capture system will also depend on the country's situation and its preference for the timing of revenues and for risk. Royalties are levied almost universally; they tend to offer a more stable income source than a profits tax. An income surtax is administratively simple to implement if the country has a preexisting corporate income tax. License fees upon award of the contract offer less reward for developing countries than developed ones, since companies are likely to perceive greater political, economic, and exchange rate risk, in addition to geological and commodity market risk, diminishing their willingness to pay. Production and equity sharing should be approached cautiously, with awareness of the risks. Provisions should be made for arms-length management of production responsibilities, to avoid conflicts of interest with regulatory responsibilities. Regardless of the rent capture method, companies expect a certain rate of return and will be discouraged from investing if that will not be met. Tax provisions that favor investment may allow additional rent capture elsewhere, but their complexity generally necessitates a sound corporate income tax system and good auditing capabilities.

A particular challenge arises in areas where mining cannot be as tightly controlled or enforced as in the diamond mines of Botswana. For example, in the old mines of Orissa, India, licensed and unlicensed areas are replete with "rat-holers," small-scale artisanal miners. The smuggling market is rumored to be even larger than the legal trade, with sizable mafia involvement.[35] Some lease holders also encourage smuggling to evade royalty payments. In such cases, resource management policies have to take these indirect impacts into account. In particular, rent-capture schemes may have to avoid levying too-high royalties based on production because it encourages evasion. Instead, fixed license fees and profit taxes—which piggyback on existing income tax regimes—may be preferred. By avoiding production taxes,

[35] Bisoi, Dilip Kumar, "Calvin Klein in Kalahandi," *Financial Express*, March 6, 2005. http://www.financialexpress.com/fe_full_story.php?content_id=84479.

legitimate producers are less disadvantaged compared with smugglers, and the smaller marginal gain to smuggling also stifles the related corruption.

Assess environmental impacts. The potential environmental impacts of a resource extraction project should be assessed for several reasons: first, to decide whether the benefits of the project—for the developing country—exceed its costs; second, to identify the needs of local stakeholders who will be affected and determine their compensation; and third, to design regulatory strategies for mitigation and enforcement. Those strategies can also incorporate revenue-raising market mechanisms, like environmental taxes, to ensure that the costs of environmental damage are internalized to the firm. A liability fund, which earmarks those revenues, can ensure that funds are available to cover any excess cleanup costs or health costs that might fall to the government. These mechanisms should be of particular importance where valuable biodiversity and renewable resources are located over the nonrenewable ones.

A quandary for developing countries lies between the promise that resource rents can help pay for critically needed public infrastructure and services, and the risk that those rents will be squandered and even undermine existing institutions. Some strategies for developing resources can compensate for institutional weaknesses. Nevertheless, the larger problem of poor governance—a weak rule of law and poor responsiveness and accountability between citizens and government—remains the greatest challenge so that natural resources can be a broad-based economic blessing, rather than a curse.

References

Acemoglu, Daren, Simon Johnson, and James Robinson. 2003. "An African Success Story: Botswana." In Dani Rodrik (ed.), *In Search of Prosperity: Analytical Narrative on Economic Growth*, Princeton University Press.

Acemoglu, Daren, Simon Johnson, and James Robinson. 2004. Institutions as the Fundamental Cause of Long-Run Growth," Prepared for the *Handbook of Economic Growth* edited by Philippe Aghion and Steve Durlauf.

Arbelaez, Mario Jaramillo. 2004. "Mining Royalties in Colombia." In *Mining Royalties.* IDRC Report. Canada: Mining Policy Research Initiative, International Development Research Centre.

Baunsgaard, Thomas. 2001. "A Primer on Mineral Taxation." IMF Working Paper 01/139. Washington, DC: International Monetary Fund.

Boschini, Anne D., Jan Pettersson, and Jesper Roine. 2004. "Resource Curse or Not: A Question of Appropriability." Working Paper in Economics 2003:12. Stockholm University.

