

## CHAPTER 9

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# How Mineral-Rich States Can Reduce Inequality

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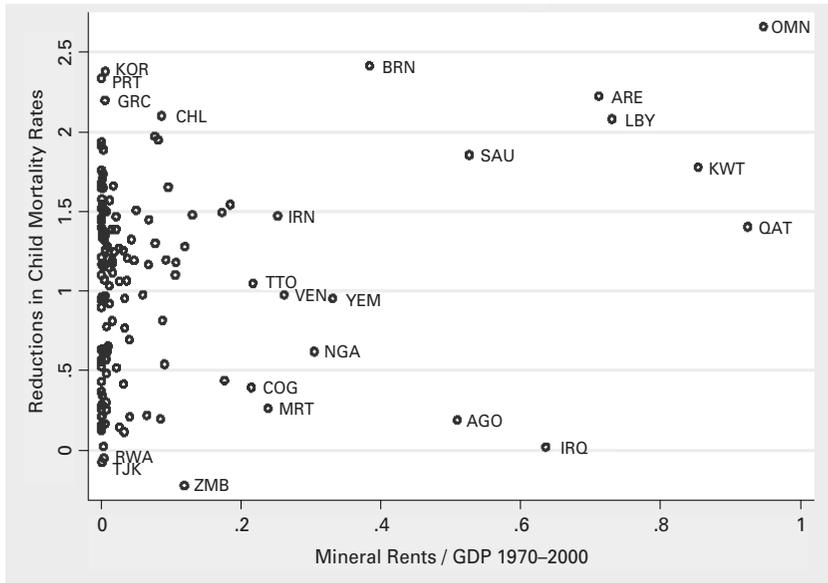
### ABSTRACT

What should governments in mineral-rich states do about the gap between rich and poor populations (vertical inequality), and the gap between mineral-rich and mineral-poor regions (horizontal inequality)? This chapter looks at how mineral wealth can affect vertical and horizontal inequality, and what governments can do about it. It also explores the advantages and disadvantages of the decentralization of mineral revenues, and offers a series of guidelines for states that seek to better manage the distributional problems caused by mineral booms.

### INTRODUCTION

If we use a broad measure of development progress—changes in child mortality rates between 1970 and 2000—we find enormous variation in the performance of oil- and gas-exporting states (figure 9.1). Indeed, oil and gas exporters tend to have *more* varied outcomes than non-exporters: as the dependence of countries on oil, gas, and other mineral exports rises, so does the variation among states in development outcomes. Oil and gas revenues seem to magnify the ability of governments to do both good and bad things for their citizens.

One key to success is managing the impact that mineral rents have on the distribution of income—both the “vertical” (between rich and poor) and the “horizontal” (across regions of a country) distributions of income. Both kinds of inequality can be harmful: high levels of vertical inequality may retard development, and can reduce the poverty-alleviating powers of economic growth (Easterly 2002; World Bank 2001); horizontal



**Figure 9.1** Mineral Wealth and Reductions in Child Mortality, 1970–2000.

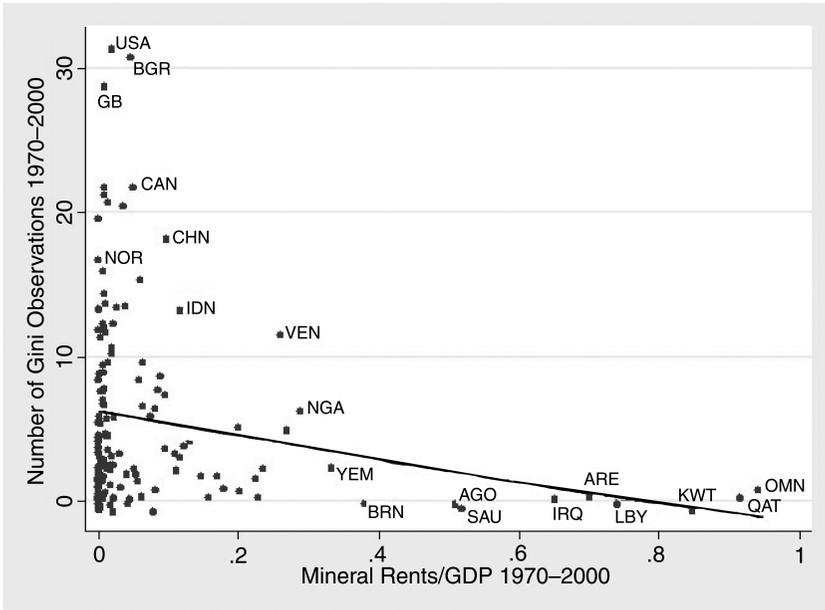
*Note:* The vertical axis measures the difference between (the log of) child mortality in 1970 and (the log of) child mortality in 2000. Higher numbers indicate faster progress in reducing child mortality.

inequality—and sudden changes in horizontal inequality—can lead to violent conflict (Stewart 2000).

Surprisingly little is known about the relationship between mineral wealth and vertical income inequality. If one uses what is perhaps the most common measure of income inequality—the “Gini” coefficient—one finds that a country’s dependence on mineral wealth appears to be uncorrelated with inequality. Resource-rich countries appear to be neither more nor less unequal, on average.

But in fact there are good reasons not to draw strong conclusions from the lack of a simple relationship between inequality and mineral wealth. First, data on income inequality are missing for most of the world’s oil-dependent countries. In fact, as can be seen in figure 9.2, there is a strong *negative* relationship between a country’s dependence on mineral rents and the amount of data we have about its inequality levels.

Second, there are other dimensions of inequality that are not captured by standard inequality data and for which we also lack data—particularly income inequality between groups: such as between rural and urban workers, and between men and women. A great deal of research remains to be done.



**Figure 9.2** Mineral Wealth and Missing Gini Data, 1970-2000.

This chapter discusses what we *do* know about inequality and mineral wealth, and what governments can do to promote better outcomes. The next section discusses the impact of mineral wealth on vertical inequality; it suggests that despite our poor state of knowledge, governments can take certain steps to foster better outcomes. The third section considers the influence of mineral wealth on horizontal inequality, noting that many mineral-rich states are plagued by secessionist movements. The fourth section explores one common approach to horizontal inequality: the decentralization of mineral revenues. It argues that decentralization has many drawbacks, but if it is unavoidable, governments can design policies to minimize these drawbacks. The fifth section discusses research priorities on this topic, and the sixth section concludes.

## VERTICAL INEQUALITY

### THE PROBLEM

Mineral booms have strong effects on the labor force; yet we know little about their ultimate impact on the vertical distribution of income. It may

be useful, however, to describe how mineral booms typically affect the labor force and to highlight some concerns.

A mineral boom can affect the labor force through two mechanisms. The first is the Dutch Disease, described in chapter 1: a sharp rise in mineral exports will typically cause an appreciation in the real exchange rate, which in turn will reduce the international competitiveness of the country's agricultural and manufacturing exports and may reduce employment in these sectors (Corden and Neary 1982; van Wijnbergen 1984). Although governments can do much to offset the effects of the Dutch Disease, too frequently they do not. Nigeria's economy, for example, suffered because of the government's failure to act. A sharp rise in Nigeria's petroleum exports in the 1960s and early 1970s led to an appreciation of the exchange rate. The higher exchange rate made it virtually impossible for firms in the agriculture and manufacturing sectors to sell their goods profitably abroad. Instead of devaluing the currency, the government kept it overvalued, for fear of inflation. The result was that booming oil exports crowded out agriculture and manufacturing exports, and hence, jobs in these sectors.

The shift in exports from agriculture and manufacturing to oil leads to a shift in the sectoral composition of the labor force. Table 9.1 compares the sectoral employment patterns in two countries with large oil sectors (Nigeria and Saudi Arabia) to otherwise similar countries that lack oil (Ghana and Egypt).<sup>1</sup> In both cases we see that the oil exporters have considerably lower employment in agriculture relative to services.

Even though this sectoral shift is well understood by economists, it is unclear how it affects the distribution of income. In theory, the impact on employment levels should be neutral: if workers can easily move from one sector to another—for example, from agriculture to construction—then the sectoral shift could have modest effects on income distribution.

**Table 9.1** Employment by Sector in Selected Countries

	Agriculture	Industry	Services
<i>Middle East/North African Comparison</i>			
Egypt (1995)	34	21.9	44.1
Saudi Arabia (1990)	19.2	19.8	61
<i>West African Comparison</i>			
Ghana (1990)	62.2	10.1	27.9
Nigeria (1995)	2.9	22	75.1

Source: World Development Indicators (online; accessed July 8, 2005).

If there are limits on intersectoral labor mobility, however—meaning some types of workers in agriculture and manufacturing are unable to move into services—it could cause a rise in unemployment for these types and a shift in income distribution. This could affect the distribution of income between men and women: if there is a shift away from sectors where women have good job opportunities (manufacturing) to ones where they have poor or no job opportunities (construction), then gender inequality may rise. Similar problems could arise for older workers, low-skill workers, and rural dwellers.