Collier, Paul, and Anke Hoeffler. 2004. Greed and Grievance in Civil War. *Oxford Economic Papers* 56: 563–595.

Cuddington, John. 1988. "Fiscal Policy in Commodity-Exporting LDCs." Policy, Planning and Research Working Paper WPS 33. Washington, DC: World Bank Group.

Davis, J., R. Ossowski, J. Daniel, and S. Barnett. 2001. "Stabilization and Savings Funds for Nonrenewable Resources." IMF Occasional Paper 205. Washington DC: International Monetary Fund.

Doan, David B. 1999. "The Mineral Industry of Colombia." Washington, DC: US Geological Survey. Available at http://minerals.usgs.gov/minerals/pubs/country/1999/9507099.pdf.

EIA (Energy Information Agency). 1999. "Federal Financial Interventions and Subsidies in Energy Markets 1999: Primary Energy." Report SR/OIAF/1999-03. Washington, DC: EIA Office of Integrated Analysis and Forecasting.

EITI. 2003. "Revised Draft Reporting Guidelines." Extractive Industries Transparency Initiative. May 23.

ESMAP. 2002. "Population, Energy and Environment Program (PEA): Comparative Analysis on the Distribution of Oil Rents." Technical Paper Series 20. Energy Sector Management Assistance Programme. Washington, DC: International Bank for Reconstruction and Development/World Bank Group.

ESMAP. 2005. "Comparative Study on the Distribution of Oil Rents in Bolivia, Colombia, Ecuador and Peru." Report 304/05. Energy Sector Management Assistance Programme. Washington, DC: International Bank for Reconstruction and Development/World Bank Group.

Everhart, Stephen, and Robert Duval-Hernandez. 2001. "Management of Oil Windfalls in Mexico: Historical Experience and Policy Options for the Future." Policy Research Working Paper WPS 2592. Washington, DC: World Bank Group.

Hannesson, Rögnvaldur. 2001. *Investing for Sustainability: The Management of Mineral Wealth.* Norwell, MA: Kluwer Academic Publishers.

Harford, Tim and Michael Klein. 2005. "Aid and the Resource Curse." *Public Policy for the Private Sector*, Note 291. April.

House of Representatives Standing Committee on Aboriginal and Torres Strait Islander Affairs. 1999. *Unlocking the Future: The Report of the Inquiry into the Reeves Review of the Aboriginal Land Rights (Northern Territory) Act 1976*. Canberra: Parliament of the Commonwealth of Australia.

IDRC. 2003. "Mining Companies and Local Development." IDRC Report. Canada: International Development Research Centre.

IMF. 2005. *Guide on Resource Revenue Transparency*. June 2005. Washington, DC: International Monetary Fund.

Isham, Jonathan, Michael Woolcock, Lant H. Pritchett, and Gwen Busby. Forthcoming. "The Varieties of the Resource Experience: Natural Resource Export Structures and the Political Economy of Economic Growth." *World Bank Economic Review*. Washington, DC: World Bank Group.

Katz, Menachem, Ulrich Bartsch, Harinder Malothra, and Milan Cuc. 2004. *Lifting the Oil Curse: Improving Petroleum Revenue Management in Sub-Saharan Africa*. Washington, DC: International Monetary Fund.

Lane and Tornell. 1999. "Voracity and Growth." *American Economic Review*. 89(1): 22-46.

Lange, Glenn-Marie, and Matthew Wright. 2004. "Sustainable Development in Mineral Economies: The Example of Botswana." *Environment and Development Economics* 9: 485–505.

Larstad, Trude, and Dretvik (eds.). 2005. *Facts 2005: The Norwegian Petroleum Sector*. Oslo: Ministry of Petroleum and Energy and Norwegian Petroleum Directorate. Available at http://www.npd.no/NR/rdonlyres/537038C7-8181-4662-995E-F8FAE12919E7/0/Facts2005.pdf.