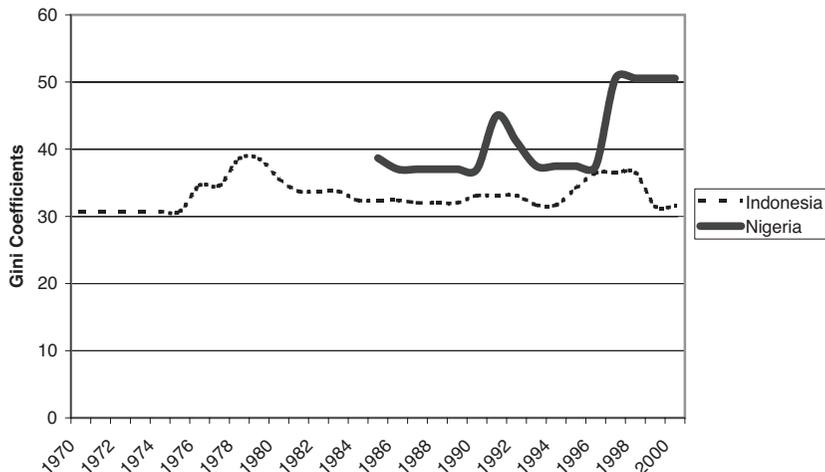
Mineral booms have a second effect on the labor force, by generating new government jobs that are funded from mineral revenues; this may have important consequences for income distribution. There is some evidence that inequality is lower in countries where a larger fraction of the labor force is employed by the government, since governments tend to compress the wages of their employees (Milanović 2001). If this is true, an oil boom may reduce inequality—at least in the middle quintiles of the income distribution—although policies intended to prevent a bloating of governments will attenuate this effect.

#### THE RESPONSES

It is difficult to predict how oil revenues will change the vertical distribution of income for any given country. Yet if the revenues have a strong impact, the social and economic consequences could be far reaching. A first implication is that any country that anticipates a substantial increase in oil and gas revenues should commission research on how growth in the oil and gas sector will affect the distribution of income. Failing to anticipate these effects will likely make it more difficult to respond to growing inequality when it occurs.

If research suggests that oil revenues will widen the gap between rich and poor, governments can take three types of measures: first, they can try to offset the hardships in the agriculture and manufacturing sectors by promoting productivity and export growth; second, they can provide new government jobs to displaced workers in these sectors; and third, they can adopt targeted pro-poor policies.

Indonesia's strategies offer a good illustration, and provide a sharp contrast to Nigeria's policies. In the 1960s and 1970s, the Indonesian government adopted many programs targeted toward the poor, including universal primary education, price controls on food and kerosene, and rural public



**Figure 9.3** Inequality in Nigeria and Indonesia, 1970–2000.

works projects; the Nigerian government did nothing comparable. The Indonesian government also took measures to enhance agricultural production and to devalue the exchange rate, allowing exports to remain competitive and avoiding the collapse in agricultural exports that hurt the rural poor in Nigeria. Finally, Indonesia's exchange rate policies, and pro-export regulatory stance, led to sustained growth in Indonesia's manufacturing sector, unlike Nigeria's manufacturing sector, which declined sharply in the 1980s (Bevan et al. 1999). These policies helped Indonesia's gini coefficient remain low and stable between 1970 and 2000, while Nigeria's gini coefficient jumped by about one-third (figure 9.3).

#### FOCUS ON DIRECT DISTRIBUTION

Another way to promote equity is to dispense mining revenues directly to citizens, in the form of a cash payment. A uniform transfer to all citizens acts like a progressive tax (or more accurately a negative regressive tax) and produces a decline in the rich to poor income ratio and in this way reduces the level of vertical inequality.

Direct distribution arrangements are used in both the U.S. state of Alaska and the Canadian province of Alberta. The older of these—the Alaska Permanent Fund—has been in place since 1977 and is widely

perceived as a success (although see also the discussions in chapters 7, 8, and 11). The Fund receives about 10 percent of the state's income from oil and annually distributes a share of the accrued interest to all citizens—both adults and children—as a dividend. Dividends fluctuate in size depending on the Fund's performance; since the first year of dividends, they have ranged from \$526 to \$2106 (2004 constant dollars). The Fund is managed by an independent corporation that invests the principal in stocks, bonds, and real estate, and whose mandate is to maximize earnings—not to invest in local development. It has grown so popular that politicians “virtually fall over one another to demonstrate to the public their efforts to defend the program” (Goldsmith 2001, 5).

Several recent articles have argued that other countries—notably Iraq—should adopt direct distribution plans (see, e.g., Birdsall and Subramanian 2004; Palley 2003; Sandbu 2006).<sup>2</sup> Advocates suggest such a plan would:

- distribute oil rents equitably;
- do a better job than the government of allocating rents in optimal ways;
- keep at least part of the state's oil revenues out of the hands of politicians, and hence reduce corruption, rent-seeking, and government inefficiency;
- create a second-best mechanism for hedging against price volatility;
- give citizens a more direct stake in the government's management of oil revenues, and hence force it to become less corrupt and more accountable;
- deepen financial systems in countries where they are weak; and
- become a powerful tool for achieving social goals if the distribution is made conditional on certain practices—such as immunizing children, or enrolling them in school.

There are, however, reasons to be skeptical about whether a direct distribution fund would work well in a developing country. Governments in developing states tend to be less bound by the rule of law, have less institutional stability, and are more susceptible to rent-seeking and corruption than in the advanced industrialized states.<sup>3</sup> A direct distribution plan would work only if it were managed in ways that are uncharacteristic of most oil-rich developing country governments: with strict adherence to the law, intertemporal stability, and immunity from political and rent-seeking

pressures.<sup>4</sup> For many years, developing states have established other types of specialized commodity funds (for savings or stabilization); in general, these funds have not functioned well (Davis et al. 2001; Ross 2001; see also chapter 8, this volume).

Since the distributions would take the form of rents, a direct distribution plan could also encourage several types of rent-seeking. One danger could be rent-seeking through migration: new immigrants might enter the country until the rents available are largely dissipated.<sup>5</sup> Another problem could be the growth of coercive rent-seeking organizations at the local level, such as protection rackets, shakedown operations by the police or military, for-profit rebel armies, and similar mafia-type associations.

There may be other drawbacks to having a direct distribution plan:

- It could create a parallel budget with its own revenues and disbursements, which would complicate fiscal policies.
- It may not be viable in countries that lack well-developed financial systems, where people lack the ability to manage large infusions of cash.
- It may be complex to administer, since it requires the state to maintain a large, reliable database of all of its citizens. While many states keep citizen lists for voting, people would have a much larger incentive to fraudulently manipulate a direct distribution list.
- It is unclear how it would affect regional grievances, since those who live closer to the mineral's source would be likely to demand a larger share of the funds.

If direct distribution functioned well, it would certainly allocate mineral rents in an equitable way. But there are reasons why it might not work well, and governments should proceed with caution when considering this option. States that adopt direct distribution plans should be ready to avert fraud and rent-seeking, and may wish to consider using the distributions to encourage social goals such as child immunization and school enrollment.

## HORIZONTAL INEQUALITY

### THE PROBLEM

If the mineral-producing region is onshore, and concentrated in one or several parts of the country, a booming mineral sector may affect the geographical distribution of income.

The strength of this effect depends on four factors:

1. Initial incomes in the extractive region: if the region is poor, mineral wealth can help close any gap with the rest of the country; if it is relatively rich, it can widen the gap.
2. The difference between growth in the minerals sector and growth in the non-minerals sector.
3. The strength of linkages between the minerals sector and other economic activities.
4. The ability of the subnational government to capture income from the minerals sector.

If the mine operates as an enclave, and the regional government has no taxing authority, then a booming minerals sector may have little or no impact on the region's living standards. But if the extractive sector is well linked to the local economy, or the local government can tax minerals revenues directly or indirectly, a minerals boom can sharply boost employment and wages in the region.<sup>6</sup>

While a rise in the region's *actual* incomes may be good, a disproportionate rise in *expected* incomes may pose problems. People are dissatisfied with their income—no matter how large it is—if it falls short of their aspirations (Frey and Stützer 2002). A large gap between real and expected incomes can lead to political and social unrest. This is a special danger in regions that are geographically peripheral, have little influence over the central government, and are populated by citizens with a distinct ethnic or religious identity. In these cases, discoveries can lead to a rise in frustrations due to rising expectations even if there are no measurable adverse effects on income distribution.

Many recent econometric studies find a correlation between the production (or export) of oil and the risk of civil war.<sup>7</sup> Table 9.2 lists 10 cases of violent separatist movements in regions with significant oil, gas, or other mineral wealth. Although none of the movements were caused solely by mineral wealth, in each case separatists appeared to believe that mineral revenues would raise the benefits, or lower the costs, of independence. As Collier and Hoeffler (2002) suggest, the “allure of claiming ownership of a natural resource discovery” can encourage populations in peripheral regions to favor independence. The economic and social costs that result from such civil conflicts are extremely large; governments can avoid these costs by responding quickly to any rise in horizontal inequality.

**Table 9.2** Oil/Mineral Resources and Secessionist Movements

Country	Region	Duration	Mineral Resources
Angola	Cabinda	1975–2002	Oil
Congo, Dem. Rep	Katanga/Shaba	1960–65	Copper
Indonesia	West Papua	1969–	Copper, gold
Indonesia	Aceh	1975–	Natural gas
Morocco	West Sahara	1975–88	Phosphates, oil
Myanmar	Hill tribes	1983–95	Tin, gems
Nigeria	Biafra	1967–70	Oil
Papua New Guinea	Bougainville	1988–97	Copper, gold
Sudan	South	1983–	Oil
Yemen	East and South	1994	Oil

## THE RESPONSES

Changes in horizontal inequalities are easier to anticipate than changes in vertical inequality. Direct distribution, discussed in the preceding text, can also reduce horizontal inequality. Another strategy to offset any expected jump in regional inequality is to decentralize mineral revenues. I discuss this option in a separate section below.