Leite, C., and M. Weidmann. 1999. "Does Mother Nature Corrupt? Natural Resources, Corruption and Economic Growth." IMF Working Paper 99/85. Washington, DC: International Monetary Fund.

Leith, J. Clark, James Sackey, and David Bruns. 1999. "Botswana: A Case Study of Economic Policy Prudence and Growth." Working Paper 20004. Washington, DC: World Bank Group.

Mansoorian, Arman. 1991. "Resource Discoveries and 'Excessive' External Borrowing." *Economic Journal* 101: 1487–509.

Mathrani, Sunil. 2003. "Evaluation of the World Bank Group's Activities in the Extractive Industries, Background Paper, Papua New Guinea Country Case Study," Operations Evaluation Department, Document 29454. October 21, 2003. Washington, DC: World Bank Group.

Mehlum, Halvor, Karl Moene, and Ragnar Torvik. Forthcoming. "Institutions and the Resource Curse." *Economic Journal*.

Ok Tedi Mining. 2004. *Annual Review.* Available at http://www.oktedi.com/reports/news/52/2004_Review.pdf.

Rodrik, D.A. Subramanian, and F. Trebbi. 2002. "Institutions Rule: The Primacy of Institutions over Integration and Geography in Development." Working Paper No. 9305. Cambridge, MA: National Bureau of Economic Research.

Sachs, J., and A. Warner. 1995. "Natural Resource Abundance and Economic Growth." In G. Meier and J. Rauch (eds.), *Leading Issues in Economic Development*. New York: Oxford University Press.

Sala-i-Martin, Xavier, and Arvind Subramanian. 2003. "Addressing the Natural Resource Curse: and Illustration from Nigeria." Working Paper 9804. Cambridge, MA: National Bureau of Economic Research.

Sarraf, Maria, and Moortaza Jiwanji. 2001. "Beating the Resource Curse: The Case of Botswana." Environment Department Working Paper 83. Environmental Economics Series. Washington, DC: World Bank Group.

Tax Division. 2005. *Spring 2005 Revenue Sources Book: Forecast and Historical Data*. State of Alaska Department of Revenue. http://www.tax.state.ak.us/sourcesbook/2005/spr2005/s05RSBFINAL2.pdf.

Tinker-Salas, Miguel. 2005. "Fueling Concern: The Role of Oil in Venezuela." *Energy* 26(4) Winter. Cambridge, MA: Harvard International Review.

van den Noord, Paul. 2000. "The Tax System in Norway: Past Reforms and Future Challenges." Economics Department Working Paper 244. Paris: Organisation for Economic Co-operation and Development.

Warrack, Allan A., and Russell R. Keddie. 2002. Natural Resource Trust Funds: A Comparison of Alberta and Alaska Resource Funds. Western Centre for Economic Research Bulletin #72, University of Alberta. September.

World Bank Group. 2000. "Project Appraisal Document on Proposed International Bank for Reconstruction and Development Loans in Amounts of US$39.5 Million to the Republic of Chad and US$53.4 Million to the Republic of Cameroon and on Proposed International Finance Corporation Loans in Amounts of US$100 Million in A-Loans and up to US$300 Million in B-Loans to the Tchad Oil Transportation Company, S.A. and Cameroon Oil Transportation Company, S.A. for a Petroleum Development and Pipeline Project." Report by Energy Team/AFC07, Africa Regional Office, World Bank and Oil, Gas and Chemicals, International Finance Corporation. April 13.

———. 2005. "Chad Oil Revenues: Watching How the Money Is Spent." News. June 6. Available at http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:20526926%7EpagePK:34370%7EpiPK:34424%7EtheSitePK:4607,00.html. Accessed 8/18/05.

Appendix

IMF Guide on Revenue Transparency

In its *Guide on Resource Revenue Transparency,* IMF (2005) applies the principles of the earlier *Code of Good Practices on Fiscal Transparency* to resource revenue management. It follows the code structure, highlighting issues and best practices related to resource revenue, addressing 1) clarity of roles and responsibilities; 2) public availability of information; 3) open budgets; and 4) assurances of integrity.