Besides decentralization and direct distribution, governments can do much to narrow the gap between actual and expected incomes in the mineral-rich region. Options include:

- Giving mineral companies incentives to hire local workers and to purchase local products as part of their licensing agreement.
- Restricting the migration of workers into the extractive region. Resource booms often attract low-wage laborers from other parts of the country, or from other countries. Their presence can reduce the number of jobs for local peoples and introduce social tensions. In some countries, such as Indonesia and Papua New Guinea, tensions between locals and migrants around mining projects helped spark or accelerate separatist movements. Limiting migration—perhaps temporarily—can avert these tensions and raise the benefits of mineral extraction for local peoples.<sup>8</sup>
- Encouraging mineral firms to invest in local development. In southern Venezuela, for example, Placer Dome has allocated part of its concession to local, artisanal miners, and helped train them in mining techniques and business management. In the Philippines, WMC has helped indigenous communities gain official recognition from the government, so they can obtain royalty payments

and legal protection for their ancestral lands (for a more detailed treatment of such initiatives, see Switzer 2001).

- Encouraging nongovernmental organizations (NGOs) to mediate between local peoples and mineral firms. There is often a sharp divide between local citizens, who have complaints about the environmental, social, and economic consequences of mineral extraction, and large foreign firms, who have little understanding of local concerns and conditions. NGOs that specialize in environmental protection, social justice, and labor rights can help bridge this gap: they can help administer local development programs that are funded with mining revenues; monitor the activities of firms, government, and other actors; convene adversarial parties, making them more transparent and accountable; and provide early warnings about impending conflicts.
- Promoting full transparency for all mining revenues. Local peoples may develop inaccurate beliefs about the size and distribution of mining revenues when they lack accurate information, or when the government lacks credibility. In Aceh, Indonesia, the rebel movement fostered the widespread belief that if the region became independent, citizens would be 20 times richer—a wild exaggeration, but one that worked well for the rebel group. Had the government's revenue figures for Aceh been more transparent, and credible, citizens would have been less susceptible to this propaganda. Transparency would also reduce corruption and improve people's confidence that mineral revenues were not being squandered.

Finally, distributional issues are more likely to ignite violence when police or military forces engage in predatory behavior. Mineral projects often attract police, military, and paramilitary organizations that use extortion to gain a share of the available rents, either directly from the extractive firm and its contractors, or indirectly from the people who work for them. In some cases, military units have staged or facilitated attacks on mining firms in order to extort funds.<sup>9</sup> Local populations understandably resent such predatory behavior, which helps widen the rift between their actual and expected incomes from mining.

Both governments and firms can help curtail these activities. A recent project by BP in West Papua, Indonesia, has used innovative techniques to minimize the gap between real and expected incomes, and avoid predation

by the Indonesian military. These include holding extensive consultations with local communities and NGOs since the early days of the project; developing a relocation agreement with a small village, which included plans for local hiring, restrictions on in-migration, sustainable economic development, cultural preservation, and biodiversity conservation; insisting that Indonesian security forces remain away from the project area, and creating instead a community-based security force; and agreeing to independent evaluations of its operation, which helps make its promises to the community more credible.

#### DECENTRALIZING REVENUES

Another response to risks of rising horizontal inequality is to divide mineral revenues between central and subnational governments. Indeed, there now appears to be a global trend toward the decentralization of petroleum and other mineral rents (Brosio 2003). While these arrangements may look like an easy way to manage regional tensions over mineral rents, they have serious drawbacks.

Most of the oil-rich countries in the Middle East are unitary states and have fully centralized revenue systems.<sup>10</sup> Outside the Middle East, however, many oil exporters divide mineral rents between central and subnational governments, regardless of whether they are unitary states (Colombia, Ecuador, Kazakhstan) or federal states (Mexico, Nigeria, Russia, Venezuela, and Indonesia<sup>11</sup>) (Ahmad and Mottu 2003).

There are three ways that subnational governments may receive mineral revenues: they may levy taxes directly on the mineral industry; they may receive direct transfers of a share of the central government's mineral revenues, based on some formula; and they may receive indirect transfers from the central government, once the revenues have been smoothed and allocated according to the national budgeting process. The first two approaches in particular—subnational taxing authority over minerals, and direct transfers of mineral revenues—have serious drawbacks:

- Since central governments have more diversified revenue bases than subnational governments, they are better insulated from the effects of mineral revenue volatility.
- The capacity of any subnational region to efficiently absorb new investments from windfall spending will be less than the national capacity to do so.

- Central governments are better able to implement countercyclical fiscal policies—that is, to expand the economy during a recession, or contract it when inflation becomes too high.
- While fiscal discipline is a problem for most central governments, the problem is often worse at the subnational level.<sup>12</sup>
- Allowing subnational governments to impose taxes creates special problems:
  - Subnational governments have less ability to administer complex types of taxes, and to tax large foreign firms, than central governments.
  - When subnational governments impose their own taxes or royalties, they may create inefficiencies by overlapping with national levies.

Subnational governments are clearly entitled to revenues that compensate them for the social, environmental, and infrastructure costs of oil and gas extraction. But beyond these, the arguments in favor of subnational petroleum taxes are political. Local governments find oil and gas taxes attractive, because they are taxing an immobile asset, and the costs are typically borne by those who reside in other jurisdictions. Regional governments often claim ownership of these resources, and may threaten secession if they get less than they seek. Moreover, the constitution may give them the right to levy certain kinds of taxes within their jurisdictions.

Ahmad and Mottu (2003) argue that the first-best arrangement is full centralization of all oil revenue, with carefully designed transfers to subnational governments. Recognizing that this is often politically untenable, their second-best recommendation is to allow subnational governments to levy relatively small, stable types of petroleum taxes—such as production excise taxes—while the national government levies taxes and royalties that capture the more volatile forms of revenue. They also suggest any subnational petroleum taxes be supplemented by more stable revenue sources. They prefer this to revenue-sharing arrangements, which they fear will allow subnational governments to avoid accountability, complicate the central government's macroeconomic planning, and fail to provide subnational governments with stable financing for local public services.

While Brosio (2003) agrees that full centralization is the first-best solution, he favors a revenue-sharing arrangement as the second-best alternative.

He argues that the process of collecting and administering taxes is too complex for most subnational governments to carry out, at least in developing states; that it makes it harder to equalize revenues across subnational jurisdictions; and that it impinges on national energy policies.

The case for giving subnational governments taxing authority, or a direct share of mineral revenues, would be strengthened if there was evidence that these measures could help avert secessionist movements. No systematic analyses have been done, however, leaving the issue unclear. On the one hand, bargaining with subnational governments can be an arduous process: the division of oil revenues is a zero-sum game in which every state and local government wants as much as it can get, and there is no magic allocation formula that everyone will think is just. On the other hand, revenue-sharing arrangements have sometimes been important components of broader policies to reduce secessionist pressures in resource-rich regions—for example, in Indonesia.

Local and regional governments should be compensated for the costs they bear when mineral extraction occurs in their jurisdiction. Local and indigenous peoples, who live on the land where extraction takes place, deserve special accommodations—beginning with their full recognition as stakeholders whose concerns must be addressed before any new project begins.<sup>13</sup> But giving subnational governments either the authority to levy mineral taxes or a fixed share of the nation's oil revenues should be avoided whenever possible. The best approach is for governments to collect revenues centrally, and make allocation decisions centrally, but with input from local and regional authorities.

If such an arrangement is unobtainable, the government should try to adopt a revenue system that

- minimizes the volatility of subnational revenues;
- minimizes any inefficiencies created by overlapping tax bases;
- does not exacerbate preexisting regional inequalities;
- encourages or requires subnational governments to coordinate their fiscal policies with the central government;
- encourages subnational governments to use any oil revenues to complement, not substitute for, their existing tax base;
- is accompanied by expenditure responsibilities, so that the added revenues are targeted toward some type of public good;
- is based on a formula that is stable over time, so that the issue of revenue or tax sharing will not be constantly revisited;

- is fully transparent and regularly audited; and
- does not encourage citizens to create new subnational jurisdictions in order to collect the rents provided by the central government.

### RESEARCH PRIORITIES

There is much we do not know about inequality in mineral-rich developing states. Future research in this area could address five questions:

1. *How does mineral wealth influence vertical inequality?* Data on income inequality are almost nonexistent for mineral-rich countries. Finding ways to measure inequality in these countries would give us a better idea of the general relationship between mineral wealth and income inequality. Equally valuable would be studies that track the distribution of income over time in countries undergoing a mineral boom. To understand the links between mineral wealth and income inequality, gaining this baseline data is critical.

2. *Are there significant constraints on intersectoral mobility for certain groups in mineral-rich countries?* If certain groups—such as women, older workers, rural workers, or low-income workers—are less able to move from the tradable to the nontradable sector when an economy is faced with the Dutch Disease, then mineral booms will have important distributional consequences. It will also open the door to government remediation. There has been little or no research on this issue.

3. *What strategies have mitigated horizontal inequalities when a mining boom has strong local effects?* There are many cases of secessionist movements in minerals-rich regions; yet there are other countries where no such conflicts occur, even though the preconditions exist.<sup>14</sup> Careful studies of these successful cases may provide us with clues about ways that states can avert regional conflicts over mineral rents.