By clarity of roles and responsibilities, the IMF Guide means clear legal frameworks for defining the government's resource ownership rights and the power of a specific entity to grant mineral or hydrocarbon rights and regulate their use. Fiscal and quasi-fiscal arrangements should be disclosed, and complexity and opportunities for official discretion avoided. Cited best practices are 1) standard agreements and terms for exploration, development, and production, though the terms may vary over time; 2) licensing procedures that are clear and open; 3) opening disputes to (international) arbitration; and 4) disclosure of individual agreements and contracts regarding production from a license or contract area.

For awarding licenses, the IMF Guide express a clear preference for open-bid procedures over negotiated deals, which may allow for official discretion. However, negotiated deals may be more common for early stages of resource exploration, in order to tailor risk-sharing aspects. In all cases, signed contracts should be published.

For capturing resource rents, the IMF Guide considers two main measures, aside from direct ownership and production. Tax and royalty systems are the choice for industrialized countries; best practice is to build them onto the existing corporate tax regime. Production-sharing contracts tend to be individually designed, with complex arrangements covering price, production, and cost variability. Transparency would require all of these parameters to be publicly available, just like the tax code. Additional options, such as signature bonuses, can generate revenue early on, but they often come at a cost of preferential tax treatment later. Fiscal stability clauses also pose tradeoffs between investor certainty and policy flexibility, not to

mention administrative ease. The IMF Guide encourages a holistic view of rent capture, with transparency of all taxes, fees, and exemptions.

Where the government is the primary owner of natural resource companies, these commercial responsibilities should be clearly separated from the general government's policy and regulatory operations. At the opposite extreme, in some instances commercial extraction operations are given quasi-fiscal activities, undertaking social or environmental expenditures as part of their concession. The IMF Guide considers such arrangements to impede government transparency by removing some activities—and forgone tax or resource revenues—off the budget. Similarly, the IMF Guide somewhat discourages extrabudgetary funds—such as earmarking portions of resource revenues for development, savings, or environmental reclamation—as introducing complexity and possibly creating dual budget processes. However, given the potential benefits and popularity of these arrangements, it primarily underscores the need for clear missions, independent oversight, and full disclosure.

Subnational jurisdictions pose another challenge for fiscal transparency, which is most easily implemented with a consolidated central budget process. The IMF Guide argues that, since energy-sector policies are typically implemented at the central level, resource tax and expenditure policies should be as well. Meanwhile, transfers can be used to address issues of equity and development priorities. However, overlapping jurisdictions cannot always be avoided. As we see in this report, in some countries—including Canada, the United States, and India—the state-level government retains authority over the resource rights; on Aboriginal lands in Australia and in Papua New Guinea, traditional landowners have the authority, be it explicit or de facto, to veto extraction projects. Therefore, in practice, when multiple stakeholders must be involved in the resource development and rent distribution process, it is difficult to follow all of the strategies for simplicity and transparency.

Extractive Industries Transparency Initiative

The Extractive Industries Transparency Initiative (EITI) is a coalition of governments, companies, civil society groups, investors, and international organizations; it promotes good governance of revenues from extractive industries through greater transparency. EITI has been sponsored by the UK Department for International Development since 2002, and the World

Bank Group also brings to the table its expertise in extractive industries and in promoting transparency.

The "Revised Draft Reporting Guidelines" of EITI (2003) describe reporting of revenue transfers. These voluntary guidelines promote transparency and accountability by reporting not only government revenues received, but also tax and royalty payments made by companies, thus providing a means for verification and identification of inconsistencies.

Currently, several nations are in various stages of implementing EITI processes. They include Azerbaijan, the Republic of Congo, Ghana, Kyrgyz Republic, Nigeria, Sao Tome and Principe, Timor Leste, and Trinidad and Tobago.[36]

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[36] http://www.eitransparency.org/countryupdates.htm (accessed September 6, 2005).

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