4. *How and why have decentralization strategies in mineral-rich states varied in their effectiveness?* Even though decentralization has many drawbacks, states continue to decentralize their mineral revenues. The more we know about these experiments, the more we can help governments improve outcomes. Studies that compare successful and unsuccessful decentralizers would be valuable, as would studies that compare regional outcomes in decentralizing states. It may be especially fruitful to study states (such as Indonesia) that have decentralized and have multiple mineral-rich regions, so we can observe variation in outcomes between these regions.

5. *What are the conditions under which direct distribution is most likely to work?* Direct distribution plans have only been implemented in wealthy states. Yet if there continues to be interest in these plans, it would be valuable to have a more precise theory about the conditions under which they are most likely to produce success.

### CONCLUSION

Despite some claims to the contrary, in fact surprisingly little is known about the links between mineral wealth and vertical inequality. Many observers assume that mineral rents—in the presence of weak institutions—increase the gap between rich and poor. Yet it is possible that the opposite is true: growth in the government sector may lead to wage compression and less inequality. The data and analyses we have at the moment are just not good enough to tell us which scenario is more likely.

At a minimum, states facing mineral booms should focus their attention on the problem of vertical inequality, and pay special attention to the ability of workers to move from the “tradable” sector (typically agriculture and manufacturing) into the “nontradable” sector (generally services). If an intersectoral shift will leave behind certain groups—such as women, low-income workers, rural workers, and older workers—the government should consider countermeasures. Apart from equity considerations, governments should also adopt policies that can help prevent the economy from growing excessively dependent on a single commodity, including prudent exchange-rate policies, and measures to boost productivity and competitiveness in the manufacturing and agricultural sectors.

We have a much clearer picture about horizontal inequality. Mineral booms tend to exacerbate regional inequalities under certain conditions: when the extractive region was initially wealthy; when growth in the minerals sector outpaces growth in other sectors; when the minerals sector has strong forward or backward linkages to the local economy; and when the regional government can directly or indirectly tax mineral incomes. It can be especially destabilizing when, in the extractive regions, expected changes in income outpace real changes in income.

States have a large toolkit for addressing these problems. Unfortunately, one of the most common approaches—decentralizing mineral revenues—has many drawbacks, and should only be done when it is politi-

cally unavoidable. A second approach, the Alaska-type direct distribution plan, has not been tried in a developing state, where institutions tend to be weak. If successful, it would allocate mineral revenues in an admirably equitable way; if unsuccessful, it could promote widespread rent-seeking and fraud.

A less risky approach would be to adopt policies that narrow the income gap between the extractive region and the rest of the country, and, within the extractive region, policies that reduce the gap between real and expected incomes. These measures include full revenue transparency, promoting good corporate citizenship, restricting migration to the extractive region, fostering the role of NGOs, and curtailing predation by security forces.

#### NOTES

1. Note that under the ILO definition used by the World Bank, not all people working in a sector are considered “employed”; rather, in the definition used by these institutions, “[e]mployees are people who work for a public or private employer and receive remuneration in wages, salary, commission, tips, piece rates, or pay in kind.”

2. Sandbu (2006) suggests a unique arrangement, whereby the government would distribute oil rents and simultaneously tax back a fraction of them.

3. Even in Alaska, the Permanent Fund has not been fully protected by the rule of law: since the early 1990s, the state legislature has used deficit spending to gain access to the Fund’s revenues (Goldsmith 2001).

4. Several studies argue that when developing states have large rents available, their political leadership becomes subject to a type of adverse selection: the politicians most likely to gain office are the ones most willing and able to seize these rents and deploy them for political gain (Collier and Hoeffler 2005; Ross 2001). Hence even if such a fund were established under a wise government, it would create an incentive for more opportunistic leadership.

5. This does not occur in Alaska, for two reasons: the annual payment accounts for about six percent of total household income, meaning that the rents are fairly small; and the costs of migrating to Alaska—due to its harsh winter and physical isolation—are fairly large.

6. I am assuming that the local labor supply is not perfectly elastic.

7. See Buhaug and Rod (2005), Fearon (2004), Humphreys (2005), and Ross (2004).

8. Of course, restricting migration to a booming region may also have harmful effects that must be weighed against these benefits: it could reduce job growth (while raising wages) in the extractive region; if the region is relatively wealthy, it could heighten geographical inequalities; and if done without due consideration, it could exacerbate regional tensions. Still, under some conditions it may be a useful policy tool.

9. See, for example, “US Mining Company’s Payments to Indonesia Trigger Probe,” *New York Times*, January 18, 2006.

10. The United Arab Emirates is a notable exception.

11. Indonesia is a unitary state that has recently decentralized, and now bears many of the features of a federal state.

12. On these points, see Ahmad and Mottu (2003), Bahl (2001), Brosio (2003), and McLure (2003).

13. The World Bank, the International Council on Metals and Mining, and ES-MAP have recently developed a “Community Development Toolkit” to help firms and governments assess and respond to the needs of affected communities in extractive regions. It is available at [http://www.icmm.com/library\\_pub\\_detail.php?rcd=183](http://www.icmm.com/library_pub_detail.php?rcd=183)?

14. Malaysia—where there is substantial oil wealth off the coasts of the remote, ethnically distinct states of Sabah and Sarawak—is one example.

#### REFERENCES

- Ahmad, E. and E. Mottu. 2003. “Oil Revenue Assignments: Country Experiences and Issues.” In *Fiscal Policy Formulation and Implementation in Oil-Producing Countries*, J. Davis, R. Ossowski, and A. Fedelino, eds. Washington, DC: International Monetary Fund, pp. 216–42.
- Bahl, R. 2001. “Equitable Vertical Sharing and Decentralizing Government Finance in South Africa.” *International Studies Program Working Paper Series*. Atlanta.
- Bevan, D. L., P. Collier, and J. W. Gunning. 1999. *Nigeria and Indonesia*. New York: Oxford University Press.
- Birdsall, N. and A. Subramanian. 2004. “Saving Iraq from Its Oil.” *Foreign Affairs* 83(4): 77–89.
- Brosio, G. 2003. “Oil Revenue and Fiscal Federalism.” In *Fiscal Policy Formulation and Implementation in Oil-Producing Countries*, J. Davis, R. Ossowski, and A. Fedelino, eds. Washington, DC: International Monetary Fund, pp. 243–72.
- Buhaug, H. and J. K. Rod. 2005. “Local Determinants of African Civil Wars, 1970–2001.” Working Paper. The Norwegian University of Science and Technology (NTNU), and the International Peace Research Institute, Oslo (PRIO).
- Collier, P. and A. Hoeffler. 2002. “The Political Economy of Secession.” 23 December. Available online at <http://users.ox.ac.uk/~ballo144/self-det.pdf>.
- Collier, P. and A. Hoeffler. 2005. “Democracy and Resource Rents.” ESRC Working Paper.
- Corden, W. M. and P. J. Neary. 1982. “Booming Sector and De-industrialization in a Small Open Economy.” *The Economic Journal* 92: 825–48.
- Davis, J., R. Ossowski, J. Daniel, and S. Barnett. 2001. “Oil Funds: Problems Posing as Solutions?” *Finance and Development* 38(4): 56–59.
- Easterly, W. 2002. *Inequality Does Cause Underdevelopment*. Washington, DC: Center for Global Development.
- Fearon, J. D. 2005. “Primary Commodities and Civil War.” *Journal of Conflict Resolution* 49(4): 483–507.

- Frey, B. S. and Stützer, A. 2002. *Happiness and Economics: How the Economy and Institutions Affect Well-Being*. Princeton: Princeton University Press.
- Goldsmith, S. 2001. "The Alaska Permanent Fund Dividend Program." Working Paper. University of Alberta, Edmonton, Alberta.
- Humphreys, M. 2005. "Natural Resources, Conflict, and Conflict Resolution: Uncovering the Mechanisms." *Journal of Conflict Resolution* 49(4): 508–37.
- McLure, C. E. 2003. "The Assignment of Oil Tax Revenue." In *Fiscal Policy Formulation and Implementation in Oil-Producing Countries*, J. Davis, R. Ossowski, and A. Fedelino, eds. Washington, DC: International Monetary Fund, pp. 204–15.
- Milanovic, B. 2001. "Determinants of Cross-Country Income Inequality: An 'Augmented' Kuznets Hypothesis." *World Bank Policy Research Working Papers*.
- Palley, T. 2003. "Combating the Natural Resource Curse with Citizen Revenue Distribution Funds." *Foreign Policy in Focus* (December): 1–12.
- Ross, M. L. 2001. *Timber Booms and Institutional Breakdown in Southeast Asia*. New York: Cambridge University Press.
- Ross, M. 2004. "What Do We Know About Natural Resources and Civil War?" *Journal of Peace Research* 41: 337–56.
- Sandbu, M. E. 2006. "Taxable Resource Revenue Distributions: A Proposal for Alleviating the Natural Resource Curse." *World Development* 34(7): 1153–70.
- Switzer, J. 2001. "Armed Conflict and Natural Resources: The Case of the Minerals Sector." London: International Institute for Environment and Development.
- van Wijnbergen, S. 1984. "The 'Dutch Disease': A Disease After All?" *The Economic Journal* 94: 41–55.
- World Bank. 2001. *World Development Report 2000/2001: Attacking Poverty*. New York: World Bank and Oxford University Press.